Corporate Governance and Profit Shifting: The Role of the Audit Committee

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Abstract

We examine tax-motivated profit shifting as the outcome of corporate governance characteristics in multinational enterprises (MNEs). We propose a novel subsidiary-year measure of profit shifting, estimated from the responses of subsidiary profits to exogenous parent earnings shocks. Subsequently, we hypothesize that audit committee size and experience, as well as CEO duality are key factors affecting profit shifting. Our baseline results show that increasing audit committee size by one standard deviation increases profit shifting by an economically significant 7.8%. We also find that this positive effect reverses for MNEs with higher numbers of audit committee members who have audit expertise and for MNEs without CEO duality.

Keywords: Corporate governance; Profit shifting; Audit committee; Directors' experience; CEO duality
JEL classification: F23, H25, H26; H32, M41

1. Introduction

For multinational enterprises (MNEs), tax-motivated profit shifting involves moving profits from high-tax jurisdictions to low-tax jurisdictions in order to increase after-tax income. Economic globalization intensifies this practice, triggering governments and international organizations to contain it via increased efforts and policies (mostly the OECD/G20 Inclusive Framework on Base Erosion and Profit Shifting, or BEPS; OECD, 2019). Extant research focuses on external and country-specific factors affecting MNE profit shifting, but we know little about the intrafirm decision processes that lead to more profit shifting.[1]

In this study, we examine the relation between corporate governance and profit shifting. We focus on corporate governance characteristics that are theoretically more closely related to profit-shifting decisions and have clear empirical implications. We build three testable hypotheses. First is that the audit committee's role in influencing an MNE's tax-planning strategies and monitoring its compliance with international tax law and regulation is of key importance in profit shifting decisions. By regulation, audit committees are composed almost entirely of independent non-executive directors (INEDs) with a view to improve accounting quality, legal compliance and risk management. By synthesizing the views and expertise of many INEDs, a large audit committee might better improve monitoring. These dynamics might be especially true for large MNEs with many subsidiaries in different countries that have different tax laws and regulations. If the monitoring role of the board is positively associated with the committee's size, MNEs with large audit committees will conduct less profit shifting.

However, established literature links large audit committees to inefficient monitoring (e.g., Vafeas, 1999; Aldamen et al., 2012). There are two key reasons. First, large audit committees might be the result of agency problems between the audit committee and the MNE executives. Specifically, MNEs might appoint many audit committee members precisely to encourage free riders within the committee and reduce the screening of management's decisions. Second, and related, large audit committees might face agency problems within its members, given that large committees are linked to capture by those members with

[1] See, for example, Klassen and Laplante (2012a, b), Klassen et al. (2014), Dyreng et al. (2016), Dyreng and Markle (2016), Markle (2016), De Simone (2016), De Simone et al. (2021), and Delis et al. (2020).

relevant expertise. In addition to the monitoring role of the audit committee, more audit committee members with unique knowledge of the subsidiaries' tax jurisdictions may support more income shifting (advisory role of the audit committee). Therefore, reduced monitoring and stronger advice can lead to more profit shifting (including what the OECD refers to as base erosion).

A second hypothesis we test is on the relation between the functional expertise of the audit committee members and profit shifting. Noting that experienced auditors are fully aware of the increased international stringency among regulators toward profit shifting, they might place more weight on their own reputational costs. For example, Dyreng et al. (2016) find reputational losses due to more profit shifting, irrespective of whether the practices are illegal (Starbucks is a well-known case). Members of the audit committee who have deeper knowledge of profit-shifting practices at other MNEs and awareness of the increasing number of relevant legal cases might also be more risk-averse. This would be especially true given that auditors are independent directors and thus more immune to control by CEOs or other directors. Based on these considerations, we hypothesize that when the number of MNE audit committee members with audit experience increases, MNEs either directly limit profit shifting, or enhance the negative effect of audit committee size or moderate the positive effect of audit committee size.

The third key corporate governance characteristic that potentially affects profit shifting is board independence in general and CEO duality in particular. CEO duality (i.e., the CEO is also the chairman of the board) is widely considered as a key element blurring sound corporate governance and board independence (e.g., Jensen and Meckling, 1976), and it heavily contributes to many renowned accounting scandals (e.g., Enron). The CEO, by being the firm's ultimate decision maker and with augmented roles as board chair, might champion profit-shifting strategies to engage in rent extraction, for example (Desai et al. 2007). Thus, our third hypothesis notes that CEO duality might overcome the "hurdles" of an independent and experienced audit committee, thus increasing profit shifting.

We test these hypotheses using *Orbis* and *BoardEx* data for MNEs with parent companies in the United States over the period 2008-2017. *Orbis* provides accounting data for corporations worldwide, detailed information on their ownership structure, and the links between parent companies and subsidiaries.

BoardEx collects biographical information on executives and board members of U.S. public companies, including relevant information on audit committees and CEO duality.

We conduct our empirical analysis in two stages. We first estimate the level of profit shifting at the subsidiary-year level, building on the differences-in-differences (DID) model in Dharmapala and Riedel (2013). This model identifies profit shifting by exploiting external earnings shocks at firms that are comparable to the parent firm. To improve the shocks' exogeneity to the MNE's own profitability, we restrict the analysis to subsidiaries in different industries and countries than their parent companies.

Our contribution is to estimate this model semiparametrically (or nonparametrically), which allows deriving coefficient estimates (slopes) on the DID component by subsidiary and year. For these estimations, we use firm-level data from all available countries (not only for the U.S.-based MNEs), which is important for two reasons. First, we eliminate the curse of dimensionality, a problem related to not having dense observations when estimating nonparametric models. Second, using only U.S. multinational firms results in using firms whose parents almost always have higher tax rates than their subsidiaries and this imposes a strong (and unwanted) restriction on our results.

The estimates from this exercise are our subsidiary-year measure of profit shifting. To our knowledge, this is the first subsidiary-year measure of profit shifting in the literature. Further, given that the earnings shocks are independent of the specific parent firms' managerial processes (they are instrumented by shocks to firms other than the parent), our profit shifting measure is also independent of the well-known selection problem in corporate governance (i.e., firm profitability jointly leads to profit shifting and board characteristics, or firm profits results in specific corporate governance characteristics).

In the second stage, we examine how parents' corporate governance characteristics affect firm-year profit shifting. Our preferred model (with the most stringent set of controls and fixed effects) predicts that the key variable directly affecting profit shifting is audit committee size. We find that decreasing audit committee size by one standard deviation (having 1.1 fewer directors) yields a decrease in profit shifting of an economically significant 7.8%. This result is robust to different controls, fixed effects, and assumptions in the profit-shifting estimations. This result is also robust to an instrumental variables (IV) model, using

the number of retirements or deaths in audit committees as an exogenous instrument, as well as to models exploiting interesting cross-sectional characteristics in which we expect a differential association between the audit committee size and profit shifting (asset tangibility, firms' effective tax rates, and size of foreign subsidiaries network). While we conduct many identification tests, we acknowledge that there may still be other unobserved firm traits that jointly lead to board characteristics and income shifting behavior.

Importantly, we find that audit committee experience moderates the positive effect of audit committee size on profit shifting. In our sample, only about 20% of the average MNE's directors have functional audit experience. According to our estimates, raising this number lowers the positive effect of audit committee size on profit shifting, and at an approximately 50% ratio, the effect of size is eliminated. Moreover, by conducting separate estimations on subsamples of MNEs with high ratios of directors with audit expertise (the top quartile) and those with lower such ratios (the remainder three quartiles), we find that the effect of audit committee size is positive and significant only in the latter subsample.

Similar findings prevail when examining the heterogeneous effect of audit committee size on profit shifting due to CEO duality. We note that the positive effect of audit committee size prevails only for MNEs with CEO duality (approximately 67% of our sample). For that subsample, a one-standard-deviation decrease in audit committee size decreases profit shifting by 9.75%. In contrast, the effect of audit committee size on profit shifting for MNEs without duality is not statistically significant.

Besides profit shifting for tax-related reasons, the underlying principal-agent problem can lead to nontax transfer pricing agency issues (e.g., budget allocations, intra-group trade, risk shifting, and, ultimately, investment efficiency). Minimizing the global tax bill is an additional constraint for governance mechanisms when choosing the optimal transfer pricing policy (Baldenius et al., 2004) and, in principle, corporate governance should also affect the nontax outcomes of transfer pricing. Our analysis recognizes that corporate governance potentially affects both the tax-related and the nontax-related profit shifting. Empirically, our key premise is that changes in nontax profit shifting apply to both high-tax affiliates and low-tax affiliates. Thus, we aim to first identify tax-related profit shifting from the heterogeneous responses of parents' earnings to exogenous earnings shocks for low-tax subsidiaries vs. high-tax subsidiaries. This

is an important reason to use a two-stage analysis in which we first estimate tax-related profit shifting at the firm-year level and then we use these estimates as a function of corporate governance characteristics.[2]

Our study contributes to the profit-shifting literature by looking, for the first time, into the role of corporate governance, and in particular, the audit committee characteristics. The studies closer to our objectives are those on the determinants of profit shifting (e.g., Klassen and Laplante, 2012a, 2012b; Sugathan and George, 2015; Dyreng and Markle, 2016; Markle, 2016; De Simone, 2016). These studies focus on country characteristics (e.g., regulatory costs, territorial versus worldwide systems, and country-level institutions) or characteristics of the firm's environment (e.g., financial reporting pressures, capital constraints, and foreign ownership).

Our research also contributes to the literature examining the role of corporate governance in firms' general tax-planning strategies (e.g., Minnick and Noga, 2010; Brown, 2011; Brown and Drake, 2014; Armstrong et al., 2015; Li et al., 2017; Beasley et al., 2020). Studying the relation between corporate governance and international profit shifting has important differences compared to related studies of domestic tax planning or using a very broad measure of tax outcomes (Wilson and Wilde, 2018). In particular, the geographic footprint of MNE operations requires compliance with tax law in multiple countries, and transactions across borders are subject to different tax laws and country agreements. This also implies that intrafirm accounting and corporate governance strategies to manage profit shifting are more complex compared to domestic tax planning and might require specialized knowledge. These special characteristics of profit shifting have implications for audit committee structure and experience, especially given that tax laws evolve in different countries.

Moreover, due to the large flows of funds internationally and the blurred concepts of fully tax-compliant profit shifting, disputes with tax authorities may arise even when a firm is not trying to reduce taxes strategically (Klassen et al., 2017). Thus, although corporate boards may preclude management from

[2] The difference-in-difference research design, the various controls, and the multiple fixed effects we use, as well as an adequately high adjusted R-squared, can significantly mitigate concerns for alternative explanations, but as with any empirical strategy, we cannot fully rule them out.

engaging in tax shelters due to potential negative impacts on firm value (Wilson, 2009; Chow et al., 2016) or on their own reputations (Graham et al., 2014; Dyreng, et al., 2016), decisions around international tax compliance are much less stark and impossible to prohibit outright. In that case, the role of board structure, especially using specialized and experienced audit committee members, is likely more fundamental compared to the usual cases of tax planning.

Our findings benefit policy makers as they attempt to contain profit shifting by proposing changes in these characteristics. For example, Deloitte places corporate governance at the core of its analysis of corporate taxation (Deloitte, 2015). In turn, the OECD, within its base erosion and profit-shifting (BEPS) initiative, directly (but only theoretically) links corporate governance with tax management (e.g., Centre for Tax Policy and Administration, 2009; OECD, 2015; Lambe, 2015). Governments have already begun related processes. For example, the U.K. and Canadian tax authorities undertake governance reviews in conjunction with tax audits, and Australia has an extensive guide to corporate responsibilities for tax oversight, including at the board level (Misutka and MacEachern, 2013). Our evidence lends an additional support to those who argue for stronger corporate governance measures.

2. Hypothesis development

2.1. The unique characteristics of profit shifting and related literature

One main objective of tax planning is to lower the present value of tax payments to governments. Tax planning increases cash flows and sometimes reported income. However, at least as far back as Enron's tax-planning activities came to light in 2001, it is also clear that when tax planning practices become too aggressive, firm value eventually suffers because of the legal and reputational costs (Oppel, 2001). Further, aggressive tax planning practices reduce value in specific settings, such as accounting fraud (Lennox et al., 2013), debt costs (Hasan et al., 2014), and stock price crash risk (Kim et al., 2011).

International profit shifting is a specific but complicated tax planning strategy. We use the word *complicated* because, unlike most other tax-planning strategies, profit shifting requires an international network of affiliates navigating complex laws and regulations in order to reduce tax bases in countries with

high tax rates and have those earnings taxed in countries with low tax rates (Desai and Dharmapala, 2009). Moreover, international profit shifting increasingly withstands scrutiny from high-tax-rate countries (Mescall and Klassen, 2018). The enactment and implementation of rules under the OECD/G20 BEPS framework shows that countries have been taking considerable steps to reduce tax avoidance. The most recent step introduces a global minimum tax rate, reducing the benefits of income shifting (OECD 2021).

Complexity is high because profit shifting is based on concepts (such as the arm's length principal) that are subject to broad interpretation. Capitalizing on this complexity , tax reductions through profit shifting strategies might bear lower risk than other forms of tax reductions, raising MNEs' incentives to conduct more profit shifting. These distinguishing elements of profit shifting generate research questions on which specific corporate governance characteristics causally affect the practice.

Several studies are related to ours. Sugathan and George (2015), for example, examine how the quality of country-level institutions and foreign ownership affect profit shifting, and call for more research on how firm-specific corporate governance affects profit shifting. Klassen et al. (2017) survey 219 tax executives about their transfer-pricing practices, which are key aspects of international profit shifting. They establish that firms differ in their goals for transfer pricing with some more focused on tax reduction than others, but they do not explore the characteristics that drive these differences.

Studies also explore the features of the board of directors and broad measures of tax-planning. For example, Lanis and Richardson (2011) and Richardson et al. (2013) explore the role of the board of directors in Australian firms' tax-planning activities. They find that having more independent directors is associated with less tax aggressiveness. However, Moore et al. (2017) find the opposite for U.S. firms. Minnick and Noga (2010) fail to show any association for U.S. firms. Armstrong et al. (2015) also study the impact of corporate governance on tax avoidance. Using quantile regressions to examine the extreme tails of the tax avoidance distribution, they find that board financial expertise and independence have a positive (negative) relation with tax avoidance for low (high) levels of tax avoidance. Notably, Armstrong et al. (2015) control for the size of foreign operations, consistent with common approaches to broad studies of tax avoidance. Our interest is in the interaction of foreign operational activities and corporate governance on the choices

made around income shifting.[3] International income shifting, in particular, provides a strong setting to explore one aspect of tax planning that has gained considerable public attention (e.g., Starbucks in the UK; Barford and Holt, 2013). This conjecture further motivates our analysis, also given the important theoretical differences between general tax avoidance and profit shifting, described above.

2.2. The audit committee

Audit committee size and composition are important factors that affect financial reporting quality (e.g., Carcello and Neal, 2000; Chen and Zhou, 2007; Pomeroy and Thornton, 2008). Several studies suggest that the audit committees' composition, in terms of legal expertise (Krishnan et al., 2011), industry expertise (Cohen et al., 2014), and financial expertise (McDaniel et al., 2002; Kusnadi et al., 2016), has a significant impact on the financial reporting quality. Ghosh et al. (2010) and Chen and Zhou (2007) note that firms with smaller boards and audit committees monitor their financial reporting more efficiently.

More aligned with our objectives, Richardson et al. (2013) show that if a firm has a more independent internal audit committee, it is less likely to be tax aggressive, mainly because of their better assessment of the accounting policies used and reputation-related concerns. On the same line, an unpublished paper by Robinson et al. (2012) reports evidence that audit committee financial expertise is generally positively associated with tax planning, in line with the hypothesis that employing experienced audit committee members maximizes after tax returns. However, with very risky types of tax planning this association becomes negative mainly because of reputational concerns. Our paper seeks to extend the literature to the effect of audit committee characteristics on MNEs' profit shifting.

Profit shifting transactions are complex due to international tax laws, different market regulations, and multiple countries' bilateral tax agreements. Because the audit committee has a responsibility to

[3] While income shifting and overall Cash ETR are correlated, they are not as highly correlated as one might expect. For example, Chen et al. (2018) and De Simone et al. (2021) develop different firm-specific proxies of income shifting. They include these proxies in standard Cash ETR regressions and show a coefficient between -0.01 and -0.03 on their income shifting proxies. While statistically significant, the correlation is not large. For Chen et al., the inter-quartile range of these proxies are 0.29 and 0.31 for the average and instrumental versions, respectively. Thus, multiplying these two reveals that the average effect on Cash ETR from an interquartile range change in the income shifting proxy is at best 1% reduction in Cash ETR. De Simone et al. use an indicator and find a similar magnitude. Thus, while correlated, we would assert that the two measures are capturing different aspects of corporate tax activities.

monitor the risk profile of the company's activities and has financial experts on it (the monitoring role of the board), well-informed audit committees and their specific characteristics such as independence, size, and their members' expertise play a central role in influencing the level of tax planning aggressiveness (Brown et al., 2009; McGuire et al., 2012; Robinson et al., 2012; Deslandes et al. 2019). Moreover, BEPS action 13 and relevant legislation in several countries require larger companies to provide exceptionally detailed data about their global operations, including the location of employees, tangible assets, earned income, and tax payments. An efficient audit committee is usually aware of the international tax landscape (which is in a constant state of flux), oversees internal controls, and promptly shares the necessary data with their own MNEs (the advisory role of the board), while assessing trends in the tax authorities, and the public (to reduce information asymmetries and other agency problems). Thus, audit committees aim to stay aware of reputational dangers and be ready to answer questions about profit shifting if/when it emerges.[4]

Based on these considerations, we hypothesize that the audit committee and its characteristics are important corporate governance mechanisms that affect the level of profit-shifting. We assert that the key audit committee characteristics are size and relevant experience.

