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Iftekhar Hasan and Panagiotis Karavitis and Pantelis Kazakis and Woon Sau Leung

Fordham University, University of Glasgow, University of Glasgow, University of Cardiff

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Iftekhar Hasan
Fordham University

Panagiotis Karavitis
University of Glasgow, Adam Smith Business School

Pantelis Kazakis
University of Glasgow, Adam Smith Business School

Woon Sau Leung
University of Cardiff

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Author's coordinates. *Iftekhar Hasan*: Fordham University. Email: ihasan@fordham.edu. *Panagiotis Karavitis*: Adam Smith Business School, University of Glasgow. Email: Panagiotis.Karavitis@glasgow.ac.uk. *Pantelis Kazakis*: Adam Smith Business School, University of Glasgow. Email: Pantelis.Kazakis@glasgow.ac.uk. *Woon Sau Leung*: Cardiff University. Email: leungws1@cardiff.ac.uk.

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Abstract

In this work we investigate the relationship between corporate social responsibility (CSR) and profit shifting. First, we employ worldwide data for parent firms and their foreign subsidiaries to derive a profit shifting measure. Then, drawing on legitimacy theory and risk-management strategy, we find corporate social responsibility to be positively correlated with profit shifting. In addition, we find this relationship to be stronger in parent firms in countries under the territorial tax system. We perform a battery of sensitivity tests and robustness checks to corroborate our findings. By and large, our results suggest that multinational firms with higher CSR scores shift larger amounts of profits to their low-tax foreign subsidiaries, potentially indicating strategic planning in the choice of CSR investments by multinational enterprises.

Keywords: corporate social responsibility; profit shifting; legitimacy theory; risk-management; corporate tax systems; agency problems

JEL codes: F23, G30, G32, H25, H26, L10, L21, M14

1 Introduction

> *"Big multinationals are paying significantly lower tax rates than before the 2008 financial crisis, according to Financial Times analysis showing that a decade of government efforts to cut deficits and reform taxes has left the corporate world largely unscathed."* (Toplensky, 2018).

This article in the Financial Times sparks once again the contentious debate regarding multinational enterprises' (MNEs) propensity to avoid paying taxes in their host countries. Consequently, this has put the public attention on such firms and their adopted tax planning strategies. Such a strategy is that of profit shifting—the tendency of some firms to move profits from the host country, where corporate taxes are higher, to a country with lower taxation. This phenomenon is expanding rapidly owing to accelerated globalization and tax differences across the world. To this end, some politicians have called for a minimum corporate tax rate to deter MNEs from moving their profits to tax heavens.[1] The reason for this is that profit shifting activities decrease tax revenue, erode the tax base of high tax economies, and decrease the competition in the local market. This could lead to lower government expenditures and lower consumption overall.

Corporate social responsibility (CSR) has seen a rise across the globe since the 1960's, whereby a number of firms have steadily started to increase their investments in CSR activities, either due to planned strategies or due to pressure from their shareholders. Contrary to the view of Friedman (1970), who states that the sole responsibility of firms is to increase their profits and value, other researchers claim that firms may participate in beneficial activities that increase stakeholders' welfare. The argument here is that well-governed firms are more likely to follow

[1] See Escritt (2018) for a discussion regarding the relevant statements from the German minister of finance, Olaf Scholz.

socially responsible paths (i.e., good governance view), whereby firm value maximization takes into consideration stakeholders too (Deng et al., 2013). Hence, an interesting question one asks is why some firms choose to be socially responsible, while others choose to be solely profit maximizers (Liang and Renneboog, 2017).

MNEs have a number of different strategies at their disposal to tax avoid; some of them take place within the same country, while others between different countries—in this case we have profit-shifting.[2] In this work, we study the relationship between CSR and profit shifting, which we view as a pristine area of research for accounting, finance, and management literatures. In doing so, we follow the suggestions of Hanlon and Heitzman (2010) and Sikka (2010), who stress the need to investigate the relationship between CSR and tax avoidance. Prior work in this area of research is limited by the use of single country data that make it extremely difficult to perform causality tests (e.g., Lanis and Richardson, 2012; Hoi et al., 2013; Watson, 2015; Davis et al., 2016).

Research so far has studied tax avoidance practices of firms (local and multinational), within the narrow borders of a country (within-country). In this work, we study a very specific form of tax avoidance, profit shifting, which is only observed for MNEs with subsidiaries in countries overseas (across countries). Profit-shifting severs tax revenues for economies with high corporate taxation, and for this reason it has drawn the attention of many scholars worldwide. First, profit shifting erodes the tax base of high-tax economies—taxable income leaves the country to be taxed in other jurisdictions with lower taxation. Second, it provides an unfair competition advantage for the MNEs, which could impair competition between firms and decrease welfare in the country where the MNE is headquartered. To the best of our knowledge, our work is the first

[2] For a thorough review regarding the local (within-country) tax avoidance and international (across countries) profit shifting see Beuselinck and Pierk (2018).

large-scale international study that examines exclusively the relationship between CSR and profit shifting, a practice that occurs for MNEs with international subsidiaries. By specifically studying the relationship between CSR and profit shifting, we add to our understanding of the tax planning strategies of MNEs. We view this as the natural continuation in this area of research.

Utilizing accounting data with a worldwide coverage, we determine the level of profit shifting for MNEs using a difference-in-differences (DiD) method developed by Dharmapala and Riedel (2013). The advantage of this method is that it allows us to create an exogenous measure of profit shifting. After we calculate profit shifting for each firm, we proceed to our main analysis, which aims at disentangling the relationship between CSR and profit shifting for MNEs. To do so, we employ a battery of different econometric techniques and sensitivity tests to corroborate our findings.

The causal and qualitative relationship between CSR and profit shifting is not obvious. Thus, we need to deal with a number of issues in order to obtain unbiased estimates. The first issue is that of reverse causality. The second, and perhaps more severe, is that of omitted variables. A potential third problem in our analysis is that of selection bias. That is, a group of firms, in a non-random manner, are more willing to invest in CSR activities compared to the rest. We deal with the problem of reverse causality by estimating the profit shifting values of each firm based on exogenous industry shocks. By doing so, we obtain an exogenous measure for profit shifting. We deal with the second problem by borrowing insights from the legitimacy theory. Specifically, we conjecture that firms will want to strategically increase their legitimacy in order to avoid scrutiny (e.g., by the government and the public) and to be affected less severely in the light of corporate scandals or corporate misbehavior towards stakeholders. To this end, we study one direction of causality, that from CSR to profit shifting using two sets of instrumental variables. First, following

Liang and Renneboog (2017), we use legal origins as an instrument for CSR, as the authors have found firms from Civil Law countries to demonstrate higher CSR scores.[3] The second instrument we use is that of industry peer's average CSR scores (e.g., Laeven and Levine, 2009; Lin et al. 2011; Ferrell et al. 2016). As for the third issue, we implement an endogenous treatment-regression model where we utilize legal origins as the exclusion restriction—this scheme is similar to that of Doidge et al. (2007), although the authors' scope is different from ours.