A large audit committee might improve monitoring and synthesize the viewpoints and expertise of more qualified members. These dynamics might be especially true for large MNEs with many subsidiaries in different countries that have different tax laws and regulations. Further, the literature closely links audit committee size with the number of audit committee meetings (Raghunandan and Rama, 2007), potentially yielding improved accounting, monitoring, and overall practices. If this monitoring role of the board prevails, MNEs with large audit committees will conduct less profit shifting.

However, most of the literature notes a dark side of large audit committees. The literature suggests that communication and decision making of larger boards are less effective in representing shareholders'

[4] Audit committee members who do not adequately examine aggressive practices would experience difficulty justifying their effectiveness, both to the rest of the audit committee or to the board of directors. Thus, these audit committee members might be more concerned (because their self-concept is threatened) with tax decisions that support aggressive practices, and they would reduce this discomfort by investigating these decisions thoroughly with probing questions. On the same line, audit committee members with audit experience might be less comfortable with accounting and tax decisions compared to members with less audit experience when outcomes are aggressive (Pomeroy, 2010).

interests compared to smaller boards (e.g., Yermack, 1996; Van den Berghe and Levrau, 2004). Moreover, large audit committees are linked to inefficient governance because of communication problems and all-too-frequent meetings (e.g., Vafeas, 1999). These characteristics yield monitoring inefficiencies and reduced oversight. Similar to our perspective, Aldamen et al. (2012) conclude that smaller audit committees with more experience and financial expertise are positively associated with firm performance.

On the basis of these theoretical considerations, there are three arguments explicitly linking large audit committees to profit shifting. To conduct profit shifting effectively, MNEs with subsidiaries in many countries must turn to many audit committee members with unique knowledge of the tax, financial, and macroeconomic environments in subsidiary countries. Adding more members on these specific environments can thus be based on the MNEs' expectation that when opportunity arises, large audit committees increase profit shifting to maximize MNE profit. This is the advisory role of the audit committee in favor of more profit shifting.

Second, large audit committees might exacerbate agency problems in monitoring. Large audit committees imply principal-agent problems between audit committees (on one hand) and management and control (on the other hand). Specifically, MNEs appointing many audit committee members might refrain from checking the output quality of these committees (precisely because they appoint many members to do so), and this lack of monitoring and control can yield more profit shifting.

Third, large audit committees might increase within-audit committee problems, such as capture by those with relevant expertise or free-riding by those without expertise. The essence of this mechanism is that a small audit committee reduces profit shifting mainly because of the underlying larger per auditor reputational costs incurred by a smaller number of audit committee members (as opposed to diffusion of these costs to more audit committee members). These last two arguments again reflect the monitoring role of the audit committee. Given the above, we formulate our first hypothesis as follows:

Hypothesis 1. The audit committee size affects tax-motivated profit shifting.

Given that audit committees are mostly independent by regulation, the second key characteristic distinguishing audit committees is INEDs' experience. With the term experience, we measure whether audit

committee independent directors have previous experience with an important role (functional expertise).

Dechow et al. (1996), and Beasley et al. (2000) find that a more independent audit committee reduces organizational risk (e.g., fraud) and earnings management. More generally, empirical evidence suggests that a higher number of INEDs on the board reduces financial fraud (Beasley, 1996; Chen et al., 2006), transfer-pricing manipulation (Lo et al., 2010), and the propensity for opportunistic earnings management (Peasnell et al., 2005). Deslandes et al. (2019) find that financial expertise of an audit committee plays an important role in constraining tax aggressiveness. Thus, bringing together the roles of independent board members with experienced auditors, a natural question is whether having more experienced INEDs on audit committees reduces profit shifting, especially by enhancing the negative effect, or moderating the positive effect of audit committee size (i.e., moderating the effect in hypothesis 1).

We note again that the characteristics of profit shifting and the relevance of having more independent auditors are somewhat different compared to other tax-planning strategies. Given the additional complexity due to the rapid digitalization of the economy, the continued evolution of new business models, and the accelerated internationalization (OECD, 2015), more experienced independent audit committee members with deeper knowledge of relevant practices are expected to fulfil better their monitoring responsibilities toward profit-shifting practices.

There are two interrelated issues behind this question; one concerns the nature of independent directors and the other concerns the nature of experience. First, the audit committee members are independent in order to improve accounting quality. The regulatory framework toward profit shifting is becoming increasingly stringent (e.g., enactment of BEPS, country-specific laws, and continuous monitoring using IT methods) and the reputational costs of independent members is larger. Second, given the complex nature of profit shifting, audit committee members, with high level of accounting and finance expertise, can identify, understand, and explain better to the board potential financial repercussions or opportunities associated with such international tax planning activities (Robinson et al., 2012; McGuire et al., 2012; Hsu et al., 2018). On this line, a deeper knowledge of the profit-shifting practices at other MNEs and awareness of the details and outcomes of important relevant legal cases suggest that experience might

make independent auditors more risk-averse. Thus, the combination of independence and experience (as opposed to only independence) can improve the audit committee's ability to monitor and induce aversion to profit shifting.[5]

Given the above, we hypothesize that including more experienced, independent audit committee members either directly reduces profit shifting or moderates the positive effects of a large audit committee. We formulate our next hypotheses as follows:

Hypothesis 2a. MNEs with experienced independent audit committee members engage in less tax-motivated profit shifting.

Hypothesis 2b. The number of experienced, independent members on MNE audit committees moderates the effect that large audit committees have on tax-motivated profit shifting.

CEO duality is key reason why agency problems persist between shareholders and managers (Jensen and Meckling, 1976; Fama and Jensen, 1983; Jensen, 1993). CEO duality reduces board monitoring effectiveness and increases the likelihood of fraud in firm operations (e.g., Chen et al., 2006). CEO duality creates better coordination across the complex mechanics needed to shift profits to subsidiaries abroad and allows for the creation of an audit committee that is more profit-shifting friendly. A board with CEO as chairperson might also more easily overcome the conflicts of interest and private information needed to take the risks associated with profit shifting.

Based on these theoretical considerations, we formulate the following hypotheses regarding the effect of CEO duality on profit shifting:

Hypothesis 3a. CEO duality results in greater amounts of tax-motivated profit shifting.

Hypothesis 3b. CEO duality moderates the effect that large audit committees have on tax-motivated profit shifting.

[5] The profit-shifting effect of having more INEDs with functional expertise on the audit committee might also be positive. If INEDs fall into agency capture, their expertise can reduce profit-shifting uncertainty, handle more complicated types of profit shifting, and generate important relevant networks and social capital (Brown and Drake, 2014).

3. Estimation of profit shifting

3.1. Empirical model

The complicated nature of profit shifting and the private information about MNE activities mean that profit shifting is difficult to measure. Most existing methods identify whether profit shifting exists at the aggregate country or industry level. They model how subsidiary profits respond to tax differences between the parent and subsidiaries (e.g., Hines and Rice, 1994) or among subsidiaries (e.g., Huizinga and Laeven, 2008). An appealing feature of Huizinga and Laeven (2008) is that they identify profit shifting from the response of subsidiary profits to a composite tax variable, reflecting all bilateral differences in the subsidiary countries' tax rates. In line with existing literature (e.g., Markle, 2016; De Simone, 2016), to use the Huizinga-Laeven model in our setting requires identification from interaction terms between that composite tax variable and several corporate governance characteristics. The issue is that, as Huizinga and Leaven also suggest, both the top statutory tax rate used to calculate the composite tax index and the composite tax index might be endogenous. Thus, in using this model, we would have to deal with two endogenous tax variables and several endogenous corporate governance variables. Given that our aim is to look inside the black box of individual firms and examine the role of corporate governance, it is ideal to estimate tax-motivated profit shifting at the subsidiary-year level.[6]

A second important identification problem is selection bias. In our case, selection comes from the potential choice of specific corporate governance characteristics (e.g., large audit committees) with the aim of conducting more profit shifting. Another challenge is that corporate governance is a general notion with several underlying characteristics, and identifying exogenous variations for one characteristic (e.g., through a change in relevant regulation) does not guarantee the same for other characteristics. Thus, we need an approach that examines the relation between profit shifting and more than one corporate governance characteristic, while avoiding to the extent possible these sources of bias.

[6] De Simone et al. (2016; 2019) provide a measure of profit shifting at the subsidiary and MNE-year level, respectively, but not at the subsidiary-year level. In our framework, it is important to identify how profit shifting responds to changes in corporate governance as a remedy against selection bias.

Our approach is to estimate *exogenous* variations in profit shifting at the subsidiary-year level. To this end, we conduct an empirical analysis in two stages. First, we build on the differences-in-differences (DID) model of Dharmapala and Riedel (2013). This model identifies how an exogenous shock at time *t* to parent *p* pretax and pre-shifting profit $\tilde{\pi}_{pt}$ affects subsidiary *i* profits π_{it} in a low-tax country, relative to subsidiary *j* profits π_{jt} in a high-tax country. The low-tax subsidiaries form a treatment group, and we compare them to subsidiaries in high-tax countries. In the presence of tax-motivated profit-shifting, an exogenous change in the parent pretax and pre-shifting profits (earnings shock) leads disproportionately to changes in the pretax profits of a low-tax subsidiary relative to a high-tax subsidiary.

The empirical model takes the form:

$$log\pi_{it} = \beta_0 + \beta_1 loga_{it} + \beta_2 log\tilde{\pi}_{pt} + \beta_3\left(Low\text{-}tax\ subsidiary_{it} \cdot log\tilde{\pi}_{pt}\right) +$$

$$\beta_4 Low\text{-}tax\ subsidiary_{it} + \beta_5 Leverage_{it} + e_{it} \quad (1)$$

The dummy variable *Low-tax subsidiary* is the DID identifier. It equals 1 if the subsidiary faces a lower corporate tax rate than the parent firm; it equals 0 otherwise. In line with Dharmapala and Riedel (2013), we also control for the subsidiary i's size, a_{it}, measured by the natural logarithm of total assets, as well as its exposure to debt, *Leverage*. The term *e* is the stochastic disturbance.[7]

The economic parent profits (i.e., before profit shifting) are unobserved. To construct $\tilde{\pi}_{pt}$, we follow Bertrand et al. (2002) and Sugathan and George (2015) and use the system of equations:

$$\tilde{\pi}_{pt} = \widetilde{ROA}_{pt} * \alpha_{pt}, \quad (2)$$

$$\widetilde{ROA}_{pt} = \sum_j \frac{\alpha_{jt}}{\sum_j \alpha_{jt}} \cdot ROA_{jt},\ p \neq j,\ \forall\ t \in \{1, \dots, T\}. \quad (3)$$

In equations (2) and (3), α_{pt} denotes the total assets of parent firm p (the global ultimate owner). For parents, we consolidate data and avoid double-counting the assets of subsidiary *i* in the parent's

[7] Based on our theoretical analysis leading to the estimation of equation (1), the tax difference is what creates the motivation for profit shifting. The tax difference is between the corporate tax rate faced by each parent and the equivalent rates faced by each subsidiary separately. Thus, we improve the heterogeneity of our sample by analyzing the effects of corporate governance on profit shifting observed by subsidiary-year. This heterogeneity is further enhanced by using affiliate fixed effects that cause the coefficients to capture changes in profit shifting from changes in the tax difference. We also show, however, that our results are robust to analyzing profit shifting at the MNE-year level, described below.

consolidated financial statements by subtracting each subsidiary's total assets from consolidated total assets. In turn, α_{jt} in equation (3) equals the total assets of *comparable* parent firms j in year t, and $ROA_{jt} = \pi_{jt}/\alpha_{jt}$ is the comparable parent's pretax profit over total assets. The product of the average industry profitability ratio $\widetilde{ROA}_{pt}$ and parent total assets α_{pt} (minus the total assets of each subsidiary) gives our measure of parent earnings, $\tilde{\pi}_{pt}$.

We define a firm as comparable if it is in the same industry (four-digit NACE) and country each year as specific parent firm p. To construct the set of comparable firms, we use all the national and multinational firms in *Orbis* for which data on profits and total assets are available.[8] As in Dharmapala and Riedel (2013), we keep only the subsidiary-year combinations in our sample if (i) the set of comparable firms includes at least 10 firms and (ii) the subsidiaries operate in four-digit NACE non-financial industries different from their parent companies. The first requirement increases the accuracy of our measure by providing sufficient data for each industry within a country. The second requirement enhances the shock's exogeneity by preventing industry shocks to directly affect the reported pretax profits of each subsidiary.

Using $\tilde{\pi}_{pt}$ in equation (1) introduces exogenous shocks to parents' earnings by assuming that $\widetilde{ROA}_{pt}$ is a function of comparable firms' *ROA* and the observed subsidiaries operate in a different industry. This process mitigates potential selection bias between our measure of profit-shifting and corporate governance characteristics of parent firms by breaking the link to the firm's own profitability. The reason is quite simple: the instrumented profitability shock to the parent firm is exogenous to the internal firm processes. We further assert that the firm could not have adjusted (selected) its corporate governance characteristics to change its profit shifting in the same period. This is a key advantage of the Dharmapala and Riedel (2013) model in our framework.

[8] To avoid the correlation (and the endogeneity) that arises if we include a firm in the calculation of its industry profitability, we exclude the firm from the set of comparable firms. One drawback to the data we obtain from *Orbis* is that ownership structure is only available for the last reported year (2017 in our sample). As with previous studies, this is not a key concern, because the potential misclassification of parent-subsidiary links would, if anything, bias our results toward zero (e.g., Budd et al. 2005). However, this is a potential limitation of our analysis.

If tax-motivated profit shifting occurs, then we expect $\hat{\beta}_3$ to be positive and statistically significant. This implies that a parent-firm earnings shock, $\tilde{\pi}_{pt}$, will propagate asymmetrically toward low-tax subsidiaries compared to high-tax subsidiaries. The parameter $\hat{\beta}_2$ is also important because it controls for nontax-related profit shifting (e.g., budget and capital allocations, intra-group trade, risk shifting). Thus, in line with our theoretical considerations, we distinguish between tax-related profit shifting ($\hat{\beta}_3$ from the heterogeneous responses of parents' earnings to exogenous earnings shocks for low-tax subsidiaries vs. high-tax subsidiaries) and nontax-related profit shifting (general response of π_{it} to $\tilde{\pi}_{pt}$). The issue of course is that the slope $\hat{\beta}_3$ is a constant and does not change by firm-year. In the following section, we estimate equation (1) by uncovering firm year estimates (slopes) for $\hat{\beta}_3$.

3.2. Estimation and results

To estimate equation (1), we resort to nonparametric regressions, mainly the semiparametric local linear model (e.g., Fan, 1992; Fan and Zhang, 1999; Mamuneas et al., 2006). We only outline the estimation here and leave the technical details for the Appendix. The key merit of a nonparametric approach for our purposes is that, unlike a parametric regression (e.g., ordinary least squares, OLS), the nonparametric method allows estimating $\hat{\beta}_3$ for each individual observation (by subsidiary-year) to obtain $\hat{\beta}_{3,it}$. This is our estimate of *Profit shifting*, which is the dependent variable in the second stage of our analysis.[9] The assumption of the semiparametric model is that only the DID term enters nonparametrically, whereas the rest of the terms enter parametrically.[10] We provide the technical estimation details in the Appendix.

To clarify our profit shifting measure, consider the example in Figure 1. The example is an abstraction from the IKEA structure documented in Auerbach (2016). In our example, the parent firm shifts

[9] As in Dharmapala and Riedel (2013), profit shifting is only derived from $\hat{\beta}_3$ and not from the total effect of $\tilde{\pi}_{pt}$. In other words, the coefficient $\hat{\beta}_2$ does not reflect shifted income to a subsidiary; it reflects a comovement between parent shocks and subsidiary profits. This co-movement can be due to, for example, productivity linkages between parent and subsidiary profits.

[10] We also experiment with a fully nonparametric model and note that this model yields very similar results; we do not favor the fully nonparametric model only because it adds considerable estimation time without gain in our inferences. As these estimation approaches are now standard in several statistical software packages, we only provide our estimation details here. For more information, see Loader (1999).

profits to its low-tax subsidiaries (IP Holdco, Op Affil 2, and the Service Centre). We assume the operating affiliates, Op Affil 1 and Op Affil 2 are not in the same industry as Parent. In the estimation technique, a profit shock in the parent's country, industry and year instruments a shock to the parent's profits. The estimation then uses observed profits in the three non-financial affiliates that are in different industries from the parent. To the extent that the parent's instrumented profit shock shows up to a greater degree in low tax-rate affiliates than in the high tax-rate affiliate (Op Affil 1), captured by $\hat{\beta}_3 > 0$, we conclude that there is profit shifting. Thus, our estimate of *Profit shifting* captures the response of subsidiaries' profits to an exogenous shock to parents' earnings, considering that the subsidiaries reside in a lower tax environment than their parents.

(Please insert Figure 1 about here)

We use data from *Orbis*. *Orbis* is the largest database of corporation-level accounts of registered companies worldwide. It includes information on public and private corporations' balance sheets and income statements. Importantly, it also includes the ownership structure.[11] At this stage, we use corporation-level data from all available countries (not only for the U.S.-based MNEs), which is important for two reasons. First, we eliminate the curse of dimensionality, the problem related to not having dense observations when estimating nonparametric models. This substantially improves econometric efficiency. Second, using only U.S. multinational firms results in using firms whose parents almost always have higher tax rates than their subsidiaries and this imposes a strong (and unwanted) restriction on our estimates.[12] This significantly helps with the heterogeneity of the control group in *Low-tax subsidiary* (otherwise this variable will mostly equal 1 because U.S. parent firms have higher tax rates than their subsidiaries). Moreover, we exclude finance and insurance affiliates because they are regulated in a different way than the rest of the firms. Our sample spans the period 2008-2017. We define all the variables of our empirical

[11] For a significant number of corporations, there is only very basic data, such as the name and address. Cobham and Loretz (2014) document that *Orbis* has an excellent coverage of European subsidiaries, but this is not the case for subsidiaries outside Europe. Dowd et al. (2017) highlight the lack of tax-haven coverage. In our context, this means that, if anything, our estimations of profit shifting are expected to be more conservative.