We develop two different hypotheses. Our first hypothesis draws on legitimacy theory and risk-management strategy. Specifically, firms may disclose information (e.g., annual reports) to the press (or other media) to alleviate any concerns the public might have regarding the firm's commitment to enhance societal welfare. Hence, such corporate actions could be signaling that firms care not only about their shareholders, but also their stakeholders. Having built this "moral capital" within the corporate world and in society, firms participating in unethical activities—for our case, this is profit-shifting activities, —might be "punished" less severely by people (e.g., customers) and government alike. Recent literature points to this direction (e.g., Janney and Gove; Hong and Liskovich, 2016), as it finds that firms with higher CSR scores face fewer penalties.

In our second hypothesis, we want to investigate whether the effect CSR has on profit shifting differs according to the corporate tax system. Prior literature finds that multinationals under the territorial tax system shift more income compared to those under the worldwide tax scheme (e.g., Scholes et al, 2015; Kohlhase and Pierk, 2016; Markle, 2016). In our framework, we expect CSR to have a larger impact for parent firms that are more incentivized to participate in profit shifting activities (i.e., those under the territorial tax system).

[3] Albuquerque et al. (forthcoming) notice also the endogeneity of the CSR variable. For example, a firm's financial resources may affect CSR decisions. Using data for the United States, they deal with this issue by instrumenting CSR using the political affiliation of the state a firm is headquartered.

To test these hypotheses, we utilize data from Orbis, which provides us with accounting information for parent firms originating from 20 countries and their respective subsidiaries spread in different jurisdictions (i.e., 63 countries). Specifically, we use a sample of almost 27,000 firm-year observations for the period 2009-2016 containing information for more than 500 unique parent firms and around 6,000 unique subsidiary firms. An additional advantage of using this period is the mitigation of any potential noise that would have otherwise reverberated in our data should we have included data from the financial crisis period.

Our analysis comprises two stages. In the first stage, we estimate our profit shifting measure at the subsidiary-year level following similar steps as those of Dharmapala and Riedel (2013). The advantage of this method is that it uses a difference-in-differences (DiD) approach utilizing shocks at the industry level for comparable parent firms.[4] For the purposes of our work, this is of utmost importance, since the measure of profit shifting we obtain is exogenous and free from endogeneity issues. Having found a measure for profit shifting, we proceed in the second stage, whereby we focus on the relationship between CSR and profit shifting. We utilize several econometric models and we apply sensitivity and robustness tests to corroborate our findings. Our main specification indicates a positive and statistically significant relationship between CSR and profit shifting, thus being in accordance with our first hypothesis. We also find that the effect of CSR on profit shifting is larger for parent firms under the territorial tax system, thus providing evidence in favor of our second hypothesis.

We introduce a number of important contributions in the field. First, our work combines two different strands of literature. One that studies tax aggressiveness and another one that investigates corporate social responsibility. Second, we extend the significant contributions made

[4] We follow Bertrand et al. (2002) and set comparable parent firms to be those belonging to the same industry and country.

by Hoi et al. (2013) and Davis et al. (2016) by utilizing firm data at the global level, but most importantly, by focusing on a specific form of tax planning strategy for MNE's, that of profit shifting. In fact, this is the first paper that explicitly studies the causal relationship of CSR and profit shifting accounting for the endogenous firm decision regarding the range of CSR investment and the selectivity issue of that choice. Using legal origins as an exclusion restriction, the paper finds a strong positive relationship between CSR and profit shifting. The magnitude of this effect is higher for firms that have headquarters in countries under the territorial tax system, thus indicating the importance of the multi-country setting in studying tax aggressiveness.

Furthermore, we envisage this work to act as a fruitful terrain for future research. Being the first to study the relationship between CSR and profit shifting, we have utilized the most detailed databases available to us at the moment. However, we are aware that even more sophisticated data will be a certainty in the future, especially given the big data revolution. We strongly believe that detailed corporate data for more companies around the world, along with more advanced techniques to capture profit shifting, will assist scholars in understanding the mechanisms that connect CSR and profit shifting. We trust that future researchers will take advantage of the oncoming advancements and shed more light in the questions we ask here.

The remainder of this paper proceeds along the following lines. In section 2, we review the relevant literature and develop our testable hypotheses. Section 3 discusses our research design along with the steps required to measure profit shifting. In section 4, we discuss the main findings of this study, while in section 5 we analyze the process we follow to deal with endogeneity and selectivity. Finally, we conclude in section 6.

2 Literature review and hypotheses development

2.1 Literature review

2.1.1 Profit shifting

The dawn of the 21st century saw an increasing integration of foreign markets, where MNEs constitute a key player of the global economy. As documented by Dharmapala and Riedel (2013), foreign direct investments have overtaken economic growth in the last decades, indicating their crucial role in modern economies. What is important to notice, nonetheless, is that although globalization has tied economies together, there are still differences in corporate taxation across countries that incentivize firms to reallocate their profits.

One of the most influential works regarding profit shifting activities is that of Hines and Rice (1994). By firstly developing the tax differential approach, they find that a large portion of U.S. firms move their foreign profits to tax heavens. In a similar manner, Collins et al. (1998) argue that U.S. MNEs prefer to shift their profits back home, when corporate taxation increases in countries overseas. Following Hines and Rice (1994) a number of efforts have been made to advance the empirical methods to identify profit shifting. Huizinga and Laeven (2008), based on the tax differential approach of Hines and Rice (1994), devise a new method to identify profit shifting among subsidiaries. They do so by constructing an index that incorporates weighted tax differences among all the affiliates of a MNEs' group. The authors find that European countries are severely affected. More recently, Dharmapala and Riedel (2013) move on step further. Using exogenous industry shocks, they identify profit shifting through a difference-in-differences (DiD) method.[5]

[5] For a review regarding taxes and corporate finance activities see Maydew (2001), Shackelford and Shevlin (2001), Graham (2003), and Hanlon and Heitzman (2010).

Previous studies have determined the following profit-shifting spread mechanisms: (i) transfer pricing (e.g., Hines and Rice, 1994; Huizinga and Laeven, 2008), and (ii) debt shifting (e.g., Huizinga and Laeven, 2008; Dharmapala and Riedel, 2013). More recently, Dischinger and Riedel (2011) and Karkinsky and Riedel (2012) examine another channel of profit shifting, namely the relocation of intangible assets. They find that firms have incentives to locate intangible assets (e.g., patents, or brand names) to affiliates located in countries with lower corporate tax rates.

There is a steadily growing literature studying the determinants of profit shifting. Klassen and Laplante (2012), using a U.S. sample, document that higher regulatory costs decrease profit shifting. Dyreng and Markle (2016) analyze the role of financial constraints and find that financially constrained MNEs are less likely to shift income from the U.S. to other countries compared to their unconstrained peers. Likewise, Markle (2016) studies the effect different tax systems (i.e., worldwide vs. territorial) have in firms' decisions to shift income in other countries. He finds that MNEs under the territorial tax system shift more income.

For a firm to participate in profit shifting activities, two main components are required. First, firms need to have an international network of affiliates. Second, firms need to understand well the laws considering the reduction of taxes in the country of origin. These include, *inter alia*, court penalties, administration costs, transaction, and opportunity costs (Dyreng et al., 2016). Hence, not all firms will be able to participate in profit shifting activities. In addition, even among these firms with profit shifting activities, we expect a considerable level of heterogeneity. This may be due to agency problems, or differences in managerial skills and governance, among others. In addition, there is complexity regarding the assets that a firm may choose to shift profits.

2.1.2 Corporate social responsibility

Corporate finance tradition states that corporations exist to maximize shareholder value (Berle and Means, 1932). To this end, one would expect that corporate social responsibility actions avail the firm. However, the impact CSR has on the firm is far from obvious. As Ferrell et al (2016) aptly put it, there are two main views regarding CSR. The first is the *good governance view*, stating that socially responsible firms can follow value-maximizing practices (e.g., Edmans, 2011; Deng et al., 2013). The second is the *agency view*, which states that the desire of some firms to participate in CSR activities is an indicator of agency problems (e.g., Bénabou and Tirole, 2010; Masulis and Reza, 2015).

Corporate social responsibility is also related to board structure and CEO behavior. Specifically, McGuinness et al. (2017), using Chinese data, find that greater gender balance increases CSR scores, while McCarthy et al. (2017) argue that higher CSR scores are related to lower CEO confidence. Likewise, Yuan et al. (2017) document that CSR increases with CEO ability. A reason for this could be that better CEOs have already peaked in their careers and are willing to undertake activities that are beneficial for the society. Importantly, the view analysts have about CSR appears to have changed in the passage of time. For example, Ioannou and Serafeim (2015) document that analysts in the 90's viewed CSR as an agency cost and for this reason they made pessimistic recommendations for those firms with high CSR scores. Nonetheless, with the passage of time, it appears that analysts—especially the high-ranked ones—changed their mind in favor of a positive opinion about CSR.

Past research documents that disclosure practices (among them CSR) exert a positive effect in firm valuation (Durnev and Kim, 2005). To this end, corporate social responsibility has emerged to be an important parameter for the modern firm. This is because CSR activities could be

perceived as optimal firm choices, or strategies against competition. In a recent paper Cao et al. (forthcoming) find that peer firms increase their CSR activities when an opponent has done so. More importantly, they find that laggard firms (those who do not invest in CRS activities) experience lower stock returns. In addition, firms' participation in CSR activities acts as a signaling tool for product differentiation (Albuquerque et al., forthcoming), indicating that the products of firms with higher CSR scores are supposed to be of higher quality.

A country's development could potentially affect a firm's choices. For example, institutions and the strength of the legal regime of a country are important factors regarding the effect of disclosure practices. For example, Durnev and Kim (2005) find that the positive relationship between disclosure practices and firm valuation is stronger in less investor friendly countries because disclosure practices are scarcer there. Ioannou and Serafeim (2012) argue that the political, labor, education, and cultural system seem to affect corporate social performance. One should expect this, since societies—and people therein—demand more as they become wealthier

Agency costs are important parameters of firm performance (Jensen and Meckling, 1974; McGuire et al., 1988; Hermalin and Weisbach, 1991; Agrawal and Knoeber, 1996). Among others, higher agency costs could jeopardize a firm's access to finance. In a recent paper, Cheng et al. (2014) document that firms with higher CSR scores are more likely to have access to financial intermediaries, indicating a potential decrease in agency costs when participating in CSR activities. The importance of CSR is more pronounced in periods of economic distress. For example, Lins et al. (2017) document that during the financial crisis of 2008-2009 firms with higher CSR scores had higher returns and experienced higher profitability and growth compared to firms with low CSR scores. Likewise, El Ghoul et al. (2011) find that firms with better CSR scores face lower

cost of equity. In the same spirit, Goss and Roberts (2011) argue that more responsible firms pay up to 18 base points less to bank loans compared to firms with social responsibility concerns. Furthermore, Flammer (2015) and Hasan et al. (2018) document that the adoption of CSR practices increases firm value through increased labor productivity. Finally, Nelling and Webb (2009) in a time series analysis find the relationship between CSR and firm performance to be weaker, while McWilliams and Siegel (2000) find that CSR has a neutral effect on a firm financial performance once accounting for R&D investments.[6]

2.2 Hypothesis development

As stated above, social responsibility has become a crucial component for the modern firm, so much so that (large) corporations spend vast amounts of money on it. Nonetheless, such actions are not required by any law (McWilliams and Siegel, 2000). The main reason for this is the belief that such "good actions" promote the status of the firm and strengthen its ties with citizens. In that aspect, CSR activities are strategies firms use to advertise goodwill and they could be perceived as acts of buying respect from stakeholders. Hence, these altruistic activities act as signals that avail the firm by spreading "good" information about it to the society, thus reducing search and evaluation costs (Kennet, 1980).

Paying taxes and investing in CSR activities could be considered as a diversion of resources from shareholders towards stakeholders. Past research has distinguished two main channels regarding the relationship between CSR and tax aggressiveness. The first channel draws on the idea that if firms take into consideration all stakeholders, they should participate in activities that

[6] For a review regarding the relationship between CSR and firm performance see Cochran and Wood (1984), Chatterji and Toffel (2010), and more recently Krüger (2015).

increase common good; that is, actions that do not necessarily maximize profits (Mackey et al., 2007). In such occasions, the relationship between CSR and tax aggressiveness is expected to be negative. The second channel documents a positive relationship between CSR and tax aggressiveness. Firms strategically participate in CSR activities—thus, increasing their CSR scores—in order to suffer fewer losses in cases where corporate scandals erupt. Based on the above we formalize our first hypothesis in the following manner:

> *Hypothesis 1*: Firms that intend to participate in profit shifting activities will exhibit higher corporate social responsibility (CSR) scores, in order to appease the negative effects of a potential corporate scandal. They do so by improving their legitimacy and reducing their risk through higher CSR scores.

Hypothesis 1 is partially related to legitimacy theory, which states that when a firm's goals differ from those of the public, a firm's management would disclose information about the company (e.g., through annual reports) to alleviate further concerns the public might have about its actions (Hurst, 1970; Gray et al., 1995; Lanis and Richardson, 2012). As argued in Godfrey et al. (2009), firms' participation in CSR activities shows that the latter cares about its stakeholders. When a firm succeeds in transmitting such signals to its stakeholders and [they] accept them, then a firm builds a "moral capital" within the society that may have positive effects on the firm (Simon, 1995). For example, Janney and Gove (2011) find that firms with higher reputation due to CSR activities are affected less in the event of corporate scandals. In the same spirit, Hong and Liskovich (2016) find similar results. Hence, in this situation firms acting rationally, use the CSR façade to soothe potential negative effects, such as fraud or scandals (e.g., Fombrun et al., 2000; Godfrey at al., 2009).