[12] In the analysis of profit shifting into corporate governance determinants, we use only U.S. parent companies to keep the macroeconomic, institutional, and regulatory environment constant. At that analysis, we also use many fixed effects (firm, year, industry, country, etc.).

analysis in Table 1 and report summary statistics in Table 2. After dropping missing observations for our main variables, we have a sample of 52,228 subsidiary-year observations from 6,596 subsidiaries and 940 parents for the period 2008-2017. This sample includes subsidiaries from 59 countries. Further, 76.3% of the subsidiaries in our sample face lower statutory corporate tax rates than their parents. In the appendix Table A1, we provide statistics for the distribution of parent firms and their foreign subsidiaries by country as well as for the mean profit shifting in each country.

(Please insert Tables 1 and 2 about here)

For subsidiaries, we use unconsolidated statements; for parents, we rely on consolidated statements. Consolidated parent profits can shift to low-tax subsidiaries and should be included in the analysis (as opposed to only including unconsolidated profits). Using consolidated data also creates a measure that is immune from profit shifting because any shifting is netted out upon consolidation. Further, because the construction of the average industry profitability index ($\widetilde{ROA}_{pt}$) uses data for comparable firms, the possible concern that the profits of subsidiary *i* are included is already addressed. Another advantage of consolidated data is that the requirement for separate parent data is not necessary. This allows retaining, for example, U.S. parents whose separate financial statements are not publicly available.

We measure subsidiary *i*'s profits at time *t* using the log of pretax earnings (*EBT*), subsidiary size using the log of subsidiary total assets, and financial leverage using the ratio of total debt to total assets. We use the variables in logs due to their high skewness, and this limits our sample to subsidiaries with positive earnings before interest and taxes. We obtain data on the statutory corporate tax rates from OECD and KPMG. For the theoretical justification for using statutory (as opposed to effective) corporate tax rates, see Devereux and Mafini (2007) and Huizinga and Laeven (2008). In unreported tests, we also use the statutory corporate tax-rate differences (e.g., Sugathan and George, 2015) or the statutory tax rate in the parent or the subsidiary countries instead of an indicator that separates low-tax and high-tax subsidiaries. The results are similar and are available on request.

Table 3 reports mean coefficient estimates (mean of the $\hat{\beta}_{3,it}$) and standard errors (obtained from bootstrapping and 200 replications) from the estimating equation (1). The different specifications produce

a different number of estimates $\hat{\beta}_{3,it}$ given the assumptions about the kernel type, the method for bandwidth selection, and observation density.[13] We only retain the positive observations (the ones theoretically suggesting tax motivation as in our discussion of equation 1). At the lower end of each column, we report the total observations (the total number of observations we use in the regressions) and the observations with positive profit shifting (the ones we use in the second-stage analysis on the profit-shifting determinants).

(Please insert Table 3 about here)

In the first column we report results from the semiparametric model with an Epanechnikov kernel and select the optimal bandwidth with cross-validation. This estimation method produces a larger number of estimates, $\hat{\beta}_{3,it}$, given the restrictions we place on bandwidth selection and observation density. In the second column we use a Gaussian kernel (instead of the Epanechnikov), and in the third we select the bandwidth using the Akaike information criterion (AIC) (instead of cross-validation). In the fourth column, we assume a fully nonparametric model (all explanatory variables enter the regression nonparametrically). In column (5), we remove the main terms of the DID term (as the nonparametric model should by itself take care of the underlying nonlinearity). Finally, in column (6) we add the corporate governance variables as controls to prevent our profit shifting estimates from capturing any effects of corporate governance variables on subsidiaries' pre-tax profits.

The results are very similar across the different specifications. In line with our expectations, the DID term (*Low-tax subsidiary* × *Estimated parent profits*) is positive and statistically significant at the 1% level. According to our baseline model in column 1, a 10% increase in parent earnings implies that low-tax subsidiaries receive 0.29% more profit than high-tax subsidiaries. Our results show that for every $100 profits that exogenously flow into the parent, approximately $3 more go to each low tax-rate subsidiary, relative to high tax-rate subsidiaries. Our profit-shifting results are very similar to Dharmapala and Riedel (2013), who find an equivalent of $1 to $4 of profit shifting depending on the fixed effects used.

[13] Essentially, estimates are dropped when the regression encounters regions with scarce data (sliding windows with less than 100 observations). The number of observations dropped differs for different model assumptions and use of more control variables.

Concerning the profit-shifting estimates, we report summary statistics in Table 2. A more informative picture appears in histograms and kernel densities for the full set of effective observations (both positive and negative $\hat{\beta}_{3,it}$) in Figure A1 in the Appendix. The different estimation approaches produce similar results, with one mode at zero profit shifting (or slightly above zero) and another mode at around 0.25. This is consistent with expectations suggesting that some MNEs do not conduct profit shifting, but most MNEs should have similar profit-shifting strategies and thus similar levels of profit shifting. A third small mode on the right-hand side of the histograms reflects firms with more aggressive profit shifting.

4. Audit committee and profit shifting

4.1. Empirical identification

To examine the relation between corporate governance and profit shifting we estimate the model:

$$Profit\ shifting_{it} = c_0 + c_1 g_{it} + c_2 f_{it} + \rho' + u_{it}, \quad (4)$$

where *Profit shifting* is any of our measures of *Profit shifting 1* to *Profit shifting 5*, *g* is the vector of governance characteristics, *f* is the vector of subsidiary-year and/or parent-year control variables, ρ' is a vector of fixed effects, and *u* is the stochastic disturbance. We define all variables in Table 1 and provide summary statistics in Table 2.

In this section, we use only data from U.S.-based MNEs. The main reason is that we aim to keep the MNEs' macroeconomic, institutional, and especially regulatory environment constant, as different countries have different regulations in place for corporate governance (and these differences might affect our results). Further, the ownership documentation in *Orbis* and the corporate governance documentation in *BoardEx* are uniform when considering the United States. The dataset includes 18,862 observations for 3,316 subsidiaries in 25 countries (again spanning the period 2008-2017).

Information for the corporate governance variables is from *BoardEx*. This biographical and employment information is at the director level and, thus, we calculate averages by parent (the global ultimate owner) and year. *BoardEx* also contains data on committees' composition. We match *BoardEx* and *Orbis* data using the International Security Identification Number (ISIN). Then, to avoid losing

observations, we "fuzzy merge" using a bigram string comparator score of the company name from each database. This score computes the consecutive character matches between two string variables.[14]

In line with our theoretical considerations and hypotheses, we use three key corporate governance measures. First, we use *Audit committee size*, measured by the natural logarithm of the number of directors on the audit committee. Second, we use four alternative measures of audit committee members with audit experience, defined as *INEDs with audit experience* (see Table 1 for precise definitions). Third, we use a CEO duality dummy variable (*Duality*).

The mean *Audit committee size* is approximately 4.2 directors and ranges from 1 to 8 directors. Surprisingly, the ratio of INEDs with functional audit experience to the total number of members (*INEDs with audit experience 1*) has a mean value of 0.2, suggesting that most members do not have functional audit expertise. Further, 67% of the parent firms in our sample have CEO/chairman duality, also making the potential effect of this variable particularly interesting. After merging *Orbis* with *BoardEx*, these statistics are in line with other studies that merge *BoardEx* with *Compustat* (e.g., Anderson et al., 2004; Ghosh et al., 2010; Karavitis et al., 2021). Indicatively, these studies report an audit committee size between 3.7 and 4.2, and a board size between 9.3 and 12.1.

In the Appendix, Table A2 provides information about the allocation of the U.S. subsidiaries, while Table A3 provides further descriptive statistics for the high-low tax subsidiaries (Panel A) and high-low profit shifting subsidiaries (Panel B). In Table A4, we provide additional information on our sample, differentiating between small-sized, medium-sized, and large audit committees. Very few sample firms have small-sized audit committees. We observe that firms with large audit committees, versus medium-sized audit committees, report more profits, are bigger, and engage in higher levels of profit shifting.

Moreover, we study whether our results are related to general tax avoidance. We proxy general tax avoidance with the GAAP effective tax rate (ETR). The Pearson correlation between profit shifting and

[14] We implement this fuzzy merge using the Stata ado file reclink (e.g., Biswas et al., 2017). For each potential fuzzy match, Stata provides a similarity score; higher scores imply greater degrees of similarity between the matched terms, with 1 indicating a perfect match. To ensure accuracy we select the 95% as the similarity threshold for the matching.

GAAP ETR equals -0.22 and is statistically significant at the 1% level for our sample, consistent with more aggressive profit shifting lowering tax payments (available upon request). Given the negative correlation between profit shifting and GAAP ETR, if corporate governance addresses the same aspects of these two corporate tax activities, then the correlations between audit size (on the one hand) and profit shifting and GAAP ETR on the other should have the opposite signs. However, as shown on Figures 2a and 2b this is not the case, providing evidence that there is a distinct relationship between governance and profit shifting that cannot be discerned from measures of general tax avoidance.

(Please insert Figure 2 about here)

Our approach limits the possibility of omitted-variable bias in equation (4). Again, the reason is that the earnings shock that generates the response in profit shifting is designed to be exogenous to the internal operations (and thus corporate governance characteristics) of the parent. Supporting this premise is that our results remain remarkably stable when adding control variables (especially corporate governance controls) and—quite importantly—subsidiary fixed effects (Angrist and Pischke, 2008).[15] The use of the subsidiary fixed effects requires that any omitted-variable bias must come from changes (e.g., in unobserved corporate governance variables) taking place in the same year as the change in the audit committee size. As we cannot strictly exclude this possibility, we also introduce an IV model as a robustness test along with exploiting firm-specific heterogeneity in variables that are well-known to affect profit shifting.[16]

The vector of controls includes several corporate governance variables of the parent firm (the global ultimate owner). In appendix Table A5, we show that the control variables do not have very high correlations with our three main variables (correlations do not exceed 0.5). First, we control for board size (*Board size*) to avoid *Audit committee size* capturing the potential effect of total board size. Similarly, we control for other dimensions of experience (other than audit experience) using the mean directors' board

[15] Of course, *Profit shifting* is measured with error, as it is estimated from equation (1). It is well known, however, that measurement error in the dependent variable does not lead to inconsistent OLS estimates (e.g., Pischke, 2007).
[16] To provide further comfort, in untabulated statistics, we identify sample MNEs with and without tax haven subsidiaries. The mean audit committee sizes are 4.2 and 4.1, respectively, for these two groups, the mean INEDs with audit experience 1 are 0.19 and 0.17, respectively, and the mean duality are 0.72 and 0.70. These very similar means suggest that audit committee characteristics are not strongly related to a feature common to profit shifting.

tenure (*Tenure*), the number of multiple directorships directors hold (*Number of directorships*), and the directors' network size (*Network size*). Further, we use the share of female directors in the board. Female directors are believed to hold stricter attitudes toward law compliance, produce more conservative financial reporting (Francis et al., 2015), and exert higher audit effort (Gul et al., 2008). Next, we control for the directors' mean age because several studies suggest that conservatism increases with age (Wu et al., 2005). We note that using these controls has a very small impact on the coefficients of main interest, which is evidence against omitted-variable bias.[17]

At the parent-year level, we control for financial characteristics that might affect profit shifting. Specifically, we use firm size, liquidity, total number of shares outstanding, book value, and profitability (see Table 1 for exact variable definitions). In robustness tests, we also use subsidiary characteristics. In general, we find that the subsidiary characteristics do not affect profit shifting significantly; this is expected, given that profit-shifting decisions should be made at the MNE level.

Importantly, we use several types of fixed effects. We begin with subsidiary and year fixed effects to control for time-invariant subsidiary characteristics and time-varying characteristics common to all subsidiaries, respectively. The subsidiary fixed effects further mitigate the possibility of simultaneity and omitted-variable bias because we obtain identification from firms with *changes* in *Audit committee size*, *INEDs with audit experience*, and *Duality*. Thus, given the exogeneity of earnings shocks and conditional on control variables, it is unlikely that changes in unobserved variables are correlated with both changes in our variables of main interest (*Audit committee size*, *INEDs with audit experience*, and *Duality*) and the stochastic term in equation (4).

Moving on to more a stringent specification, we saturate our model from the effects of industry and time-varying country characteristics in the subsidiary countries using subsidiary country × year fixed effects. These fixed effects control for the full gamut of macroeconomic, institutional, and societal

[17] We take two steps to safeguard our analysis from multicollinearity issues (we report correlation coefficients in Panel A of Table A5). First, we run a variable inflation factors (VIF) multicollinearity test (Panel B of Table A5). Second, we sequentially add and exclude control variables (results available on request). Both these exercises show that multicollinearity problems in our estimations are insignificant.

characteristics in industries and the parent and subsidiary countries that might correlate with both profit shifting and MNEs' corporate governance.

4.2. Baseline empirical results

Table 4 reports our baseline results from the estimation of equation (4) using *Profit shifting 1* as the outcome variable. We cluster standard errors by parent because this is the level at which we observe corporate governance variables. We begin with models including only subsidiary and year fixed effects. Given the exogeneity assumptions established in section 3, we expect that the estimates remain stable to the inclusion of control variables. This is indeed the case as we add controls in specifications 2 (corporate governance controls) and 3 (financial controls). We find that *Audit committee size* enters with a positive coefficient that is statistically significant at the 5% level, but *INEDs with audit experience* and *Duality* enter with coefficients that are not statistically different from zero.

We find that a 10% increase in *Audit committee size* increases profit shifting by approximately 3%. This is economically large, considering that *Audit committee size* takes values between 1 and 8, with a mean value of 4.2 and standard deviation of 1.1. Thus, a one-standard-deviation increase in *Audit committee size* that is initially at its mean (going from 4.2 to 5.3 is a 26% increase) yields a 7.8% increase in profit shifting. These effects are fairly stable across the first three specifications of Table 4.

(Please insert Table 4 about here)

Simply using subsidiary and year fixed effects raises the adjusted R-squared to approximately 0.67. From the rest of the corporate governance controls, the only significant one is *Network size*, which consistently enters with a negative and statistically significant coefficient. This is an important finding, suggesting that large MNEs with directors who have large networks conduct less profit shifting. Detected profit shifting can cause large reputational losses that can be exacerbated for renowned directors with large networks. Thus, these directors might be more cautious in complying with profit shifting, especially because

profit shifting is one of the most important tax-planning strategies that capture international interests and associated policies to contain it.[18]

The effect of the other controls largely follows our expectations. MNE size and liquidity positively relate to profit shifting, in line with expectations that larger MNEs with more subsidiaries and MNEs with higher cash-flow ratios conduct more profit shifting. We also expect a negative effect of *Parent ROA*, as parent firms that shift profits will show lower profitability ratios (profit is shifted to the subsidiaries).

In column 4, we add several additional fixed effects.[19] These fixed effects saturate our model from the effect of common shocks in industry-specific profit shifting (subsidiary or parent industries) and time-varying subsidiary country-specific shocks (subsidiary country × year fixed effects). The latter render the need for subsidiary country-year control variables redundant. The additional specifications confirm the previous, without significantly increasing the adjusted R-squared. This substantiates our identification assumptions on causal effects: adding more explanatory variables and fixed effects does not affect our baseline estimates (e.g., Angrist and Pischke, 2008). Nevertheless, as specification 4 of Table 4 is the most stringent specification and controls for a full set of fixed effects, we treat it as our baseline specification for the rest of the tests.

4.3. Endogeneity concerns

To further insulate our analysis for the possibility of endogeneity bias, we estimate an IV model. As an exogenous instrument, we use the number of deaths or illnesses that cause involuntary reduction in audit committee size (*Audit committee deaths & illnesses*). We observe 192 such cases in our sample. A recent corporate governance literature uses similar instruments (e.g., Fracassi and Tate, 2012). The exclusion restriction suggests that the event of an audit committee reduction due to deaths or illnesses affects profit

[18] The general literature on tax-planning offers similar arguments. For example, Coram et al. (2016) suggest that CEOs with large networks perceive accrual earnings management (the strong form of earning management) as ethically questionable, and Griffin et al. (2017) provide similar evidence. In contrast, other studies show that larger networks contribute to tax-planning strategies, especially when considering milder forms of earnings management such as real activities earnings management (Griffin et al., 2017; references therein). The reason we do not place this variable in the core of our analysis is that it is not as relevant from a policy perspective. Indeed, it is difficult to think of a policy suggesting that MNEs hire directors with larger networks.

[19] In untabulated tests we add the additional fixed effects sequentially. Results are virtually identical in these tests.

shifting only via the audit committee size, conditional on controls for other corporate governance characteristics (e.g., director expertise, network, etc.) and firm characteristics. Given that our panel is heavily unbalanced, we find that using GMM (instead of two-stage least squares) considerably improves the weak identification and overidentification tests (also GMM is more efficient than 2SLS in the presence of heteroskedasticity).[20]

Table 5 replicates Table 4 with GMM regressions. The Cragg-Donald and Kleibergen-Paap F-statistics easily pass the Stock-Yogo weak instrument critical values and the Hansen test is in the optimal region of overidentification. The estimates on *Audit committee size* remain statistically significant. Despite the strength of the first-stage results (the instrument is not weak), the actual estimates are larger than the OLS ones. Thus, we prefer to base our inferences on the more conservative OLS estimates. The estimates on the corporate governance control variables are also in line with the OLS estimates, except from *INEDs with audit experience*, which is positive and statistically significant in the GMM.