Our next task is to examine the magnitude CSR has on profit shifting by taking into consideration different tax systems. Specifically, countries under the worldwide tax system impose taxes to any income earned by its nationals either within the country or overseas, while countries under the territorial regime exempt income earned overseas.[7] Prior literature finds that multinationals under the territorial tax system shift more income compared to those under the worldwide tax scheme (e.g., Scholes et al, 2015; Kohlhase and Pierk, 2016; Markle, 2016). Hence, if the incentives for profit shifting are higher in multinationals under the territorial tax scheme, we should expect the effect of CSR on profit shifting for these firms to be larger. We formulate the above in the following hypothesis:

> *Hypothesis 2*: The relationship between CSR and profit shifting should be stronger for parent companies under the territorial tax system and weaker for parent companies under the worldwide tax system.

3 Data and methodology

3.1 Data

For our empirical analysis we require accounting information for multinational corporations, which we obtain from Orbis. Our final sample consists of 26,752 observations for the period 2009-2016. This includes 509 unique parent companies and 6,103 unique subsidiary companies. As shown in Appendices A1 and A2, parent companies originate from 20 countries, including many OECD countries and China, while subsidiary companies from 63. The second major component of our empirical analysis is information regarding corporate social responsibility. These data are drawn from the Thomson Reuters ASSET4 database.

[7] Countries with a worldwide taxation system are: Chile, Greece, Ireland, Israel, South Korea, Mexico, Poland, and the United States.

By inspecting appendix tables A1 and A2, we notice that there are quite a few differences regarding the metrics of CSR activities and profit shifting. For subsidiary companies (Table A1), we see that profit shifting spans from a minimum of zero (e.g., United States) to a maximum of 0.509 (Canada). This comes as no surprise, if we consider that corporate taxation is quite high in the United States and, thus, MNEs would not consider moving income there. Furthermore, regarding CSR scores, we see former communist countries demonstrating lower CSR scores, while Western-type societies having among the highest scores.[8] These results are in accordance with Liang and Renneboog (2017) further adding credit to our analysis. On the other hand, for the case of parent companies (Table A2), we observe that the highest levels of profit shifting occur for countries with relatively higher corporate taxation, such as the United States, Belgium, Italy, Germany, and Denmark, while for companies with their jurisdiction in countries with very low corporate taxation we see no such effect (i.e., Ireland).

We provide definitions of the variables used in our analysis along with their sources in Table 1 and correlations for the main variables used in our econometric models in appendix Table A4.

[Insert Table 1 about here]

Summary statistics are reported in Table 2. Notice that the number of observations reported in Table 2 does not directly match that of the tables of our main specifications. The reason for this is that we decided to use all available information from Orbis to estimate profit shifting and some observations were dropped when we merged data with ASSET4. Further examination of Table 2,

[8] Appendix Table A3 indicates that average CSR scores and profit shifting have changed in time. Average CSR scores were at their lowest level in 2009, while they started increasing afterwards. One reason for such a drastic change could be the financial crisis of 2007/2008 that affected many firms around the world. A potential explanation for this is that firms might not have had the necessary funds to invest in CSR objectives. Interestingly, one might notice that our profit shifting measure is the highest in 2009, perhaps indicating firms trying to decrease as much as possible the losses they incurred during the financial crisis through profit shifting activities.

indicates that about 61% of observations originate from a country with a territorial tax system, while about 73% of subsidiaries are based in countries with lower corporate taxation, as opposed to that of parent companies. Parent companies tend to be rather large. The mean value of their pretax profits is about $1.10 billion, while their total assets around $19.8 billion. However, parent profits and total assets present a wide range of values spanning from $3.8 million to $57 billion for profits and $623 million to almost $500 billion for assets. Subsidiary companies are smaller; for example, the average subsidiary company has a mean value of pretax profits of about $14 million with assets around $38 million. Parent companies present a number of heterogeneities regarding the number of subsidiaries they have around the world. The countries where parent companies are more likely to have a subsidiary are Great Britain, France, Germany, Spain, China, Italy, and Belgium. Not surprisingly, most parent companies are from the United States, Great Britain, Germany, France, and Spain. On average, the number of subsidiaries per firm is 11.81. In absolute terms, the U.S. dominate the market of subsidiaries, as they have 2,116 firms in our sample. In the second position is France, which although it has only 35 parent companies, it enters with a total of 1,149 subsidiaries in our sample—this means 33 subsidiaries per each parent company (see Appendix tables A1 and A2).

[Insert Table 2 about here]

3.2 First-stage: Estimation of profit shifting

The aim of this work is to study the inter-relationship between corporate social responsibility and profit shifting. In doing so, we need to firstly identify profit-shifting flows for parent-subsidiary pairs. The idea behind this is that parent companies will shift income to their affiliates due to

corporate tax differentials, *inter alia*. The process analyzed below closely follows the scheme implemented in Dharmapala and Riedel (2013).

We use a difference-in-differences approach (DiD) to estimate tax-motivated profit shifting. This identification method lies on utilizing the impact of exogenous shocks to a parent's pretax and pre-shifting profit, $\tilde{\pi}_{pt}$ on subsidiaries in low tax countries. For the purposes of this approach, subsidiaries in low-tax countries belong to the treatment group, while subsidiaries in high-tax countries the control-group. The hypothesis is that an increase in the pre-tax and pre-shifting profits of a parent company, would increase the pretax profits of a subsidiary firm located in a country with lower taxes, as opposed to countries where taxation is higher.

In mathematical terms, our model has the following form:

$$\log \pi_{it} = \mu_i + \beta_1 \log a_{it} + \beta_2 \log \tilde{\pi}_{pt} + \beta_3 (d_{it} \cdot \log \tilde{\pi}_{pt}) + \beta_4 d_{it} + \beta_5 lever_{it} + \rho_t + \epsilon_{it}. \quad (1)$$

In the above equation, d_{it} is an indicator variable taking value one for subsidiaries located in countries with lower taxation than parent firms. Additional controls include a subsidiary's size, a_{it}, and debt exposure, $lever_{it}$. Likewise, ρ_{it} is a set of fixed effects, such as subsidiary fixed effects, year fixed effects, industry-year fixed effects, and country-year fixed effects. Finally, e_{it} is the error term.[9]

The process of constructing $\tilde{\pi}_{pt}$ is based on the insights of Bertrand et al. (2002). Specifically, we set the following system of equations:

$$\tilde{\pi}_{pt} = \tilde{p}_{pt} \times a_{pt}, \quad (2)$$

$$\tilde{p}_{pt} = \sum_j \frac{\alpha_{jt}}{\sum_j a_{jt}} \times p_{jt}, \; p \neq j, \; \forall \, t \in \{1, \dots, T\}. \quad (3)$$

[9] For the estimation of profit shifting, we also incorporate information about the subsidiary country's population and GDP per capita, as these are important indicators that take into account many dimensions of a country's economy.

In the above equations, a_{pt} denotes the total assets of the parent company p affiliated with a subsidiary firm i. Noting that subscript j denotes comparable parent firms, we set $p_{jt} = \frac{\pi_{jt}}{a_{jt}}$ to be the ratio of pretax profit over total assets for the comparable firm. Importantly, the instrument we use, $\tilde{\pi}_{pt}$, is the product of the average industry profitability ratio ($\tilde{p}_{pt}$) with the total assets of the parent company (a_{pt}). To this end, by estimating equation (1) we obtain profit-shifting estimates at the firm-year level. Bear in mind, however, that although we possess information about the actual parent earnings, to ensure shock exogeneity we need to utilize $\tilde{\pi}_{pt}$. Another important point is that we employ shocks from comparable firms (instead of parent companies) to deal with reverse causality.

Based on parent firm p, we characterize (other) firms to be comparable when they belong to the same industry (i.e., have the same four-digit NACE codes) and country. Next, we take all national and multinational firms from Orbis for which we have available information regarding profits and total assets. For the statistical analysis that follows, we require only subsidiary-year combinations when the set of comparable firms is at least 20 firms—we do this to increase accuracy—and subsidiaries and parent companies differ at a four-digit NACE codes—so that industry shocks do not drive subsidiaries' pretax profits.

If our hypothesis about tax-motivated profit shifting is correct, we expect a positive sign for $\hat{\beta}_3$. That is, when a positive income shock occurs in the parent company, we expect profit to shift from a parent company located in a country with higher corporate taxation to a subsidiary located in a country with lower corporate taxation, *ceteris paribus*.

3.3 First stage results

Results about the estimation of profit shifting are found in Table 3. Columns in Table 3 differ in the way they incorporate fixed effects. Column (4), for example, is the most restrictive case, as it incorporates many fixed effects. The coefficient of interest is that of the interaction term, *Low (x) Parent profits*. In all specifications this is positive and statistically significant with a value around 0.03. This indicates that a 10% increase in parent's earnings is followed by 0.3% higher EBT for low tax subsidiaries. Given that our sample has an EBT mean of about $14.12 million, the coefficient for the interaction term indicates that a 10% increase in parent's earnings results in an increase in profit shifting of about $42,360 (i.e., 0.3*14.12) per subsidiary. Given that in our sample the average number of subsidiaries is 12, profit shifting is on average around $508,320. For parent firms, which on average have more subsidiaries, this number increases considerably. For example, for the case of France, where the average parent company has 33 subsidiaries, the total amount of profit shifting is close to $1.4 million.

[Insert Table 3 about here]

Based on $\hat{\beta}_3$ coefficient, we calculate the partial fitted values by subsidiary-year. This is the measure of profit shifting (ps_{it}) we use in the rest of our analysis.[10]

3.4 Second-stage: The effect of CSR on profit shifting

In the same spirit as Davis et al. (2016), to study the relationship between CSR and profit shifting, we use the following regression equation:

$$ps_{it} = \gamma_0 + \gamma_1 CSR_{it} + \gamma_2 h_{it} + \xi + u_{it} \quad (4)$$

[10] Partial fitted values are equal to: $\hat{\beta}_3(d_{it} \cdot \tilde{\pi}_{pt})$.

In equation (4), ps denotes profit shifting values for a specific parent company at a specific year.[11] CSR is the parent's composite index of corporate social responsibility. A vector with subsidiary-year and parent-year control variables is denoted by h, while ξ represents a number of different fixed effects. Finally, u is the error term.

We include several control variables that past literature has shown to affect tax aggressiveness, such as total assets, leverage, return on assets, the ratio of fixed assets to total assets, and R&D expenditures over total assets for both parent and subsidiary companies. Our specifications include a rich set of fixed effects and their interactions that help us capture various unobserved heterogeneities at the firm, industry, and time dimensions.

We collect firm-level CSR data from the Thomson Reuters ASSET4 database. Prior to being acquired by Thomson Reuters in 2009, ASSET4 was a Swiss company specializing in gathering objective and quantifiable company ESG data from publicly available information sources. For each firm, a specially-trained team of experts manually collects more than 900 data points relating to its environmental, social, governance, and economic performance. These data points are then used as inputs to construct 250 key performance indicators, further organized into 18 categories, and more broadly, into four pillars: (1) Environmental Score; (2) Social Scores; (3) Governance Scores; and (4) Economic Scores. For each of the four dimensions, a firm's pillar score in a given year is a standardized z-score and thus captures its relative performance against all other firms in the universe of ASSET4. Following Cheng et al. (2014), a firm's CSR performance is measured as the average of the Environmental Score, Social Scores, and Governance Scores. Since it is unclear a priori as to what the relative weights should be, we follow

[11] We use three different measures of profit shifting in our analysis. See Table 1 for more information.

the convention in the prior literature (e.g., Waddock and Graves (1997), Hillman and Keim (2001), Waldman et al. (2006), and Cheng et al., 2014) and assign equal importance to the three pillars.

4 Results

4.1 Inference from univariate analysis

We start with a graphical representation of the relationship between corporate social responsibility and profit shifting in Figure 1. The average values (at a country level) of CSR index and profit shifting measure demonstrate a positive relationship. Firms from countries with higher levels of CSR scores appear to have higher profit shifting.

[Insert Figure 1 about here]

We proceed by documenting results from a univariate analysis. Specifically, using the median value of the CSR score, we categorize firms as high and low-CSR. The results in Table 4 show that variable differences between the two groups are statistically significant. Respectively, subsidiary firms related to parent firms with high CSR values, demonstrate higher pre-tax profits of about $1.1 million ($3.8 million vs. $2.7 million), they are more likely to have subsidiaries in countries with lower corporate taxation (76% vs. 70%), and higher profits (the difference is about $1 billion dollars). Furthermore, parent firms with higher CSR scores show higher levels of profit shifting—in our profit shifting measure 0.330 against 0.280.[12] This outcome supports what it was shown graphically in Figure 1. That is, a clear positive relationship between CSR and profit shifting. Moreover, high CSR parent companies have larger asset tangibility, compared to subsidiary companies, where the opposite holds.

[12] Companies with high CSR scores, show also larger values for the two other proxies we use for profit shifting.