(Please insert Table 5 about here)

To provide further evidence to corroborate our interpretation of the relation between *Audit committee size* and *Profit shifting*, we exploit tax-related cross-sectional characteristics of firms. Table 6 shows the results of these tests. In column 1, we examine the case of MNEs with very high levels of intangible assets (i.e., at the top 10% of the sample). The interaction *Audit committee size* × *High intangible assets* enters with a negative and statistically significant coefficient at the 1% level. This finding reflects that MNEs with high intangibles find it easier to engage in profit shifting activities (e.g., Karkinsky and Riedel, 2012). In this case, *Audit committee size* ceases to be related (the sum of the main effect plus the interaction is close to zero). In column 2, we examine the effect of ETR on the main relation. The interaction *Audit committee size* × *Parent ETR* carries a negative and statistically significant coefficient. This suggests that as ETR is reduced, the role of *Audit committee size* is increased. Consistent with the advisory role of the audit

[20] This is not to be confused with GMM for dynamic panels, which is very sensitive to the inclusion as instruments of lagged values of the dependent and control variables. We note, however, that our results are robust when using GMM for dynamic panels.

committee that we identify in our main tests, a lower ETR necessitates a stronger advisory role to produce higher profit shifting. Flipping the perspective, the interaction also suggests that larger boards have a stronger negative relation between profit shifting and ETR, consistent with more effective profit shifting when the advisory capacity is higher. Last, in column 3 we examine tax haven operations. To this end, we obtain tax haven data from Scott Dyreng's website (also see Dyreng et al., 2012) but these data reduce our sample size dramatically. The interaction term *Audit committee size* × *Number of tax haven subsidiaries* has a negative coefficient. This finding shows that more subsidiaries an MNE operates in tax haven territories reduces the necessity for the audit committee's advisory role to advance profit shifting because it is relatively easier for those MNEs to shift taxable income.

(Please insert Table 6 about here)

4.4. Additional robustness tests

We conduct several sensitivity tests on the baseline results. These results are reporting in the online appendix. First, we use the different profit-shifting measures, as specified in section 3 (*Profit shifting 2* to *Profit shifting 6*). We report the results in Table A6. Despite the variation in available observations, our key results remain largely unaffected: *Audit committee size* is the key variable related to profit shifting.

In appendix Table A7, we re-estimate our baseline specifications using the MNE-year mean of our profit shifting estimates as the outcome variable. This analysis ensures that we are not picking up spurious effects whereby the same MNE (with the same corporate governance characteristics) has some subsidiaries with high profit shifting and some with low profit shifting. The results in Table A7 are very similar to those analyzing subsidiary-year profit shifting.

In Table A8, in addition to controlling for firm size, board size, and firm fixed effects in our main analysis, we also explore the robustness of our results to the possibility that *Audit committee size* captures scale effects. Replacing *Audit committee size* with the ratio of audit committee size to total assets yields similar results to our baseline.

We report the results from six more robustness tests in appendix Table A9. In the first specification, we add controls reflecting subsidiary financial characteristics. We do not expect that these characteristics play an important role in the decision to shift profit, as we include subsidiary fixed effect. Indeed, we find that the included subsidiary controls enter with statistically insignificant coefficients. As these variables are insignificant and we lose observations when using them, we do not include them in our baseline specifications.[21] In the second specification, we add parent fixed effects. Adding parent fixed effects while using clustering at the parent level does not affect our results (if anything, the estimate on *Audit committee size* becomes slightly more potent). In the third and fourth specifications, we clustering standard errors by parent and year (two-way clustering) and by parent and year and subsidiary country (three-way clustering). Our results remain approximately the same with our baseline. In the last two specifications, we control for the number of foreign subsidiaries and the number of countries where an MNE operates. Once again, our results are similar to our baseline.[22]

Our results are in line with hypothesis 1, indicating the positive effect of audit committee size on profit shifting. In contrast, our results fail to reject the null forms of hypothesis 2a and hypothesis 3a on the direct effects of *INEDs with audit experience* and *Duality* on profit shifting.

4.5. The roles of audit committee member experience and CEO duality

In this section, we examine how audit committee member experience and CEO duality affect the relation between audit committee size and profit shifting (hypotheses 2b and 3b). Table 7 reports in columns 1 – 3 the results from specifications that examine the heterogeneous effect of *Audit committee size* due to members' functional experience (as captured by *INEDs with audit experience*), and in columns 4 – 6 the heterogeneous effect of *Audit committee size* due to *Duality*.

[21] We experiment with many other subsidiary controls (reflecting sales, other measures of liquidity, labor, and capital, etc.). These results are available on request.

[22] For the robustness of our estimation method, in untabulated tests we also use the unweighted tax difference instead of the low-tax subsidiaries to examine the effect of *Audit committee size* on profit shifting. The findings are in line with our baseline results in Table 4. The reason we do not prefer this research design is that it suffers from severe multicollinearity problems. This test is available upon request.

We begin with two regressions, splitting our sample for values of *INEDs with audit experience 2* equal to 1 and 0, respectively. These regressions differentiate the effect of *Audit committee size* for high values of *INEDs with audit experience* (in the top quartile) and the rest. Our results show that with high values of *INEDs with audit experience*, the effect of *Audit committee size* is statistically insignificant; the coefficient on *Audit committee size* retains its significance for observations where *INEDs with audit experience 2* equals 0. Thus, we can only find our baseline results for MNEs with a lower number of audit committee members with functional expertise.

(Please insert Table 7 about here)

Splitting the sample allows different slopes for all the explanatory variables, but it has the disadvantage of smaller samples. In specification 3 of Table 7, we instead infer parameter heterogeneity using interaction terms between *Audit committee size* and *INEDs with audit experience 1*. The results are consistent with those in the first two columns, with the coefficients on the interaction terms being negative and significant. Using specification 3, we find that when *INEDs with audit experience 1* approximately equals 0.5, the positive effect of *Audit committee size* on profit shifting is eliminated (and turns negative from that point and higher).[23] The marginal effect of *Audit committee size* in this interaction model, calculated at the mean value of *INEDs with audit experience*, show that the positive effect of the audit committee size on profit shifting remains, as is of similar size to that reported in Table 4.[24]

To test hypothesis 3b, we report analogous results for CEO duality. In columns 4 – 6, we split the sample into boards with and without CEO duality and find that the effect of *Audit committee size* is positive only for MNEs with CEO duality. In fact, for these MNEs, a one-standard-deviation increase in *Audit committee size* (this again equals 1.1 as in the full sample) implies a 9.75% increase in profit shifting (the

[23] We repeat the analysis in specification 3 using the other definitions of INEDs with audit experience and report these results in the Appendix, Table A10, Panel A. We obtain very similar estimates when using *INEDs with audit experience 3*, while the two specifications using dummy variables also draw the same picture.

[24] These results are robust to a full gamut of sensitivity tests, as with those in section 4.4. We report these results in appendix Tables A9 to A11. Specifically, in Table A10 we employ different combinations of fixed effects in a similar way to Table 4, and in Table A11 we use the different versions of our profit-shifting estimates. Panels in both tables show the results from the four different versions of INEDs with audit experience. Finally, in Table A12 we experiment with different standard error clustering. Clearly, throughout all the specifications in Tables A9 to A11, the results are in line with those of Table 6.

equivalent in our baseline results is 7.8%). The picture is similar when using an interaction term in column 6. The main term on *Audit committee size* is not statistically significant, but the interaction term has a positive coefficient of 0.245, statistically different from zero at 10%.[25] This again suggests that the positive effect of audit committee size on profit shifting is only prevalent for MNEs with CEO duality.[26]

5. Conclusions and policy implications

We hypothesize and empirically examine whether specific corporate governance characteristics are related to tax-motivated profit shifting. Our empirical strategy first identifies profit shifting from exogenous earnings shocks to parent firms in industries different than the subsidiaries' industries. Subsequently, we examine the role of corporate governance characteristics to explain variation in the estimated profit shifting.

Our baseline results suggest that an increase of one standard deviation in the audit committee size (approximately equal to adding 1.1 directors to the audit committee) increases profit shifting by an economically significant 7.8%. This estimate is robust to an extensive series of sensitivity tests, including different measures of audit committee size and profit shifting. Importantly, we find that increasing the ratio of INEDs with functional audit experience on audit committees and abolishing CEO duality can substantially reduce or even eliminate the positive effect of audit committee size on profit shifting.

Our results suggest that tax authorities would benefit from looking at MNEs' corporate governance more closely, especially with regard to audit committee size, members' experience, and CEO duality. Our findings point to the need for policy initiatives ranging from guidelines to regulation. As the OECD's BEPS and related projects move forward to fulfill their objectives for increased transparency and tax fairness, we

[25] The coefficient on the main term on *Duality* does not have a straightforward interpretation because the interaction term includes a continuous variable (*Audit committee size*). As it stands, the coefficient shows the effect of *Duality* when *Audit committee size* equals zero, which of course is irrelevant. At the mean value of *Audit committee size*, the effect of *Duality* becomes insignificant (as in the previous specifications).

[26] In appendix Tables A13 and A14, we provide the robustness tests on these results. In Table A13 we check the sensitivity of our findings using combinations of fixed effects and different clustering of standard errors. In Table A14 we use the different versions of our profit shifting estimates. In summary, our results in this section are in line with hypotheses 2b and 3b, suggesting that the positive effect of audit committee size on profit shifting is lower (or completely eliminated) for MNEs with more INEDs with audit experience and without CEO duality. We further check the robustness of our results by restricting our sample to only U.S. foreign subsidiaries located in European Union and rerunning our baseline specifications. The results are very similar qualitatively and quantitatively. Available upon request, these untabulated tests mitigate concerns for measurement error in our estimates.

provide evidence that redesigning the audit committees could hold an important role in the implementation of this initiative. Essentially, we suggest that MNEs' audit committees must mostly include INEDs with functional audit experience and that CEO duality can override the benefits of a strong audit committee.

This study opens a window for future research. Looking inside the specific aspects of experience that cause less profit-shifting behavior (e.g., education, source of experience, experience specific to profit shifting, experience specific to subsidiary countries, etc.) is an important extension of our analysis if relevant data are available. Further, more detailed examinations of the effects of the remuneration committee on profit shifting, distinguishing between transfer pricing and debt shifting, and looking at networks (at the country, firm, or CEO and director level) between parents and subsidiaries are potentially fruitful avenues for future research.

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Figure 1: Profit shifting flows

This figure illustrates how the coefficients are estimated for an example company. Profit shifting is captured by the coefficient β_3, which is the change in profit in low tax rate, non-financial subsidiaries to an instrumented shock to the parent's income.

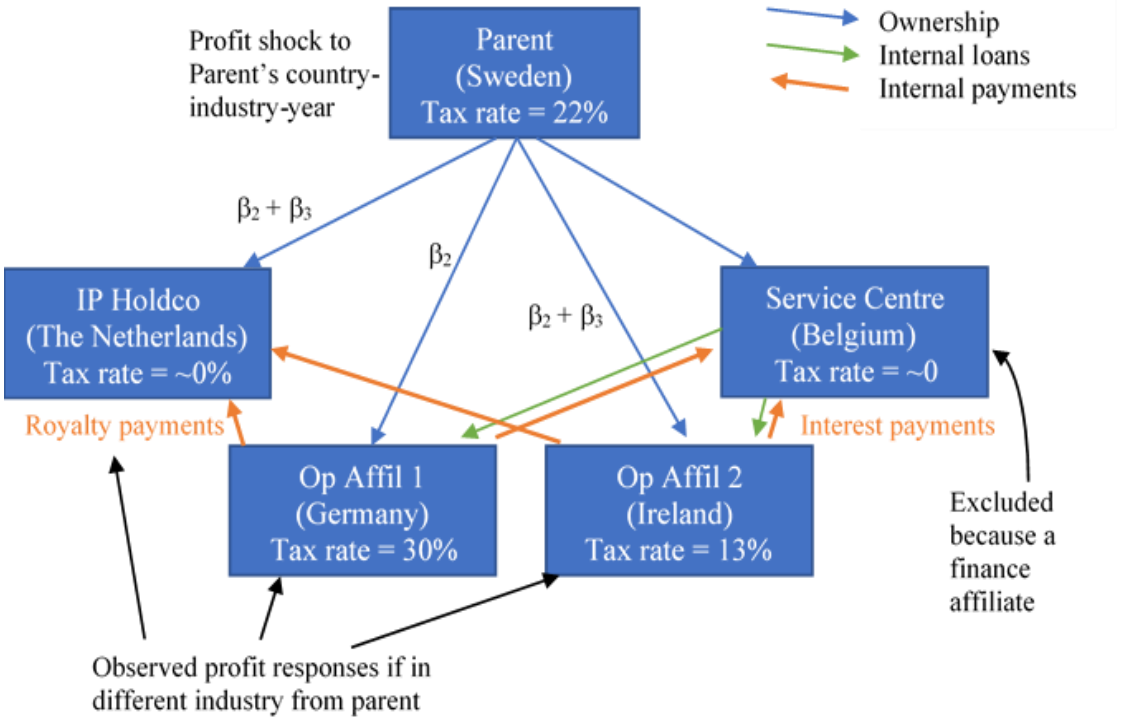


Figure 2: Bivariate relationships of Audit committee size and Profit shifting or GAAP ETR

The figures illustrate the positively sloped bivariate regressions (and data points) between *Profit shifting* and *Audit committee size* (figure 2a) and *Profit shifting* and *GAAP ETR* (figure 2b).

Figure 2a: Profit shifting & Audit committee size

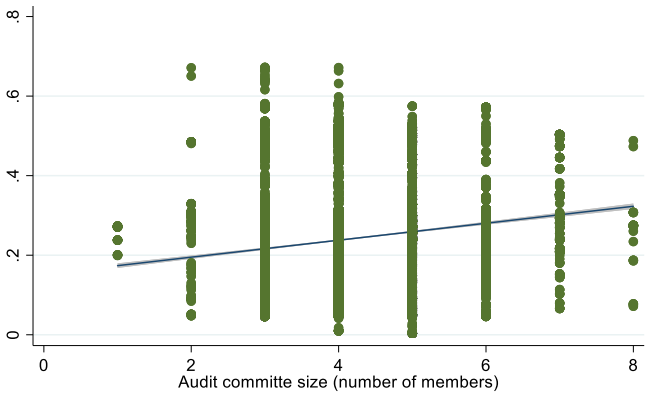


Figure 2b: GAAP ETR & Audit committee size

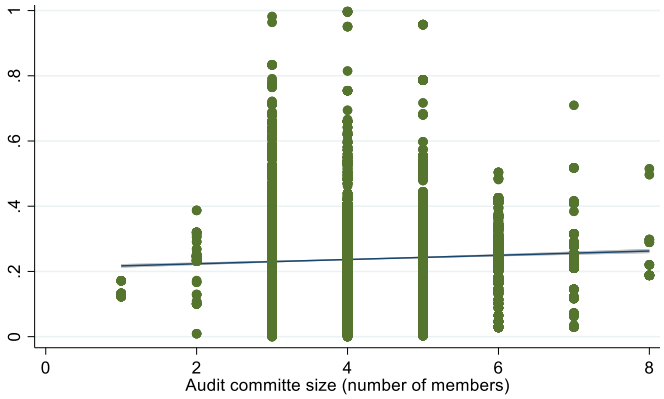


Table 1: Variable definitions and sources

Name	Description	Data source
EBT	Subsidiary's pre-tax profits (log).	*Orbis*
Low-tax subsidiary	Dummy variable equal to one if the corporate tax rate in the subsidiary's country is lower than the one in the parent's country and zero otherwise.	OECD, KPMG
Estimated parent profits	$\tilde{\pi}_{it} = \tilde{p}_{jt}\alpha_{it}$, where $\tilde{\pi}_{it}$ denotes the parent's pre-tax & pre-shifting profit. It is constructed as the product of the asset-weighted average profitability of all firms in the same 4-digit NACE industry in the same country and the parent's total asset stock (i.e., $\tilde{p}_j = \sum_j \frac{\alpha_j}{\sum_j \alpha_j} p_j$, $i \neq j$ and $p_j = \frac{\pi_j}{\alpha_j}$).	*Orbis*, OECD, KPMG
Subsidiary total assets	Subsidiary's total assets (log).	*Orbis*
Subsidiary leverage	Subsidiary's leverage, defined as total debt/ total assets.	*Orbis*
Profit shifting 1	The estimates $\hat{\beta}_{3,it}$ from the estimation of equation (1) using semiparametric local linear regression. We use an Epanechnikov kernel and select the bandwidth with cross validation. The control variables include *Subsidiary total assets* and *Subsidiary leverage*.	Own estimation based on *Orbis* data
Profit shifting 2	The estimates $\hat{\beta}_{3,it}$ (log) from the estimation of equation (1) using semiparametric local linear regression. We use a Gaussian kernel and select the bandwidth with cross validation. The control variables include *Subsidiary total assets* and *Subsidiary leverage*.	Own estimation based on *Orbis* data
Profit shifting 3	The estimates $\hat{\beta}_{3,it}$ (log) from the estimation of equation (1) using semiparametric local linear regression. We use an Epanechnikov kernel and select the bandwidth with the Akaike information criterion. The control variables include *Subsidiary total assets* and *Subsidiary leverage*.	Own estimation based on *Orbis* data
Profit shifting 4	The estimates $\hat{\beta}_{3,it}$ (log) from the estimation of equation (1) using a fully nonparametric local linear regression. We use an Epanechnikov kernel and select the bandwidth with cross validation. The control variables include *Subsidiary total assets* and *Subsidiary leverage*.	Own estimation based on *Orbis* data
Profit shifting 5	The estimates $\hat{\beta}_{3,it}$ (log) from the estimation of equation (1) using semiparametric local linear regression. We use an Epanechnikov kernel and select the bandwidth with cross-validation. The model includes only the interaction term (no main terms). The control variables include *Subsidiary total assets* and *Subsidiary leverage*.	Own estimation based on *Orbis* data
Profit shifting 6	The estimates $\hat{\beta}_{3,it}$ (log) from the estimation of equation (1) using semiparametric local linear regression. We use an Epanechnikov kernel and select the bandwidth with cross validation. The control variables include *Subsidiary total assets*, *Subsidiary leverage*, and all the corporate governance controls included in this table.	Own estimation based on *Orbis* data
Audit committee size	The number of directors in the audit committee (log).	*BoardEx*
Audit size to board size	Audit committee size to the total number of directors.	*BoardEx*
INEDs with audit experience 1	The ratio of independent nonexecutive directors (INEDs) in the audit committee with audit experience to audit committee size.	*BoardEx*
INEDs with audit experience 2	Dummy variable equal to 1 if the ratio of independent nonexecutive directors (INEDs) in the audit committee with audit experience is in the top quartile of our sample, and zero otherwise.	*BoardEx*
INEDs with audit experience 3	The ratio of independent nonexecutive directors (INEDs) in the audit committee with audit experience to total of independent nonexecutive directors in the audit committee.	*BoardEx*
INEDs with audit experience 4	Dummy variable equal to 1 if the ratio of independent nonexecutive directors (INEDs) in the audit committee with audit experience to	*BoardEx*

	independent nonexecutive directors in the audit committee is in the top quartile of our sample and zero otherwise.	
Duality	Dummy variable equal to 1 if the CEO is also the chairman of the board.	*BoardEx*
Board size	The number of board directors.	*BoardEx*
Tenure	The average tenure of the board's directors.	*BoardEx*
Number of directorships	The total current number of directorships of the board's directors (quoted boards).	*BoardEx*
Network size	The average network size of the board's directors (log).	*BoardEx*
Board age	The average age of the board's directors.	*BoardEx*
Board female members	The ratio of female directors to total directors.	*BoardEx*
Parent total assets	Parent's total assets (log).	*Orbis*
Parent liquidity	Parent's cash to operating revenue.	*Orbis*
Parent shares	Parent's total number of shares (log).	*Orbis*
Parent book value	Parent's book value per share.	*Orbis*
Parent ROA	Parent's return on assets.	*Orbis*
Subsidiary labor cost	Subsidiary's cost of labor (log).	*Orbis*
Subsidiary intangible assets	Subsidiary's intangible assets (log).	*Orbis*
Subsidiary liquidity	Subsidiary's cash to operating revenue.	*Orbis*
Number of subsidiaries	The number of foreign subsidiaries per parent firm.	*Orbis*
Number of countries with foreign subsidiaries	The number of countries that parent countries own foreign subsidiaries.	*Orbis*
Parent GAAP ETR	The ratio of the parent's total tax payments to parent earnings before interest and tax.	Own calculation based on *Orbis*
High intangible assets	Dummy variable equal to 1 if the ratio of the parent's intangible assets to the parent's total assets belongs to the top 10% of our sample, and zero otherwise.	*Orbis*
Number of tax haven subsidiaries	The number of foreign subsidiaries an MNE operates in tax haven territories per year.	Scott Dyreng's website

Table 2: Summary statistics

The table reports the number of observations as well as the mean, standard deviation, minimum, and maximum of the main variables used in the empirical analysis. The variables are defined in Table 1.

	N	Mean	S.d.	Min.	Max.
EBT (log)	52,228	7.833	1.864	-13.45	16.47
Low-tax subsidiary	52,228	0.763	0.425	0.000	1.000
Estimated parent profits (log)	52,228	13.30	1.961	1.251	18.56
Subsidiary total assets (log)	52,228	10.34	1.658	-6.701	17.78
Subsidiary leverage	52,228	0.876	3.113	0.000	631.9
Profit shifting 1	18,862	0.240	0.131	0.004	0.672
Profit shifting 2	18,094	0.236	0.117	0.030	0.599
Profit shifting 3	18,089	0.214	0.117	-0.006	0.607
Profit shifting 4	15,240	0.242	0.131	0.005	0.666
Profit shifting 5	12,143	0.218	0.113	0.032	0.568
Profit shifting 6	12,143	0.224	0.117	0.029	0.591
Audit committee size	18,862	4.176	1.065	1.000	8.000
Audit size to board size	18,862	0.004	0.001	0.001	0.010
INEDs with audit experience 1	18,862	0.202	0.192	0.000	1.000
INEDs with audit experience 2	18,862	0.315	0.465	0.000	1.000
INEDs with audit experience 3	18,861	0.202	0.192	0.000	1.000
INEDs with audit experience 4	18,862	0.316	0.465	0.000	1.000
Duality	18,862	0.670	0.470	0.000	1.000
Board size	18,862	10.59	2.290	5.000	22.00
Tenure	18,862	10.07	4.033	0.000	28.13
Number of directorships	18,862	22.22	8.651	3.000	74.00
Network size (log)	18,862	7.819	0.587	4.075	9.110
Board age	18,862	62.18	3.431	44.29	76.40
Board female members	18,862	0.170	0.095	0.000	0.556
Parent total assets (log)	18,862	16.17	1.723	10.30	20.02
Parent liquidity	18,862	15.25	10.83	-95.99	92.72
Parent shares (log)	18,862	12.61	1.560	6.418	16.13
Parent book value	18,862	2.821	2.825	-20.96	55.95
Parent ROA	18,862	9.086	8.198	-73.43	71.31
Subsidiary labor cost (log)	16,048	9.204	1.227	-0.057	14.70
Subsidiary intangible assets (log)	10,886	5.598	3.172	-10.04	14.87
Subsidiary liquidity	15,462	9.529	11.23	-94.36	99.72
Number of subsidiaries	18,862	14.18	22.44	1.000	256.0
Number of countries with foreign subsidiaries	18,862	6.120	10.09	1.000	110.0
Parent GAAP ETR	18,713	0.238	0.117	0.000	0.997
High intangible assets	18,713	0.099	0.299	0.000	1.000
Number of tax haven subsidiaries	7,873	21.49	28.67	0.000	177.0

Table 3: Estimation of profit shifting

The table reports coefficient estimates and standard errors (in parentheses) from the estimation of equation 1. Dependent variable is EBT and all variables are defined in Table 1. All specifications are estimated with semiparametric local linear regression, except from specification (4), which is estimated with nonparametric local linear regression. The standard errors are from a bootstrapping procedure with 200 replications. Table 1 also specifies the differences between each specification in the definitions of *Profit shifting 1* to *Profit shifting 6*. Specifically, specification 1 uses the Epanechnikov kernel and cross-validation for the bandwidth. Specification 2 uses the Gaussian kernel and cross-validation for the bandwidth. Specification 3 uses the Epanechnikov kernel and AIC for the bandwidth. Specification 4 replicates specification 1 but allows all variables to be nonparametrically estimated (as opposed to only the DID term). Specification 5 includes only the DID term, and specification 6 includes all controls, as well as the corporate governance variables. *Total observations* is the total number of observations we use in the regressions. *Effective observations* is the number of observations that survive after using the minimum of 100 observations within the sliding windows. *Positive profit shifting* is the number of observations for which our profit shifting estimates (the firm-year coefficients on the DID term) are positive. The ***, **, and * marks denote statistical significance at the 1%, 5%, and 10% level, respectively.

	(1) Profit shifting 1	(2) Profit shifting 2	(3) Profit shifting 3	(4) Profit shifting 4	(5) Profit shifting 5	(6) Profit shifting 6
Low-tax subsidiary ×	0.0286***	0.0289***	0.0321***	0.0291***	0.0035***	0.0270***
Estimated parent profits	(0.00681)	(0.00681)	(0.00682)	(0.00694)	(0.00088)	(0.00694)
Low-tax subsidiary	-0.327***	-0.334***	-0.397***	-0.256***		-0.292***
	(0.0890)	(0.0890)	(0.0892)	(0.0921)		(0.0906)
Estimated parent profits	-0.0111*	-0.0119**	-0.0128**	-0.00715		-0.0148**
	(0.00600)	(0.00599)	(0.00603)	(0.00623)		(0.00654)
Subsidiary total assets	0.871***	0.872***	0.864***	0.867***		0.869***
	(0.00365)	(0.00365)	(0.00384)	(0.00387)		(0.00370)
Subsidiary leverage	-0.0363***	-0.0367***	-0.0312***	-0.0291***		-0.0337***
	(0.00573)	(0.00573)	(0.00570)	(0.00570)		(0.00573)
Audit committee size						-0.00294
						(0.0241)
Duality						-0.142***
						(0.0126)
Board size						-0.00503**
						(0.00236)
Tenure						0.0166***
						(0.00169)
Number of directorships						0.00222**
						(0.000961)
Network size						0.0579***
						(0.00840)
Mean age of the board						-0.00838***
						(0.00183)
Ratio of female members						-0.189***
						(0.0528)
Total observations	52,228	52,228	52,228	52,228	52,228	51,246
Positive profit shifting U.S.	29,994	28,793	28,607	24,313	29,994	19,549

Table 4: Baseline results

The table reports coefficient estimates and *t*-statistics (in brackets) for all explanatory variables. The observational units are subsidiaries with foreign parents. All variables are defined in Table 1. The dependent variable is *Profit shifting 1*. For expositional brevity, the variable *Parent earnings per share* is divided by 100. The lower part of the table indicates the type of fixed effects used in each regression. The ***, **, and * marks denote statistical significance at the 1%, 5%, and 10% level, respectively

	(1)	(2)	(3)	(4)
Audit committee size	0.293**	0.269**	0.303***	0.306***
	[2.536]	[2.323]	[2.661]	[2.695]
INEDs with audit experience 1	0.21	0.184	0.171	0.162
	[1.442]	[1.231]	[1.138]	[1.082]
Duality	-0.053	-0.049	-0.057	-0.053
	[-1.102]	[-0.998]	[-1.239]	[-1.165]
Board size		0.012	0.004	0.004
		[0.787]	[0.246]	[0.260]
Tenure		-0.02	-0.021	-0.02
		[-1.492]	[-1.642]	[-1.630]
Number of directorships		0.001	0.001	0.001
		[0.068]	[0.105]	[0.174]
Network size		-0.316*	-0.313**	-0.316**
		[-1.792]	[-2.022]	[-2.063]
Board age		-0.004	-0.005	-0.005
		[-0.258]	[-0.415]	[-0.434]
Board female members		0.167	0.142	0.144
		[0.607]	[0.515]	[0.526]
Parent total assets			0.194***	0.196***
			[2.666]	[2.681]
Parent liquidity			0.008*	0.008*
			[1.846]	[1.858]
Parent shares			-0.224**	-0.218**
			[-2.113]	[-2.076]
Parent book value			-0.008	-0.008
			[-0.156]	[-0.163]
Parent ROA			-0.007**	-0.006**
			[-2.085]	[-2.080]
Observations	18,862	18,862	18,862	18,713
Adjusted R-squared	0.661	0.667	0.674	0.672
S.E. clustering	Parent	Parent	Parent	Parent
Subsidiary effects	√	√	√	√
Year effects	√	√	√	-
Sub. industry effects	-	-	-	√
Parent industry effects	-	-	-	√
Sub. country-year effects	-	-	-	√

Table 5: GMM regressions

The table reports coefficient estimates and *t*-statistics (in brackets) for all explanatory variables. The observational units are subsidiaries with foreign parents. All variables are defined in Table 1. The dependent variable is *Profit shifting 1*. Panel A reports the first-stage results on the instrumental variable and Panel B reports the second-stage results. The lower part of the table reports the Cragg-Donald and Kleibergen-Paap F-statistics for weak identification, as well as the Stock-Yogo critical value, which equals 16.85. It also reports the Hansen test for overidentifying restrictions (p-value). The lower part of the table indicates the type of fixed effects used in each regression. For expositional brevity, the variable *Parent earnings per share* is divided by 100. The ***, **, and * marks denote statistical significance at the 1%, 5%, and 10% level, respectively.

	(1)	(3)
	Panel A: First stage results	
	-0.167***	-0.166***
Audit committee deaths & illnesses	[-9.13]	[-9.34]
	Panel B: Second stage results	
Audit committee size	1.052**	1.078**
	(2.404)	(2.433)
INEDs with audit experience 1	0.408**	0.405**
	(2.192)	(2.181)
Duality	0.007	0.010
	(0.147)	(0.208)
Board size	-0.060*	-0.061*
	(-1.663)	(-1.687)
Tenure	-0.024*	-0.024*
	(-1.894)	(-1.929)
Number of directorships	0.006	0.006
	(0.668)	(0.752)
Network size	-0.265**	-0.274**
	(-2.146)	(-2.212)
Board age	0.004	0.003
	(0.303)	(0.259)
Board female members	-0.379	-0.408
	(-1.021)	(-1.099)
Parent total assets	0.351***	0.350***
	(3.160)	(3.172)
Parent liquidity	0.006	0.006*
	(1.587)	(1.679)
Parent shares	-0.223	-0.211
	(-1.304)	(-1.236)
Parent book value	0.059	0.062
	(0.941)	(0.975)
Parent ROA	-0.007*	-0.007*
	(-1.823)	(-1.961)
Observations	14,273	14,124
Cragg-Donald	182.2	175.0
Kleibergen-Paap	25.6	26.6
Hansen (-p-value)	0.66	0.64
Subsidiary effects	√	√
Year effects	√	-
Sub. industry effects	-	√
Parent industry effects	-	√
Sub. country-year effects	-	√
Parent country-year effects	-	√

Table 6: Heterogeneous effects due to cross-sectional characteristics

The table reports coefficient estimates and *t*-statistics (in brackets) for all explanatory variables. The observational units are subsidiaries with foreign parents. All variables are defined in Table 1. The dependent variable is *Profit shifting 1* and all specifications include the controls in Table 4. In specification 1, we examine the effect of *High intangible assets* (top 10%). In specification 2, we examine the effect of *Parent GAAP ETR*. In specification 3, we examine the effect of *Number of tax haven subsidiaries*. The lower part of the table indicates the type of fixed effects used in each regression. The industry fixed effects are at the two-digit NACE level. The ***, **, and * marks denote statistical significance at the 1%, 5%, and 10% level, respectively.

	(1)	(2)	(3)
Audit committee size	0.341***	0.318***	0.471**
	[2.883]	[2.767]	[2.578]
High intangible assets	0.723***		
	[3.324]		
Audit committee size × High intangible assets	-0.427***		
	[-2.594]		
Parent GAAP ETR		0.050**	
		[2.522]	
Audit committee size × Parent GAAP ETR		-0.038***	
		[-2.689]	
Number of tax haven subsidiaries			0.010**
			[2.586]
Audit committee size × Number of tax haven subsidiaries			-0.007**
			[-2.541]
Observations	18,713	18,713	7,873
Adjusted R-squared	0.674	0.673	0.723
S.E. clustering	Parent	Parent	Parent
Subsidiary effects	√	√	√
Sub. industry effects	√	√	√
Parent industry effects	√	√	√
Sub. country-year effects	√	√	√

Table 7: Heterogeneity of the effect of audit committee size

The table reports coefficient estimates and *t*-statistics (in brackets) for all explanatory variables. The observational units are subsidiaries with foreign parents. All variables are defined in Table 1. The dependent variable is *Profit shifting 1* and all specifications include the controls in Table 4. In specification 1, we limit our sample to that with *INEDs with audit experience 2* equal to 1. In specification 2, we limit our sample to that with *INEDs with audit experience 2* equal to 0. Specification 3 uses *INEDs with audit experience 1* as an interaction. In specification 4, we limit our sample to that with Duality equal to 1. In specification 5, we limit our sample to that with Duality equal to 0. Specification 3 to 6 use *INEDs with audit experience 1*. The lower part of the table indicates the type of fixed effects used in each regression. The industry fixed effects are at the two-digit NACE level. The ***, **, and * marks denote statistical significance at the 1%, 5%, and 10% level, respectively.