[Insert Table 4 about here]

4.2 Inference from multivariate analysis

Results of our baseline model are found in Table 5. We start with a simple specification where we include only our main control variable (CSR) and a plethora of fixed effects. Specifically, parent fixed effects, parent industry-year fixed effects, parent country-year fixed effects, subsidiary industry-year fixed effects, and subsidiary country-year fixed effects. By doing so, we obtain a quite high R^2 of 74.2%. We then start progressively adding controls for parent and subsidiary firms.[13]

The results for the CSR measure indicate a positive and statistically significant relationship. In turn, this means that parent firms with higher CSR scores exhibit higher profit shifting. For example, based on the last model presented in column 4, we find a coefficient of 0.024. This outcome indicates that a one unit increase in CSR measure, increases profit shifting by 2.4 percentage points, or alternatively, by moving from the 25th to the 75th percentile of CSR we obtain an increase of profit shifting of equal to 0.5 percentage points.[14] Hence, the results we obtain support our first hypothesis. That is, firms care about their image and because potential revelations of profit shifting might hurt their value in multiple ways, they have already strategically increased CSR, in order to face less severe punishment.[15] Most importantly, our results are conceptually in line with those of Davis et al. (2016), although we examine a very specific tax planning activity, profit shifting.[16]

[13] We repeat this analysis in Appendix Table A7, where instead of having our dependent variable and lagged (by one year) control variables, we use changes. The results are practically the same.
[14] The 75th and 25th percentile values for CSR are 0.886 and 0.672. Hence, the outcome for the interquartile difference is the result of the following calculation: $(0.886 - 0.672) \times 0.024 = 0.005$.
[15] For empirical evidence regarding this mechanism see Hong and Liskovich (2016).
[16] The measure of profit shifting we construct is bounded to zero from below. Hence, to deal with any problems of censoring, we perform a tobit regression. The results, found in Appendix Table A9, remain almost identical.

[Insert Table 5 about here]

About 48% of parent companies in our sample are from the United States. For this reason, and as a robustness exercise, we test the same baseline specification without including U.S. parent companies. We do this to ensure that our results are not driven by the activities of U.S. firms. The results are in the Appendix Table A5. The results are qualitatively very similar. However, and perhaps more importantly, we see that the CSR coefficient we obtain now is larger in all specifications. We return to this finding with additional details when we discuss the effect of the different tax systems in profit shifting incentives.

Next, we run several sensitivity tests to corroborate our main findings. Results of the above are in Table 6. Specifically, column (1) and column (2) include two different proxies of profit shifting obtained from specifications (2) and (3) of Table 3—the first one accounts for subsidiary and year fixed effects, while the second accounts for subsidiary and industry-year fixed effects. In column (3) we cluster standard errors at the parent level instead of the subsidiary level to deal with this specific form of heteroscedasticity, which could perhaps drive our results and provide wrong inference. Importantly, in order to address potential bias due to profit shifting measure carrying potential errors from the first stage, we perform a bootstrap estimation with 500 replications. In all these sensitivity tests, our control for corporate social responsibility is relatively unaffected. Finally, the last specification of Table 6 adds subsidiary fixed effects. The inclusion of subsidiary fixed effects increases the explanatory power of the model considerably, as R^2 reaches almost 94.4%. It is important to notice here that our main variable of interest, CSR, is still statistically significant, albeit the coefficient is somewhat smaller.

[Insert Table 6 about here]

Following the insights of Scholes et al. (2015), Kohlhase and Pierk (2016), and Markle (2016), we expect that parent firms located in countries under the territorial tax scheme, to be more tax aggressive—to shift more profit. The reason is that by doing so, they would be able to repatriate their profits without the obligation to pay any taxes to their government. Having found a positive association between CSR and profit shifting, we investigate whether the magnitude is larger for parent firms located in countries under the territorial tax regime. We test this in the following manner. First, we split the sample into worldwide vs. territorial-only countries. Second, in the pooled sample, we include the $CSR \times Territorial$ interaction term. This allows us to explore the cross-tax-system variation of CSR's potency on profit shifting. The results we obtain are in accordance with our second hypothesis. Specifically, we find that higher CSR scores have a larger effect on firms from countries under the territorial tax system. By inspecting Table 7, we see the effect of CSR to be much lower for firms under the worldwide tax system vs. firms under the territorial tax system (0.05 for worldwide against 0.038 for territorial). Likewise, in the pooled sample, the interaction term $CSR \times Territorial$ is positive and statistically significant with a value of 0.04.

[Insert Table 7 about here]

In a robustness exercise (see Appending Table A6) we analyze the same question, but now our sample includes only U.S. firms and those belonging to the territorial tax system. The results are practically unchanged, owing to the fact that worldwide companies in our sample are mostly populated by U.S. firms, thus confirming once more our conjecture that territorial firms have higher incentives to participate in profit shifting activities.

By and large, our results exhibit a weak association between CSR and profit shifting for parent firms located in countries under the worldwide tax system (which are expected to exhibit lower

profit shifting). To this end, our findings are the first to document that in the relationship between CSR and profit shifting (i.e., across-countries tax avoidance) one has to account the difference among different corporate tax systems. Past literature (e.g., Hoi et al., 2013; Watson, 2015; Davis et al., 2016) was not able to study the aforesaid, as it relied solely on U.S. data.

5 Dealing with endogeneity and potential selectivity

One important issue that emerges when studying corporate decisions is endogeneity and selectivity–a result of a firm's choices. Endogeneity can be a consequence of reverse causality, omitted variables, and measurement error. Selectivity, in this setting, originates from firms choosing specific paths that might not be randomly selected, for example firms that more actively participate in CSR activities might differ from the rest in a specific pattern. In what follows, we exhibit several potential solutions to deal with the above issues.

5.1 Reverse causality

First, we run several tests to show that the effect we obtain is more likely to run from CSR to profit shifting. Our first test is to estimate models where CSR is a dependent variable and the profit shifting measure is an explanatory variable. Should we find that the effect of profit shifting is insignificant, then the possibilities of reverse causality will be limited.

Table 8 reports the results. All models include the same controls used in our baseline analysis plus the profit shifting variable. By carefully inspecting the table and all its econometric specifications, one deduces that profit shifting does not have any effect on CSR scores, as the coefficients in all specifications are not only statistically insignificant, but their values are close to nil. These results should not come as a surprise, because the profit shifting measure is constructed

based on exogenous shocks of the industry where a firm operates, rather than its actual profit shifting activities.[17]

[Insert Table 8 about here]

Insofar, we have relied on industry profitability ratios of peer companies to create our measure of profit shifting (see equations 1-3). To further strengthen our results and provide an evaluation of our measure of profit shifting, we run two additional robustness tests. In doing so, we check the sensitivity of our findings utilizing the true pre-tax parent earnings.[18] The results of this test are reported in Table A10 and are qualitatively similar to those of Table 3. We then proceed by re-running our main econometric model—the effect of CSR on profit shifting (i.e., eq. 4).[19] The results are in Table A11 and are qualitatively similar to our baseline specification found in Table 5. A common pattern we observe in our findings is that the coefficients are quantitatively larger when we use the true pre-tax earnings of the parent company (π_{pt} instead of $\tilde{\pi}_{pt}$). The reason for this is that the coefficients are "inflated" due to endogeneity issues from reverse causality. In our main analysis, the use of $\tilde{\pi}_{pt}$ constructed by industry profitability ratios, significantly mitigates these endogeneity concerns, as it is not a choice variable for the parent firm. However, this is not the case when we use the true pre-tax earnings of the parent company.