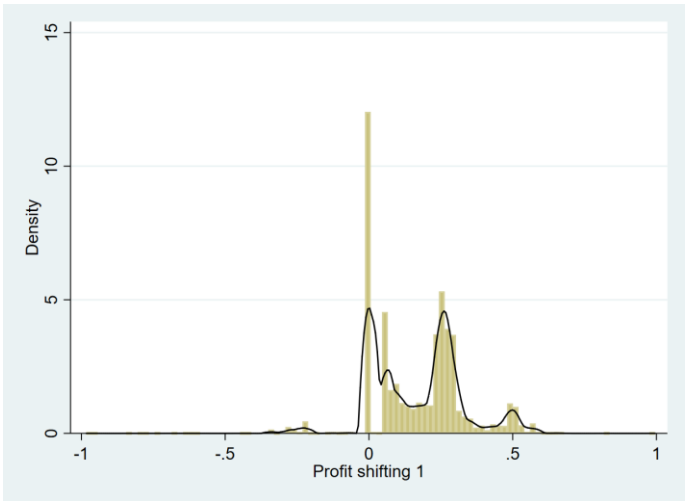
	(1)	(2)	(3)	(4)	(5)	(6)
Audit committee size	-0.063	0.500***	0.483***	0.366**	0.082	0.147
	[-0.438]	[3.013]	[2.955]	[2.272]	[0.701]	[1.353]
INEDs with audit experience			1.344***	0.039	-0.041	0.156
			[2.672]	[0.183]	[-0.319]	[1.053]
Audit committee size × INEDs with audit experience			-0.934**			
			[-2.395]			
Duality	-0.046	-0.090	-0.053			-0.398**
	[-0.822]	[-1.572]	[-1.199]			[-2.067]
Audit committee size × Duality						0.245*
						[1.847]
Network size	-0.306***	-0.416*	-0.324**	-0.585**	-0.049	-0.310**
	[-2.961]	[-1.751]	[-2.110]	[-2.050]	[-0.574]	[-2.044]
Marginal effect at mean of INEDs with audit experience			0.294***			
			(2.644)			
Observations	5,538	12,578	18,713	12,374	5,898	18,713
Adjusted R-squared	0.761	0.663	0.673	0.667	0.721	0.673
S.E. clustering	Parent	Parent	Parent	Parent	Parent	Parent
Subsidiary effects	√	√	√	√	√	√
Sub. industry effects	√	√	√	√	√	√
Parent industry effects	√	√	√	√	√	√
Sub. country-year effects	√	√	√	√	√	√

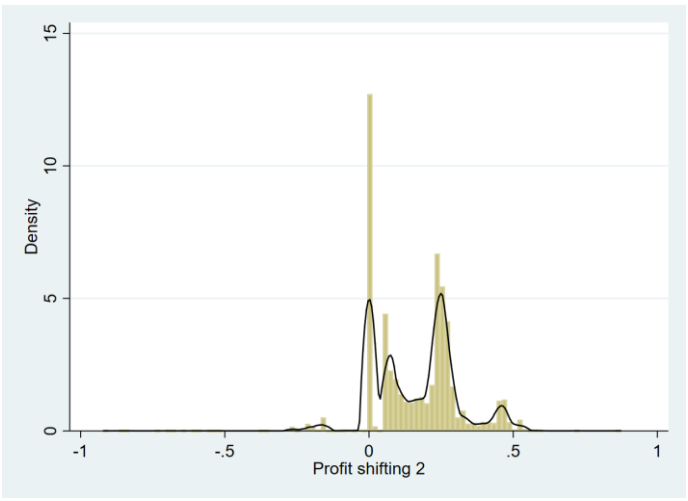
Appendix

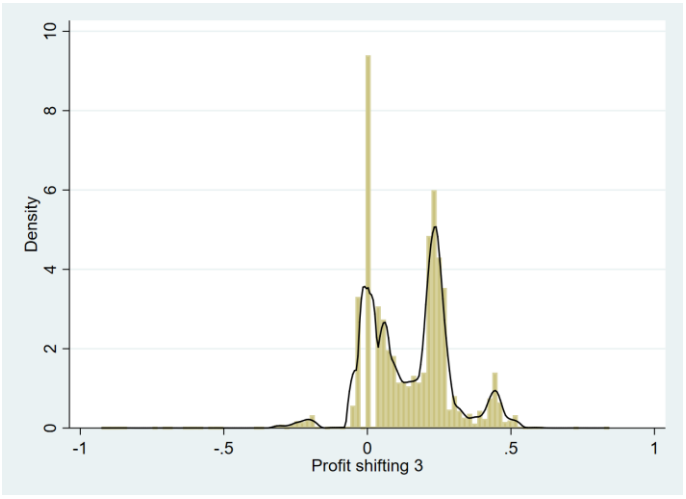
Corporate Governance and Profit Shifting: The Important Role of the Audit Committee

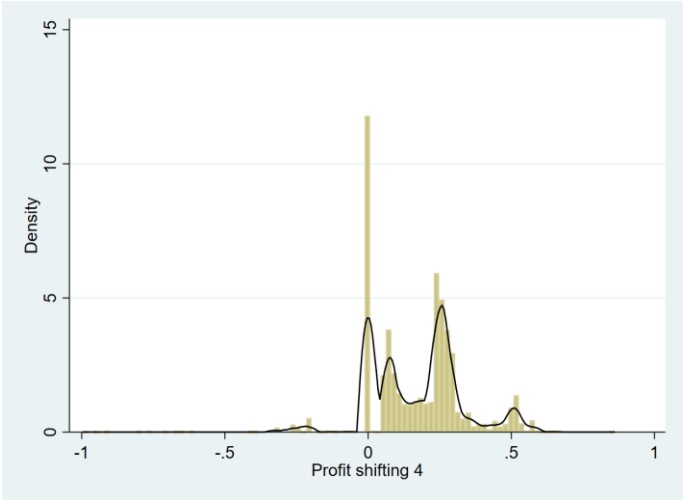
This appendix, intended for online use only, includes more information on our sample and additional robustness tests. Figure A1 reports histograms and kernel densities for our profit-shifting estimates. The first two tables include information for the countries included in the two-stages of our analysis (i.e., estimation of profit shifting and analysis of profit shifting into its determinants). Tables A3 and A4 provide further descriptive statistics. Table A5 is a correlations matrix for the main explanatory variables of the second-stage analysis. Tables A6 onward provide robustness tests on the effect of corporate governance variables on profit shifting.

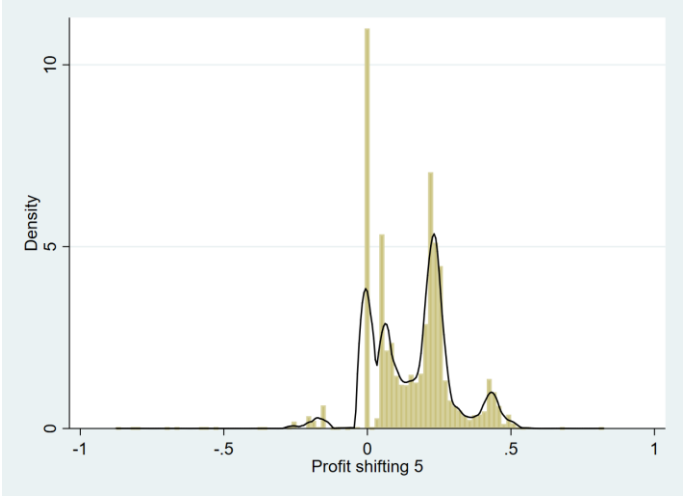
Figure A1: Densities of profit shifting measures

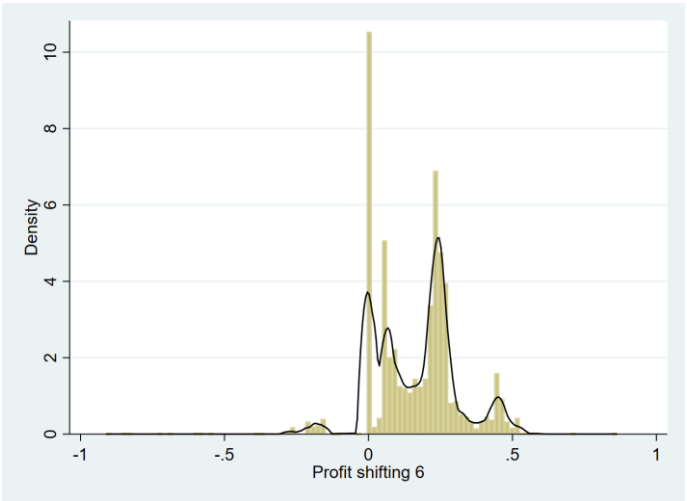












Technical details for the nonparametric estimation

We estimate equation (1) using semiparametric or nonparametric local linear regression. The local linear regression is a moving average regression that builds on classical OLS but estimates the regression line within localized subsets of the data (sliding windows). Consider the local linear model as $Y_{it} = \mu(x_{it}) + \varepsilon_{it}$, where *x* are predictor variables and *Y* is the response variable. We estimate the unknown function $\mu(x)$ by fitting a polynomial model within a sliding window (neighborhood of *x*). Differently phrased, the estimate of μ at *x* uses all observations whose x_{it} values are closest to *x*. Each point in this neighborhood is weighted according to its distance from *x*. Points close to *x* have large weights, and points far from *x* have small weights. The next sliding window is the one around *x'* (the observation closest to *x*), which includes *x* along with other observations in the equivalent neighborhood of *x'* but leaves out the most distant observation to *x'* (that is included in the equivalent window of *x*) and so on. The number of windows equals the number of observations.

Within the sliding windows the estimation assumptions are the same with OLS (errors independent and identically distributed with zero mean and finite variance, etc.). We make no strong assumptions about μ globally, but locally around *x* we assume that μ can be well approximated. By using these observation-specific sliding windows, we obtain observation-specific $\hat{\beta}_{3,it}$.

Formally, for the observation *x*, define a bandwidth $h(x)$ and the sliding window (x-$h(x)$, x+$h(x)$). The observations are weighted using $w_i(x) = W(^{x_i - x}/_{h(x)})$, where W is a weight function that assigns the larger weight for observations close to *x*.

Given the weight function, two important issues in the estimation are the choice of the kernel (the shape of the weighting function) and the optimal bandwidth (the smaller the bandwidth is, the larger the weight assigned to points between *x* and x_i). We mainly use an Epanechnikov kernel (where $W(x) = 1 - x^2, |x| < 1$), but we also experiment with Gaussian, triangle, and biweight kernels (the results do not change significantly).

In turn, there are many alternatives for the derivation of optimal bandwidth (e.g., Loader, 1999), and we choose the one that minimizes the integrated mean squared error of the prediction (cross-

validation method). We find that our results are not sensitive to different methods of bandwidth selection (e.g., the nearest neighbor bandwidth).

A third important issue is that this class of models suffers from the so-called curse of dimensionality when the estimation encounters regions with small density in observations.[27] To avoid this problem, we impose that sliding windows must have at least 100 observations; we drop the rest of the observations from our analysis (essentially this is equivalent to dropping outliers).[28]

[27] This essentially means a small number of observations within the sliding window. As in any parametric regression with a small number of observations, this implies less precise estimates.

[28] We find that increasing the minimum number of observations to 150 or 200 does not affect our results but reduces the number of estimates $\hat{\beta}_{3,it}$ (and thus the availability of observations for the rest of our empirical analysis).

Table A1: Country-specific information by parent and subsidiary country

The table includes two panels. Panel A reports the number of parent firms by parent country, the percentage of each country's parent firms to the total number of parents, and the mean profit shifting by parent country (i.e., *Profit Shifting 1*). Panel B reports the number of foreign subsidiaries by subsidiary country, the percentage of each country's foreign subsidiaries to the total foreign subsidiaries, and the mean profit shifting by subsidiary country (i.e., *Profit Shifting 1*).

Panel A: 18 Parent countries

Country	Parents	Parents %	Profit shifting	Country	Parents	Parents %	Profit shifting
China	5	0.53%	0.032	Luxembourg	2	0.21%	0.067
Denmark	10	1.06%	0.033	Netherlands	23	2.45%	0.069
Finland	20	2.13%	0.067	Norway	16	1.70%	0.121
France	67	7.13%	0.205	Poland	15	1.60%	0.032
Germany	57	6.06%	0.134	Spain	24	2.55%	0.135
Greece	4	0.43%	0.113	Sweden	48	5.11%	0.071
Ireland	5	0.53%	0	Turkey	1	0.11%	0.072
Israel	5	0.53%	0.235	United Kingdom	177	18.83%	0.057
Italy	11	1.17%	0.162	United States	444	47.23%	0.219
					940	**100.00%**	

Panel B: 59 Subsidiary countries

Country	Subsidiaries	Subsidiaries %	Profit shifting	Country	Subsidiaries	Subsidiaries %	Profit shifting
Albania	2	0.03%	0.333	Latvia	35	0.53%	0.245
Australia	213	3.23%	0.131	Lithuania	14	0.21%	0.239
Austria	68	1.03%	0.166	Luxembourg	33	0.50%	0.136
Bangladesh	1	0.02%	0.064	Macedonia(F.)	1	0.02%	0.120
Belgium	416	6.31%	0.099	Malaysia	19	0.29%	0.230
Bosnia&Herzeg.	1	0.02%	0.502	Malta	9	0.14%	0.113
Botswana	1	0.02%	0.090	Mexico	7	0.11%	0.010
Brazil	17	0.26%	0.030	Netherlands	74	1.12%	0.165
Bulgaria	50	0.76%	0.271	Nigeria	4	0.06%	0.000
Canada	1	0.02%	0.133	Norway	161	2.44%	0.093
Chile	4	0.06%	0.365	Pakistan	3	0.05%	0.040
China	396	6.00%	0.171	Panama	1	0.02%	0.367
Colombia	9	0.14%	0.198	Poland	229	3.47%	0.218
Croatia	27	0.41%	0.235	Portugal	121	1.83%	0.206
Czech Republic	231	3.50%	0.227	Korea (Rep)	102	1.55%	0.189
Denmark	104	1.58%	0.134	Romania	98	1.49%	0.257
Estonia	27	0.41%	0.158	Russian Feder.	249	3.78%	0.195
Finland	60	0.91%	0.179	Serbia	24	0.36%	0.284
France	686	10.40%	0.131	Slovakia	75	1.14%	0.220
Germany	861	13.05%	0.154	Slovenia	16	0.24%	0.280
Ghana	1	0.02%	0.125	South Africa	1	0.02%	0.000
Greece	58	0.88%	0.225	Spain	359	5.44%	0.147
Hungary	83	1.26%	0.198	Sweden	211	3.20%	0.159
Iceland	7	0.11%	0.197	Turkey	5	0.08%	0.196
India	13	0.20%	0.031	Ukraine	23	0.35%	0.245
Indonesia	1	0.02%	0.092	U.K.	806	12.22%	0.192
Ireland	114	1.73%	0.215	United States	7	0.11%	0.000
Italy	415	6.29%	0.133	Uruguay	1	0.02%	0.503
Japan	28	0.42%	0.121	Vietnam	12	0.18%	0.152
Kenya	1	0.02%	0.000	**Total:**	**6,596**	**100.00%**	

Table A2: Information on the location of U.S. subsidiaries in our sample

The table reports the number of unique U.S. subsidiaries by country, as well as the ratio of the number of subsidiaries in a country to the total number of subsidiaries by U.S. parents (e.g., Italy has 174/3,316=5.25% of the U.S. subsidiaries of our sample).

Country	Number	Percentage	Country	Number	Percentage
Australia	102	3.08%	Japan	20	0.60%
Austria	62	1.87%	Netherlands	178	5.37%
Belgium	148	4.46%	Norway	43	1.30%
China	219	6.60%	Poland	73	2.20%
Czech Republic	79	2.38%	Portugal	39	1.18%
Denmark	53	1.60%	Republic of Korea	56	1.69%
Finland	25	0.75%	Romania	50	1.51%
France	372	11.22%	Russian Federation	85	2.56%
Germany	409	12.33%	Slovakia	24	0.72%
Greece	25	0.75%	Spain	156	4.70%
Hungary	41	1.24%	Sweden	93	2.80%
Ireland	91	2.74%	United Kingdom	699	21.08%
Italy	174	5.25%	**Total**	**3,316**	**100.00%**

Table A3: Additional subsidiaries' descriptive statistics

Panel A: Low-tax Vs High-tax subsidiaries (1st stage estimation)

	Low-tax subsidiary-years		High-tax subsidiary-years		Differences in Mean	
variable	N	Mean	N	Mean	Mean	Signif.
EBT	37,422	17,306	15,593	12,997	-4,309	***
Subsidiary total assets	37,422	174,302	15,593	168,585	-5,717	
Tax difference (Subsidiary-Parent)	37,422	-0.096	15,593	0.052	0.149	***
Number of subsidiaries (for the MNE)	37,422	79.16	15,593	51.94	-27.22	***
Subsidiary intangible assets	36,628	9,050	15,398	11,008	1,958	**
Subsidiary leverage	37,422	0.894	15,593	0.966	0.072	***
Subsidiary liquidity	30,602	9.439	13,750	8.240	-1.199	***

Panel B: High Vs low profit shifting subsidiaries (2nd stage estimation)

	High profit shifting subsidiaries		Low profit shifting subsidiaries		Differences in Mean	
variable	N	Mean	N	Mean	Mean	Signif.
EBT	9,762	20,493	9,763	15,787	-4,706	**
Subsidiary total assets	9,740	262,792	9,754	130,402	-132,389	***
Tax difference (Subsidiary-Parent)	9,762	-0.129	9,763	-0.127	0.002	**
Number of subsidiaries (for the MNE)	9,762	57.38	9,763	35.18	-22.20	***
Subsidiary intangible assets	9,369	8,855	9,337	7,543	-1,312	
Subsidiary leverage	7,745	0.927	7,704	0.890	-0.037	*
Subsidiary liquidity	7,949	9.602	7,978	9.586	-0.016	

Table A4: Summary statistics by audit committee group size

The table reports the number of observations, the mean of small (1-2 members), medium (3-5 members) and large (6-8 members) audit committees as well as the t-test for the differences of the main variables used in the empirical analysis. The variables are defined in Table 1.