5.2 Omitted variable bias and selection bias

Having found that reverse causality is less likely to be an issue in our econometric analysis, we next proceed by employing an instrumental variables approach (IV) to deal with endogeneity due to omitted variables and a Heckman selection model to deal with selection.

[17] We repeat this analysis using variable changes instead of levels. The results reported in Appendix Table A8 are very similar.
[18] We re-estimate profit shifting using equations 1-3, but this time we use π instead of $\tilde{\pi}$.
[19] In this case, profit shifting is calculated as $\hat{\beta}_3(d_{it} \cdot \pi_{pt})$ instead of $\hat{\beta}_3(d_{it} \cdot \tilde{\pi}_{pt})$.

Regarding endogeneity, a good instrument is one which is not correlated with the main outcome variable but is correlated with the variable that is instrumented. In other words, our instrument should affect profit shifting only through CSR and not directly. To this end, we follow Liang and Renneboog (2017) and use the legal origins of a country as our instrumental variable.[20] However, instead of using all five different dummy variables for each legal system, we create a variable that takes value one for all countries under the French legal system and zero otherwise. One reason for doing this is that past literature has documented clear differences between French civil law compared to the rest. Another reason is because Liang and Renneboog (2017) find firms under the French legal system to have higher levels of CSR. Although this sample may look small, the inclusion of OECD countries, thus including many European countries, indicates that our final sample does a good job in representing the main legal origin families.

Past research has revealed that the role of legal origins in various socioeconomic phenomena and the corporate world is very important. From a historical perspective, there are two main families of legal origins: the Common law tradition and the Civil law tradition—the latter is multidimensional and manifested in many forms, such as the French, German, and Scandinavian civil laws. In the past two decades, scholars have quantified the effect legal origins have in a country's rules and economic outcomes. Specifically, for the case of law and finance, theory suggests that the differences between legal origins play a crucial role in the development of the financial system of a country.[21]

[20] Legal origins characterize the legal tradition of a country where a parent company is headquartered. La Porta et al. (1998) recognize the following law systems: English (E), French (F), Germanic (G), Scandinavian (Scand), and Socialist (S). Parent companies in our database are from the following countries: Austria (G), Australia (E), Belgium (F), Switzerland (G), China (S), Germany (G), Denmark (Scand), Spain (F), Finland (Scand), France(F), Great Britain (E), Hungary (S), Ireland (E), Israel (F), Italy (F), Netherlands (F), Norway (Scand), Poland (S), Sweden (Scand), United States (E).

[21] See La Porta et al. (2008) for a thorough review on the effects legal origins have in the economy and Beck and Levine (2005) on the effects of legal institutions in financial development.

Evidently, legal origins are among the primary forces that shape contracts between different economic entities (e.g., between shareholders and stockholders). Although both "born" in Europe, the Civil and Common law have significant dissimilarities. An important difference lies on the way the state perceives private property. Some researchers have pointed out that Civil law tends to cultivate and feed a strong state that puts less emphasis on private property rights. In this case, a very strong state under the Civil law system is more likely to move resources towards the entities it prefers the most, thus giving space to corruption and other unlawful activities between government officials and citizens.

Glaeser and Shleifer (2002) provide a nice overview regarding the historical evolution of legal origins that helps us understand how the aforementioned may affect people's (economic) incentives, *inter alia*. Regarding its structure and the way it operates, Civil law relies on professional judges and written records—in this sense, it is more bureaucratic and static, —while Common law relies on lay judges and oral arguments that can evolve with the passage of time—in this sense, Common law is more dynamic. Not only is Civil law more bureaucratic, but due to codification, it relies on bright line rules (BLR), which describe exactly the actions that are prohibited, but also their specific punishment. That is, in case of an unlawful action, the offender will know his punishment with a high certainty.

Regarding economic markets, Common law favors private market outcomes and shareholder protection, while Civil law favors state intervention through its BLRs and stakeholder protection. Precisely this favor of Civil law towards stakeholders is the reason corporations in countries under this legal regime, must comply with rules that protect stakeholders at a much higher degree (e.g., stricter regulations and protection laws), compared to Common law countries. Evidently, the legal regime of a country affects corporations in multiple ways, especially in their

choices for transparency and better governance (Doidge et al., 2007), where higher investments in the aforesaid, might help corporations considerably in the global markets and their potential investments in foreign lands.

We posit that legal origins affect a firm's investment in CSR activities in at least two ways. First, as mentioned before, Civil law countries, and especially countries with French legal origins in their judiciary system,[22] are characterized by state interventionism, rules, regulations, and, generally, more bureaucracy. A reason for this can be traced back in time, when trust and law enforcement has been historically lower in countries under the Civil law (e.g., strong feudal lords in France), and that the stricter (Napoleonic) Civil law itself was put in place to ensure that the will of state was applied. Second, countries under Civil law have adopted a stakeholder view, whereby the rights of stakeholders are above those of shareholders. Therefore, firms in Civil law countries are expected to follow corporate doctrines that enhance stakeholder welfare (i.e., higher CSR), as opposed to that of shareholders. *Ergo*, since firms prefer to have the least possible intervention from bureaucratic government agencies, they choose to meet the criteria that the state has imposed in the first place—which, on average, are expected to be higher compared to Common law countries—to enhance stakeholder welfare, which is central under Civil law.

We argue that legal origins are an appropriate instrument for CSR. First, we contend that legal origins have created "deep roots" in the society that determine general behavioral trends economic agents (i.e., individuals and firms) follow when they deal with the state and the economy. For example, for the case of corporate social responsibility, firms know that under French Civil law they do not have many degrees of freedom regarding what they need to offer to stakeholders.

[22] Compared to French Civil law, German law did not abolish any prior law, as it was in the case of France during the Napoleonic era. The Scandinavian law developed independently, and it is less closely linked to Roman Civil law, and thus French Civil law. Hence, of all different manifestations of Civil law, the French Civil law is the one characterized by the highest level of intervention in economic, and other activities.

That is, in case of a dispute, stakeholders are more likely to win (e.g., stronger unions, stricter regulations). Because the society under such a regime requires a firm to care about its stakeholders (more compared to a country under the Common law), firms are expected to loyally follow the requirement of the society. That is, if a society demands higher CSR they must be willing to provide that, or else they will face the competition of other firms or be fined by the state if they choose not to comply, or even be stigmatized for their misbehavior. Second, our instrumental variables are not expected to affect a firm's choice to participate in profit shifting activities. Although legal origins characterize general behavioral trends in the society, they are not expected to affect firms' choice to do profit shifting. This is because the choice of profit shifting is firm specific and not necessarily affected by general societal characteristics, such as legal origins, but rather a choice made by people within the firm who take into consideration a number of parameters prior to proceeding to the action.