	Small size: Audit committees with 1-2 members		Medium size: Audit committees with 3-5 members		Large size: Audit committees with 6-8 members		Differences Medium - Small		Differences Large - Medium	
	N	Mean	N	Mean	N	Mean	Mean	Signif.	Mean	Signif.
EBT (log)	129	8.262	16,450	7.965	2,283	8.088	-0.297	**	0.123	***
Estimated parent profits (log)	129	13.34	16,450	13.37	2,283	14.29	0.031		0.918	***
Subsidiary total assets (log)	129	10.64	16,429	10.49	2,279	10.61	-0.153		0.126	***
Subsidiary leverage	102	0.740	12,901	0.929	1,880	0.837	0.189		-0.092	***
Profit shifting 1	129	0.266	16,450	0.234	2,283	0.278	-0.032	***	0.044	***
Profit shifting 2	122	0.261	15,788	0.231	2,184	0.272	-0.029	***	0.041	***
Profit shifting 3	127	0.240	15,771	0.209	2,191	0.249	-0.032	***	0.041	***
Profit shifting 4	111	0.267	13,268	0.236	1,861	0.279	-0.031	***	0.043	***
Profit shifting 5	92	0.235	10,543	0.212	1,508	0.261	-0.023	**	0.049	***
Profit shifting 6	92	0.244	10,543	0.218	1,508	0.267	-0.025	**	0.049	***
Audit committee size	129	1.806	16,450	3.915	2,283	6.194	2.109	***	2.279	***
Audit size to board size	129	0.003	16,450	0.004	2,283	0.005	0.001	***	0.001	***
INEDs with audit experience 1	129	0.128	16,450	0.201	2,283	0.214	0.073	***	0.013	***
INEDs with audit experience 2	129	0.256	16,450	0.322	2,283	0.270	0.066	*	-0.052	***
INEDs with audit experience 3	129	0.128	16,450	0.201	2,282	0.215	0.073	***	0.013	***
INEDs with audit experience 4	129	0.256	16,450	0.322	2,283	0.270	0.067	*	-0.052	***
Duality	129	0.364	16,450	0.647	2,283	0.851	0.282	***	0.204	***
Board size	129	7.202	16,450	10.33	2,283	12.64	3.130	***	2.313	***
Tenure	129	7.785	16,450	10.21	2,283	9.177	2.422	***	-1.030	***
Number of directorships	129	14.53	16,450	21.47	2,283	28.07	6.942	***	6.603	***
Network size (log)	129	6.810	16,450	7.797	2,283	8.037	0.987	***	0.240	***
Board age	129	59.59	16,450	62.03	2,283	63.37	2.444	***	1.337	***
Board female members	129	0.119	16,450	0.164	2,283	0.215	0.045	***	0.051	***
Parent total assets (log)	129	16.15	16,450	16.02	2,283	17.22	-0.128		1.202	***
Parent liquidity	129	18.89	16,450	15.43	2,283	13.78	-3.461	***	-1.646	***
Parent shares (log)	129	12.89	16,450	12.53	2,283	13.17	-0.366	***	0.642	***
Parent book value	129	1.830	16,450	2.617	2,283	4.349	0.787	***	1.732	***
Parent ROA	129	9.626	16,450	8.978	2,283	9.835	-0.647		0.857	***
Subsidiary labor cost (log)	111	9.411	13,996	9.206	1,941	9.180	-0.205	**	-0.026	
Subsidiary intangible assets	53	5.840	9,417	5.563	1,416	5.827	-0.278		0.265	***
Subsidiary liquidity	112	10.50	13,475	9.384	1,875	10.51	-1.118		1.131	***

Table A5: Variables' bilateral relationships

Panel A: Correlation Matrix

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1. Profit shifting 1	1.000															
2. Audit committee size	0.179*	1.000														
3. INEDs audit exper.1	0.017	-0.092*	1.000													
4. Duality	0.147*	0.199*	-0.212*	1.000												
5. Board size	0.276*	0.531*	-0.039*	0.279*	1.000											
6. Tenure	-0.031*	-0.082*	-0.137*	0.123*	-0.017	1.000										
7. # of directorships	0.299*	0.427*	-0.097*	0.210*	0.698*	-0.123*	1.000									
8. Network size	0.387*	0.234*	0.028*	0.119*	0.466*	-0.159*	0.552*	1.000								
9. Board age	0.055*	0.211*	-0.254*	0.201*	0.146*	0.389*	0.094*	-0.050*	1.000							
10. Board females	0.246*	0.273*	0.013	0.159*	0.343*	-0.046*	0.423*	0.388*	0.006	1.000						
11. Parent total assets	0.487*	0.352*	-0.006	0.238*	0.647*	0.015	0.645*	0.713*	0.139*	0.428*	1.000					
12. Par. earnings/share	0.183*	0.233*	0.030*	0.113*	0.251*	0.075*	0.235*	0.215*	0.191*	0.169*	0.355*	1.000				
13. Parent liquidity	0.354*	0.002	0.037*	0.023*	0.176*	0.076*	0.164*	0.310*	0.032*	0.145*	0.394*	0.305*	1.000			
14. Parent shares	0.493*	0.252*	0.026*	0.196*	0.564*	0.020*	0.548*	0.722*	0.054*	0.356*	0.895*	0.133*	0.479*	1.000		
15. Parent book value	0.099*	0.122*	-0.032*	0.064*	0.168*	0.076*	0.170*	0.044*	0.101*	0.137*	0.271*	0.447*	0.070*	-0.075*	1.000	
16. Parent ROA	0.097*	0.087*	0.043*	0.082*	0.078*	0.188*	0.007	0.112*	0.071*	0.029*	0.138*	0.478*	0.504*	0.212*	-0.023*	1.000

Panel B: VIF test for multicollinearity among the corporate governance

Variable	VIF
Board size	2.65
Number of directorships	2.54
Network size	2.36
Audit committee size	1.56
Board age	1.41
Tenure	1.36
Board female members	1.33
Duality	1.19
INEDs with audit experience 1	1.13
Mean VIF	1.73

Table A6: Alternative measures of profit shifting

The table reports coefficient estimates and *t*-statistics (in brackets) for all explanatory variables. The observational units are subsidiaries of foreign parents. All variables are defined in Table 1. The dependent variable is shown in the first line of the table, with the different profit-shifting measure. For expositional brevity, the variable *Parent earnings per share* is divided by 100. The lower part of the table indicates the type of fixed effects used in each regression. The industry fixed effects are at the two-digit NACE level. The ***, **, and * marks denote statistical significance at the 1%, 5%, and 10% level, respectively.

	(1)	(2)	(3)	(4)	(5)
	Profit shifting 2	Profit shifting 3	Profit shifting 4	Profit shifting 5	Profit shifting 6
Audit committee size	0.221***	0.269***	0.289**	0.322***	0.314***
	[2.715]	[2.799]	[2.550]	[3.428]	[3.247]
INEDs with audit experience 1	0.146	0.193	0.152	0.173	0.173
	[1.178]	[1.343]	[1.035]	[1.253]	[1.235]
Duality	-0.040	-0.045	-0.042	-0.040	-0.040
	[-1.096]	[-0.995]	[-1.037]	[-0.998]	[-0.986]
Board size	0.003	0.004	-0.000	0.000	0.000
	[0.246]	[0.291]	[-0.005]	[0.027]	[0.008]
Tenure	-0.014	-0.017	-0.017	-0.012	-0.013
	[-1.544]	[-1.608]	[-1.380]	[-1.245]	[-1.270]
Number of directorships	-0.001	-0.002	0.002	0.000	0.001
	[-0.144]	[-0.304]	[0.281]	[0.082]	[0.113]
Network size	-0.219**	-0.253**	-0.308**	-0.218**	-0.227**
	[-2.419]	[-2.458]	[-2.125]	[-2.396]	[-2.364]
Board age	-0.002	0.001	-0.007	-0.003	-0.003
	[-0.197]	[0.052]	[-0.619]	[-0.305]	[-0.322]
Board female members	0.147	0.211	0.123	0.208	0.211
	[0.663]	[0.801]	[0.474]	[0.870]	[0.862]
Parent total assets	0.204***	0.230***	0.201***	0.209***	0.210***
	[3.811]	[3.601]	[2.944]	[3.366]	[3.300]
Parent liquidity	0.006**	0.006**	0.008**	0.005**	0.006**
	[2.363]	[2.292]	[2.017]	[2.373]	[2.324]
Parent shares	-0.174**	-0.228**	-0.208**	-0.227**	-0.230**
	[-2.001]	[-1.998]	[-2.216]	[-2.192]	[-2.189]
Parent book value	-0.016	-0.016	-0.014	-0.015	-0.015
	[-0.391]	[-0.327]	[-0.286]	[-0.316]	[-0.306]
Parent ROA	-0.004**	-0.005**	-0.006**	-0.005**	-0.005**
	[-2.048]	[-2.075]	[-2.129]	[-2.330]	[-2.329]
Observations	17,791	17,691	14,971	11,880	11,880
Adjusted R-squared	0.705	0.683	0.677	0.709	0.705
S.E. clustering	Parent	Parent	Parent	Parent	Parent
Subsidiary effects	√	√	√	√	√
Sub. industry effects	√	√	√	√	√
Parent industry effects	√	√	√	√	√
Sub. country-year effects	√	√	√	√	√

Table A7: Replication of baseline (with MNE-year mean profit shifting)

The table reports coefficient estimates and *t*-statistics (in brackets) for all explanatory variables. The observational units are subsidiaries with foreign parents. All variables are defined in Table 1. The dependent variable is the *MNE-year* mean *Profit shifting*. For expositional brevity, the variable *Parent earnings per share* is divided by 100. The lower part of the table indicates the type of fixed effects used in each regression. The industry fixed effects are at the two-digit NACE level. The ***, **, and * marks denote statistical significance at the 1%, 5%, and 10% level, respectively.

	(1)	(2)	(3)	(4)	(5)
Audit committee size	0.303***	0.304***	0.303***	0.307***	0.307***
	[2.695]	[2.719]	[2.692]	[2.788]	[2.761]
INEDs with audit experience 1	0.130	0.127	0.130	0.122	0.125
	[0.948]	[0.949]	[0.946]	[0.925]	[0.924]
Duality	-0.048	-0.048	-0.048	-0.045	-0.045
	[-1.066]	[-1.076]	[-1.065]	[-1.038]	[-1.026]
Board size	0.004	0.003	0.004	0.002	0.003
	[0.298]	[0.215]	[0.298]	[0.157]	[0.241]
Tenure	-0.021*	-0.021*	-0.021*	-0.021*	-0.021*
	[-1.729]	[-1.748]	[-1.727]	[-1.757]	[-1.731]
Number of directorships	0.001	0.001	0.001	0.002	0.001
	[0.106]	[0.132]	[0.106]	[0.222]	[0.193]
Network size	-0.305**	-0.301**	-0.305**	-0.300**	-0.304**
	[-2.041]	[-2.027]	[-2.039]	[-2.058]	[-2.069]
Board age	-0.004	-0.004	-0.004	-0.004	-0.004
	[-0.318]	[-0.290]	[-0.318]	[-0.293]	[-0.324]
Board female members	0.121	0.117	0.121	0.116	0.120
	[0.448]	[0.436]	[0.447]	[0.438]	[0.449]
Parent total assets	0.209***	0.213***	0.209***	0.217***	0.213***
	[2.842]	[2.924]	[2.839]	[3.002]	[2.912]
Parent liquidity	0.008*	0.008*	0.008*	0.008*	0.008*
	[1.844]	[1.848]	[1.842]	[1.878]	[1.869]
Parent shares	-0.160*	-0.150	-0.160*	-0.146	-0.156*
	[-1.681]	[-1.607]	[-1.679]	[-1.584]	[-1.662]
Parent book value	-0.004	-0.005	-0.004	-0.007	-0.006
	[-0.082]	[-0.114]	[-0.082]	[-0.152]	[-0.124]
Parent ROA	-0.006**	-0.006**	-0.006**	-0.006**	-0.006**
	[-2.078]	[-2.077]	[-2.076]	[-2.078]	[-2.072]
Observations	18,714	18,862	18,714	18,861	18,713
Adjusted R-squared	0.678	0.680	0.678	0.681	0.678
S.E. clustering	Parent	Parent	Parent	Parent	Parent
Subsidiary effects	√	√	√	√	√
Year effects	√	√	√	-	-
Sub. industry effects	√	-	√	-	√
Parent industry effects	-	√	√	-	√
Sub. country-year effects	-	-	-	√	√

Table A8: Replication of baseline (with standardized audit committee size)

The table reports coefficient estimates and *t*-statistics (in brackets) for all explanatory variables. The observational units are subsidiaries with foreign parents. All variables are defined in Table 1. The dependent variable is *Profit shifting 1*. For expositional brevity, the variable *Parent earnings per share* is divided by 100. The lower part of the table indicates the type of fixed effects used in each regression. The industry fixed effects are at the two-digit NACE level. The ***, **, and * marks denote statistical significance at the 1%, 5%, and 10% level, respectively.

	(1)
Audit committee size/ Parent total assets	15.832**
	[2.171]
INEDs with audit experience 1	0.118
	[0.884]
Duality	-0.045
	[-0.944]
Board size	0.025*
	[1.841]
Tenure	-0.021
	[-1.560]
Number of directorships	0.000
	[0.065]
Network size	-0.276*
	[-1.750]
Board age	-0.002
	[-0.193]
Board female members	0.151
	[0.551]
Parent liquidity	0.008*
	[1.930]
Parent shares	0.111
	[0.785]
Parent book value	0.100*
	[1.883]
Parent ROA	-0.008***
	[-2.924]
Observations	18,713
Adjusted R-squared	0.669
Subsidiary effects	√
Sub. industry effects	√
Parent industry effects	√
Sub. country-year effects	√

Table A9: Sensitivity to subsidiary controls, parent fixed effects, and standard error clustering

The table reports coefficient estimates and *t*-statistics (in brackets) for all explanatory variables. The observational units are subsidiaries with foreign parents. All variables are defined in Table 1. The dependent variable is *Profit shifting 1*. For expositional brevity, the variable *Parent earnings per share* is divided by 100. The lower part of the table indicates the type of fixed effects used in each regression. The ***, **, and * mark denote statistical significance at the 1%, 5%, and 10% level, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
Audit committee size	0.317***	0.310***	0.310**	0.310**	0.311**	0.304***
	[2.763]	[2.645]	[2.826]	[3.048]	[2.192]	[2.657]
INEDs with audit experience 1	0.155	0.150	0.150	0.150	0.085	0.161
	[0.998]	[0.972]	[0.994]	[1.010]	[0.781]	[1.072]
Duality	-0.063	-0.049	-0.049	-0.049	0.033	-0.052
	[-1.377]	[-1.075]	[-1.113]	[-1.170]	[0.645]	[-1.138]
Board size	0.001	0.003	0.003	0.003	-0.030	0.004
	[0.086]	[0.234]	[0.221]	[0.226]	[-1.498]	[0.279]
Tenure	-0.019	-0.022*	-0.022	-0.022	0.000	-0.021*
	[-1.553]	[-1.698]	[-1.557]	[-1.611]	[0.016]	[-1.662]
Number of directorships	0.001	0.001	0.001	0.001	-0.000	0.001
	[0.157]	[0.175]	[0.163]	[0.166]	[-0.066]	[0.173]
Network size	-0.326**	-0.328**	-0.328*	-0.328*	0.032	-0.315**
	[-2.257]	[-2.008]	[-1.921]	[-1.985]	[0.494]	[-2.044]
Board age	-0.005	-0.005	-0.005	-0.005	0.007	-0.005
	[-0.397]	[-0.373]	[-0.397]	[-0.397]	[0.770]	[-0.431]
Board female members	0.228	0.127	0.127	0.127	0.128	0.140
	[0.791]	[0.456]	[0.396]	[0.397]	[0.483]	[0.514]
Subsidiary total assets	-0.000					
	[-0.023]					
Subsidiary leverage	-0.003					
	[-0.953]					
Subsidiary liquidity	-0.000					
	[-0.137]					
Subsidiary intangible fixed assets	-0.000					
	[-0.135]					
Parent total assets	0.234***	0.211***	0.211**	0.211**	0.096	0.197***
	[3.197]	[2.861]	[3.002]	[3.156]	[1.573]	[2.687]
Parent liquidity	0.007*	0.008*	0.008	0.008	0.008**	0.008*
	[1.776]	[1.859]	[1.777]	[1.791]	[2.140]	[1.839]
Parent shares	-0.252**	-0.228**	-0.228***	-0.228**	0.118	-0.221**
	[-2.277]	[-2.128]	[-3.250]	[-3.095]	[1.646]	[-2.103]
Parent book value	-0.018	-0.019	-0.019	-0.019	0.087	-0.010
	[-0.323]	[-0.384]	[-0.340]	[-0.350]	[1.607]	[-0.188]
Parent ROA	-0.004	-0.006**	-0.006	-0.006	-0.006**	-0.006**
	[-1.334]	[-2.038]	[-1.610]	[-1.587]	[-2.000]	[-2.066]
Number of subsidiaries					-0.001	
					[-0.647]	
Number of countries with foreign subsidiaries						0.001
						[0.563]
Observations	12,075	18,570	18,570	18,570		
Adjusted R-squared	0.689	0.662	0.672	0.672		
S.E. clustering	Parent	Parent	Parent & year	Parent & year & subsidiary country	Parent	Parent
Subsidiary effects	√	√	√	√	-	√
Parent effects	-	√	-	-	-	-
Sub. industry effects	√	√	√	√	√	√
Parent industry effects	√	√	√	√	√	√
Sub. country-year effects	√	√	√	√	√	√

Table A10: Cross-sectional heterogeneity with additional fixed effects

The table reports coefficient estimates and *t*-statistics (in brackets) for all explanatory variables. The observational units are subsidiaries with foreign parents. All variables are defined in Table 1. The dependent variable is *Profit shifting 1* and all specifications include the controls in Table 4. The lower part of the table indicates the type of fixed effects used in each regression. The industry fixed effects are at the two-digit NACE level. The ***, **, and * marks denote statistical significance at the 1%, 5%, and 10% level, respectively.

Panel A: Alternative definitions of INEDs with audit experience

	INEDs with audit experience 1	*INEDs with audit experience 2*	*INEDs with audit experience 3*	*INEDs with audit experience 4*
	(1)	(2)	(3)	(4)
Audit committee size	0.483***	0.436***	0.483***	0.436***
	[2.955]	[2.995]	[2.954]	[2.992]
INEDs with audit experience	1.344***	0.552**	1.344***	0.550**
	[2.672]	[2.564]	[2.676]	[2.555]
Audit committee size	-0.934**	-0.416***	-0.933**	-0.414***
× INEDs with audit experience	[-2.395]	[-2.619]	[-2.399]	[-2.607]
Duality	-0.053	-0.058	-0.053	-0.058
	[-1.199]	[-1.281]	[-1.206]	[-1.280]
Network size	-0.324**	-0.313**	-0.324**	-0.313**
	[-2.110]	[-2.068]	[-2.108]	[-2.068]
Marginal effect at mean of	0.294***	0.305***	0.294***	0.305***
INEDs with audit experience	(2.644)	(2.692)	(2.645)	(2.696)
Observations	18,713	18,713	18,712	18,713
Adjusted R-squared	0.673	0.673	0.673	0.673
S.E. clustering	Parent	Parent	Parent	Parent
Subsidiary effects	√	√	√	√
Sub. industry effects	√	√	√	√
Parent industry effects	√	√	√	√
Sub. country-year effects	√	√	√	√

Panel B: INEDs with audit experience 1

	(1)	(2)	(3)	(4)	(5)
Audit committee size	0.490***	0.490***	0.490***	0.491***	0.491***
	[2.806]	[2.821]	[2.802]	[2.894]	[2.872]
INEDs with audit experience	1.341**	1.337**	1.341**	1.326**	1.327**
	[2.355]	[2.371]	[2.352]	[2.399]	[2.374]
Audit committee size	-0.927**	-0.921**	-0.927**	-0.916**	-0.920**
× INEDs with audit experience	[-2.161]	[-2.163]	[-2.158]	[-2.195]	[-2.184]
Duality	-0.053	-0.055	-0.053	-0.052	-0.051
	[-1.156]	[-1.196]	[-1.155]	[-1.172]	[-1.128]
Network size	-0.329**	-0.325**	-0.329**	-0.326**	-0.329**
	[-2.014]	[-1.999]	[-2.012]	[-2.031]	[-2.044]
Observations	18,571	18,719	18,571	18,718	18,570
Adjusted R-squared	0.674	0.675	0.673	0.677	0.674
S.E. clustering	Parent	Parent	Parent	Parent	Parent
Subsidiary effects	√	√	√	√	√
Year effects	√	√	√	-	-
Sub. industry effects	√	-	√	-	√
Parent industry effects	-	√	√	-	√
Sub. country-year effects	-	-	-	√	√

Panel C: INEDs with audit experience 2

	(1)	(2)	(3)	(4)	(5)
Audit committee size	0.442***	0.444***	0.442***	0.444***	0.443***
	[2.822]	[2.844]	[2.819]	[2.924]	[2.895]
INEDs with audit experience	0.542**	0.544**	0.542**	0.538**	0.534**
	[2.275]	[2.300]	[2.272]	[2.337]	[2.303]
Audit committee size	-0.408**	-0.409**	-0.408**	-0.405**	-0.403**
× INEDs with audit experience	[-2.349]	[-2.369]	[-2.346]	[-2.409]	[-2.381]
Duality	-0.058	-0.059	-0.058	-0.056	-0.055
	[-1.227]	[-1.265]	[-1.225]	[-1.243]	[-1.199]
Network size	-0.319**	-0.315*	-0.319**	-0.315**	-0.319**
	[-1.978]	[-1.961]	[-1.976]	[-1.992]	[-2.007]
Observations	18,571	18,719	18,571	18,718	18,570
Adjusted R-squared	0.673	0.675	0.673	0.676	0.673
S.E. clustering	Parent	Parent	Parent	Parent	Parent
Subsidiary effects	√	√	√	√	√
Year effects	√	√	√	-	-
Sub. industry effects	√	-	√	-	√
Parent industry effects	-	√	√	-	√
Sub. country-year effects	-	-	-	√	√

Panel D: INEDs with audit experience 3

	(1)	(2)	(3)	(4)	(5)
Audit committee size	0.491***	0.491***	0.491***	0.491***	0.491***
	[2.806]	[2.821]	[2.803]	[2.894]	[2.872]
INEDs with audit experience	1.341**	1.338**	1.341**	1.326**	1.327**
	[2.361]	[2.377]	[2.358]	[2.404]	[2.379]
Audit committee size	-0.927**	-0.921**	-0.927**	-0.916**	-0.920**
× INEDs with audit experience	[-2.166]	[-2.168]	[-2.164]	[-2.199]	[-2.189]
Duality	-0.053	-0.055	-0.053	-0.052	-0.051
	[-1.163]	[-1.202]	[-1.162]	[-1.179]	[-1.135]
Network size	-0.329**	-0.325**	-0.329**	-0.326**	-0.329**
	[-2.011]	[-1.996]	[-2.009]	[-2.028]	[-2.041]
Observations	18,570	18,718	18,570	18,717	18,569
Adjusted R-squared	0.674	0.675	0.673	0.677	0.674
S.E. clustering	Parent	Parent	Parent	Parent	Parent
Subsidiary effects	√	√	√	√	√
Year effects	√	√	√	-	-
Sub. industry effects	√	-	√	-	√
Parent industry effects	-	√	√	-	√
Sub. country-year effects	-	-	-	√	√

Panel E: INEDs with audit experience 4

	(1)	(2)	(3)	(4)	(5)
Audit committee size	0.442***	0.443***	0.442***	0.444***	0.442***
	[2.820]	[2.842]	[2.817]	[2.921]	[2.893]
INEDs with audit experience	0.540**	0.542**	0.540**	0.536**	0.532**
	[2.268]	[2.292]	[2.265]	[2.329]	[2.296]
Audit committee size	-0.405**	-0.407**	-0.405**	-0.402**	-0.400**
× INEDs with audit experience	[-2.339]	[-2.359]	[-2.336]	[-2.399]	[-2.370]
Duality	-0.058	-0.059	-0.058	-0.056	-0.055
	[-1.226]	[-1.264]	[-1.224]	[-1.241]	[-1.198]
Network size	-0.319**	-0.315*	-0.319**	-0.315**	-0.319**
	[-1.978]	[-1.962]	[-1.976]	[-1.993]	[-2.007]
Observations	18,571	18,719	18,571	18,718	18,570
Adjusted R-squared	0.673	0.675	0.673	0.676	0.673
S.E. clustering	Parent	Parent	Parent	Parent	Parent
Subsidiary effects	√	√	√	√	√
Year effects	√	√	√	-	-
Sub. industry effects	√	-	√	-	√
Parent industry effects	-	√	√	-	√
Sub. country-year effects	-	-	-	√	√

Table A11: Cross sectional heterogeneity with alternative measures of profit shifting

The table reports coefficient estimates and *t*-statistics (in brackets) for all explanatory variables. The observational units are subsidiaries with foreign parents. All variables are defined in Table 1. The dependent variable is shown in the first line of the Table, with the different profit-shifting measures and all specifications include the controls in Table 4. The lower part of the table indicates the type of fixed effects used in each regression. The industry fixed effects are at the two-digit NACE level. The ***, **, and * marks denote statistical significance at the 1%, 5%, and 10% level, respectively.

Panel A: INEDs with audit experience 1

	(1) Profit shifting 2	(2) Profit shifting 3	(3) Profit shifting 4	(4) Profit shifting 5	(5) Profit shifting 6
Audit committee size	0.364***	0.431***	0.455***	0.493***	0.489***
	[3.027]	[3.038]	[2.748]	[3.538]	[3.413]
INEDs with audit experience	1.067**	1.232**	1.218**	1.287**	1.311**
	[2.292]	[2.294]	[2.240]	[2.428]	[2.436]
Audit committee size × INEDs with audit experience	-0.720**	-0.812**	-0.834**	-0.868**	-0.887**
	[-2.165]	[-2.096]	[-2.060]	[-2.313]	[-2.317]
Duality	-0.041	-0.047	-0.042	-0.041	-0.041
	[-1.142]	[-1.047]	[-1.091]	[-1.050]	[-1.038]
Network size	-0.221**	-0.255**	-0.309**	-0.223**	-0.231**
	[-2.472]	[-2.514]	[-2.160]	[-2.483]	[-2.449]
Observations	17,791	17,691	14,971	11,880	11,880
Adjusted R-squared	0.707	0.684	0.678	0.711	0.707
S.E. clustering	Parent	Parent	Parent	Parent	Parent
Subsidiary effects	√	√	√	√	√
Sub. industry effects	√	√	√	√	√
Parent industry effects	√	√	√	√	√
Sub. country-year effects	√	√	√	√	√

Panel B: INEDs with audit experience 2

	(1) Profit shifting 2	(2) Profit shifting 3	(3) Profit shifting 4	(4) Profit shifting 5	(5) Profit shifting 6
Audit committee size	0.325***	0.393***	0.419***	0.453***	0.447***
	[3.011]	[3.073]	[2.826]	[3.610]	[3.471]
INEDs with audit experience	0.421**	0.481**	0.503**	0.494**	0.505**
	[2.295]	[2.241]	[2.290]	[2.419]	[2.424]
Audit committee size × INEDs with audit experience	-0.317**	-0.353**	-0.372**	-0.355**	-0.363**
	[-2.463]	[-2.355]	[-2.326]	[-2.504]	[-2.503]
Duality	-0.045	-0.051	-0.046	-0.044	-0.045
	[-1.210]	[-1.101]	[-1.159]	[-1.111]	[-1.100]
Network size	-0.213**	-0.246**	-0.299**	-0.212**	-0.220**
	[-2.412]	[-2.434]	[-2.118]	[-2.382]	[-2.352]
Observations	17,791	17,691	14,971	11,880	11,880
Adjusted R-squared	0.706	0.683	0.678	0.711	0.706
S.E. clustering	Parent	Parent	Parent	Parent	Parent
Subsidiary effects	√	√	√	√	√
Sub. industry effects	√	√	√	√	√
Parent industry effects	√	√	√	√	√
Sub. country-year effects	√	√	√	√	√

Panel C: *INEDs with audit experience 3*					
	(1) Profit shifting 2	(2) Profit shifting 3	(3) Profit shifting 4	(4) Profit shifting 5	(5) Profit shifting 6
Audit committee size	0.364***	0.431***	0.455***	0.493***	0.489***
	[3.027]	[3.037]	[2.747]	[3.537]	[3.412]
INEDs with audit experience	1.066**	1.231**	1.217**	1.285**	1.309**
	[2.296]	[2.298]	[2.242]	[2.429]	[2.437]
Audit committee size × INEDs with audit experience	-0.719**	-0.811**	-0.833**	-0.866**	-0.885**
	[-2.169]	[-2.099]	[-2.063]	[-2.313]	[-2.317]
Duality	-0.041	-0.047	-0.042	-0.041	-0.041
	[-1.147]	[-1.052]	[-1.098]	[-1.054]	[-1.043]
Network size	-0.220**	-0.255**	-0.309**	-0.222**	-0.231**
	[-2.468]	[-2.510]	[-2.156]	[-2.477]	[-2.443]
Observations	17,790	17,690	14,970	11,879	11,879
Adjusted R-squared	0.707	0.684	0.678	0.711	0.707
S.E. clustering	Parent	Parent	Parent	Parent	Parent
Subsidiary effects	√	√	√	√	√
Sub. industry effects	√	√	√	√	√
Parent industry effects	√	√	√	√	√
Sub. country-year effects	√	√	√	√	√

Panel D: *INEDs with audit experience 4*					
	(1) Profit shifting 2	(2) Profit shifting 3	(3) Profit shifting 4	(4) Profit shifting 5	(5) Profit shifting 6
Audit committee size	0.325***	0.392***	0.418***	0.452***	0.447***
	[3.009]	[3.072]	[2.823]	[3.607]	[3.468]
INEDs with audit experience	0.419**	0.479**	0.501**	0.491**	0.502**
	[2.287]	[2.233]	[2.283]	[2.410]	[2.414]
Audit committee size × INEDs with audit experience	-0.315**	-0.350**	-0.370**	-0.352**	-0.360**
	[-2.451]	[-2.343]	[-2.318]	[-2.493]	[-2.493]
Duality	-0.045	-0.051	-0.046	-0.044	-0.045
	[-1.209]	[-1.100]	[-1.159]	[-1.110]	[-1.099]
Network size	-0.213**	-0.246**	-0.299**	-0.212**	-0.220**
	[-2.413]	[-2.435]	[-2.118]	[-2.383]	[-2.353]
Observations	17,791	17,691	14,971	11,880	11,880
Adjusted R-squared	0.706	0.683	0.678	0.710	0.706
S.E. clustering	Parent	Parent	Parent	Parent	Parent
Subsidiary effects	√	√	√	√	√
Sub. industry effects	√	√	√	√	√
Parent industry effects	√	√	√	√	√
Sub. country-year effects	√	√	√	√	√

Table A12: Sensitivity on the heterogeneity of the effect of audit committee size due to experience in audit committees (different standard error clustering)

The table reports coefficient estimates and *t*-statistics (in brackets) for all explanatory variables. The observational units are subsidiaries with foreign parents. All variables are defined in Table 1. The dependent variable is *Profit shifting 1* and all specifications include the controls in Table 4. In specification 1 and 2, we use *INEDs with audit experience 1.* In specification 3 and 4, we use *INEDs with audit experience 2.* In specification 5 and 6, use *INEDs with audit experience 3.* In specification 7 and 8, we use *INEDs with audit experience 4.* The lower part of the table indicates the type of fixed effects used in each regression. The industry fixed effects are at the two-digit NACE level. The ***, **, and * marks denote statistical significance at the 1%, 5%, and 10% level, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Audit committee size	0.489**	0.489***	0.441**	0.441***	0.489**	0.489***	0.441**	0.441***
	[3.054]	[3.413]	[3.220]	[3.582]	[3.054]	[3.413]	[3.218]	[3.580]
INEDs with audit experience	1.320**	1.320**	0.533**	0.533**	1.320**	1.320**	0.531**	0.531**
	[2.381]	[2.625]	[2.624]	[2.955]	[2.392]	[2.638]	[2.619]	[2.956]
Audit committee size ×	-0.914*	-0.914**	-0.402**	-0.402**	-0.914*	-0.914**	-0.400**	-0.400**
INEDs with audit experience	[-2.144]	[-2.350]	[-2.843]	[-3.212]	[-2.154]	[-2.361]	[-2.841]	[-3.219]
Duality	-0.050	-0.050	-0.054	-0.054	-0.050	-0.050	-0.054	-0.054
	[-1.165]	[-1.225]	[-1.234]	[-1.299]	[-1.173]	[-1.234]	[-1.233]	[-1.298]
Network size	-0.328*	-0.328*	-0.318*	-0.318*	-0.328*	-0.328*	-0.318*	-0.318*
	[-1.938]	[-2.003]	[-1.922]	[-1.984]	[-1.936]	[-2.000]	[-1.923]	[-1.985]
Observations	18,570	18,570	18,570	18,570	18,569	18,569	18,570	18,570
Adjusted R-squared	0.673	0.673	0.673	0.673	0.673	0.673	0.673	0.673
S.E. clustering	Parent & year	Parent & year&sub. country	Parent & year	Parent & year&sub. country	Parent & year	Parent & year&sub. country	Parent & year	Parent & year&sub. country
Subsidiary effects	√	√	√	√	√	√	√	√
Sub. industry effects	√	√	√	√	√	√	√	√
Parent industry effects	√	√	√	√	√	√	√	√
Sub. country-year effects	√	√	√	√	√	√	√	√

Table A13: Heterogeneity of the effect of audit committee size due to CEO duality (with different fixed effects and standard error clustering)

The table reports coefficient estimates and *t*-statistics (in brackets) for all explanatory variables. The observational units are subsidiaries with foreign parents. All variables are defined in Table 1. The dependent variable is *Profit shifting 1* and all specifications include the controls in Table 4. The lower part of the table indicates the type of fixed effects used in each regression. The industry fixed effects are at the two-digit NACE level. The ***, **, and * marks denote statistical significance at the 1%, 5%, and 10% level, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Audit committee size	0.175	0.177	0.175	0.173	0.172	0.172	0.172
	[1.487]	[1.517]	[1.486]	[1.526]	[1.496]	[1.257]	[1.320]
Duality	-0.340	-0.338	-0.340	-0.348*	-0.349*	-0.349	-0.349
	[-1.639]	[-1.646]	[-1.637]	[-1.717]	[-1.701]	[-1.487]	[-1.508]
Audit committee size ×	0.203	0.201	0.203	0.210	0.212	0.212	0.212
Duality	[1.444]	[1.443]	[1.443]	[1.512]	[1.506]	[1.279]	[1.328]
INEDs with audit	0.152	0.156	0.152	0.151	0.147	0.147	0.147
experience 1	[0.983]	[1.021]	[0.982]	[0.997]	[0.958]	[0.987]	[1.007]
Network size	-0.319**	-0.315*	-0.319*	-0.315**	-0.319**	-0.319*	-0.319*
	[-1.966]	[-1.951]	[-1.964]	[-1.982]	[-1.995]	[-1.925]	[-1.988]
Observations	18,571	18,719	18,571	18,718	18,570	18,570	18,570
Adjusted R-squared	0.673	0.674	0.672	0.676	0.673	0.673	0.673
S.E. clustering	Parent	Parent	Parent	Parent	Parent	Parent & year	Parent & year & sub. country
Subsidiary effects	√	√	√	√	√	√	√
Year effects	√	√	√	-	-	-	-
Sub. industry effects	√	-	√	-	√	√	√
Parent industry effects	-	√	√	-	√	√	√
Sub. country-year effects	-	-	-	√	√	√	√

Table A14: Heterogeneity of the effect of audit committee size due to CEO duality (with alternative measures of profit shifting)

The table reports coefficient estimates and *t*-statistics (in brackets) for all explanatory variables. The observational units are subsidiaries with foreign parents. All variables are defined in Table 1. The dependent variable is shown in the first line of the table, with the different profit-shifting measures and all specifications include the controls in Table 4. The lower part of the table indicates the type of fixed effects used in each regression. The industry fixed effects are at the two-digit NACE level. The ***, **, and * marks denote statistical significance at the 1%, 5%, and 10% level, respectively.

	(1) Profit shifting 2	(2) Profit shifting 3	(3) Profit shifting 4	(4) Profit shifting 5	(5) Profit shifting 6
Audit committee size	0.109	0.146	0.126	0.166	0.153
	[1.232]	[1.362]	[1.170]	[1.590]	[1.435]
Duality	-0.285*	-0.316	-0.397**	-0.381**	-0.390**
	[-1.731]	[-1.620]	[-1.998]	[-2.065]	[-2.073]
Audit committee size × Duality	0.173	0.191	0.252*	0.242*	0.249*
	[1.567]	[1.450]	[1.819]	[1.926]	[1.931]
INEDs with audit experience 1	0.143	0.190	0.147	0.168	0.169
	[1.170]	[1.338]	[1.015]	[1.246]	[1.227]
Network size	-0.212**	-0.246**	-0.299**	-0.211**	-0.219**
	[-2.379]	[-2.416]	[-2.105]	[-2.351]	[-2.323]
Observations	17,791	17,691	14,971	11,880	11,880
Adjusted R-squared	0.706	0.683	0.678	0.710	0.706
S.E. clustering	Parent	Parent	Parent	Parent	Parent
Subsidiary effects	√	√	√	√	√
Sub. industry effects	√	√	√	√	√
Parent industry effects	√	√	√	√	√
Sub. country-year effects	√	√	√	√	√