Having established that legal origins might act as an appropriate exclusion restriction for corporate social responsibility (CSR) measures, we perform an instrumental variables (IV) analysis to deal with endogeneity, and an endogenous treatment-regression model (Heckman selection) to deal with selectivity.[23]

In mathematical terms, the IV model is the following:

$$ps_{it} = \psi_0 + \psi_1 \widehat{CSR_{it}} + \psi_2 h_{it} + \xi + \varpi_{it} \quad (5)$$

$$CSR_{it} = \kappa_o + \kappa_1 FrenchLaw_i + \varsigma_{it} \quad (6)$$

As in our main specification, ps denotes the profit shifting measure, h is a vector of subsidiary-year and parent-year control variables, ξ represents various fixed effects, while ϖ and ς are the

[23] For the case of the Heckman treatment model, high CSR is a dummy variable taking value one when a firm's CSR belongs to highest quartile.

error terms. Contrary to the baseline analysis though, instead of using the endogenous CSR values for our main equation (eq. 5), we use the fitted values obtained from equation 6.

The selection model takes the following form:

$$High\ CSR_{it} = 1 \text{ if } \quad \mu_0 + \mu_1 FrenchLaw + \mu_2 h_{it} + \xi + \zeta > 0, \quad \text{with } \zeta \sim (0, \sigma^2) \tag{7}$$

$$ps_{it} = \eta_0 + \eta_1 High\ CSR_{it} + \eta_2 h_{it} + \xi + \lambda + \omega \tag{8}$$

Equation 7 is our selection or treatment equation, and constitutes the first stage of the selection model, while equation 8 is the main equation. $High\ CSR$ takes value one for all firms that belong to the highest CSR quartile. λ is the inverse Mill's ratio taken from the first stage and is the component that mitigates selection bias.

[Insert Table 9 about here]

We present the outcomes of this analysis is Table 9. By and large, our results follow the same pattern as before. First, for the IV case (column 1 is the second stage outcome and column 2 the first stage outcome), we find that the CSR still enters with a positive and statistically significant coefficient, although in this case the coefficient is larger. This could indicate that omitted variables attenuated the effect of CSR in the first place and through our IV we are able to capture an effect free of bias and measurement error.[24] In accordance with our conjecture, firms from countries where French legal origin has prevailed, have higher values of CSR. Statistics at the end of the table document that our instrument is relevant and well above the Stock and Yogo (2005) critical values, indicating that legal origins is a good instrument for our purpose.[25] Moving to the

[24] Another reason for such a high coefficient is weak instruments, but this is unlikely to be the case here, as the F-statistic we obtain is quite large, strongly statistically significant and far above the Stock and Yogo (2005) critical values.

[25] Stock and Yogo (2005) critical values demonstrate the strength of the identification. Hence, when the first stage F-statistic is higher than the SY critical values, we can infer that our identification is strong and that the estimate we obtain from the two-stage IV process is less biased compared to that of the OLS.

endogenous treatment model (column 3 is the main equation and 4 is the selection equation), we see that the value of the *High CSR* dummy enters with a positive and statistically significant coefficient, supporting once again our main hypothesis. In addition, by inspecting Table 9 we observe that the hazard lambda for the selection model is negative and statistically significant at the 10% level, thus indicating a potential problem of negative selection, which we address through the endogenous treatment-regression model.

Lacking any policy shock or quasi-experiment at the global level that could have potentially provided us with a clear answer to the identification issue, the use of legal origins as our exclusion restriction might seem adequate. Although legal origins have been used several times as instrumental variables in the past, a constraint one has to take into consideration is the fact that they remain unchanged with the passage of time. Optimally, we would prefer to use an instrumental variable that variates between firms but also in time. To this end, following past literature (Leaven and Levin, 2009; Lin et al., 2011; Ferrell et al., 2016) we use industry peer's average CSR scores as IV's for firm specific CSR scores. To do this, we take averages by country, industry, and year. Academic research on this topic points to this direction. For example, Cao et al. (forthcoming) argue that CSR adaptation can be perceived as a strategic response by firms in a specific sector. Precisely, if peers in a specific sector invest more in CSR activities, there is a credible threat that some firms may be left behind (laggards) and as such they may be punished in the market.[26]

The results presented in Table 10 point to this direction. Using the industry-peer CSR as our exclusion restriction, we re-run models similar to those presented in Table 9. Once again, we find a positive and statistically significant relationship between CSR and profit shifting. The

[26] In fact, this is what Cao et al. (2018) find. In an RDD design, they document that peers having difficulties in catching up experience lower stock returns.

magnitude of the coefficient is closer to that found in the baseline specification (see Table 5), albeit the coefficient obtained in the IV model is around 6% now.

[Insert Table 10 about here]

Accounting for the endogeneity of the CSR variable, our analysis shows a strong support for our hypotheses. Through our IV strategy we were able to study one direction of causality, that of CSR to profit shifting. Although we understand that more granular data are needed to strengthen the argument of causality, we have, nonetheless, provided statistical inference that purges the results obtained from simple OLS regressions. We view this as an important addition to the literature that studies the relationship between CSR and tax aggressiveness.

6 Conclusion

Heretofore, the disciplines of accounting and finance, have ignored the relationship between corporate social responsibility and multinationals' profit shifting (i.e., cross-country tax avoidance). CSR could be beneficial for the firm, as it could potentially increase a firm's value by attracting higher quality employees, reducing risk management, and increasing customer loyalty. Concurrently, CSR could be also beneficial for the society through responsible firm practices that generally avail stakeholders. On top of that, it is possible that firms with higher CSR face reduced scrutiny by both the government and the public regarding their practices. Therefore, in case of unethical corporate actions, they might be punished less severely.

Such an action is that of profit shifting which is a very specific form of tax aggressiveness. Voices in many countries have already called upon the maligned behavior of some MNEs and discussions between politicians and regulators regarding this matter is on the rise. The focal points of such discussions gravitate around the fairness of the tax system and potential mechanisms that

could curtail profit shifting, but also allow the firms to expand, innovate, and add more jobs in the economy. We strongly believe that in the future the discussion about profit shifting will be central in the political agenda, especially in large economies such as the European Union and the United States.

This is the first work that thoroughly studies the relationship between corporate social responsibility and profit shifting. To accomplish this, we use firm data from a worldwide sample—509 unique parent firms from 19 OECD countries and China, —and their respective subsidiaries—6,103 unique subsidiary companies from 63 countries. Our empirical work consists of two stages. First, we obtain exogenous profit shifting measures using a difference-in-differences (DiD) method. Next, we explicitly study the relationship between corporate social responsibility and profit shifting. Not only ours is the first work that studies the relationship between CSR and cross-country tax avoidance (profit-shifting) but also, based on legitimacy and reputation theories, this paper provides evidence of a specific direction of causality: that from CSR to profit shifting. We find that CSR and profit shifting have a positive and statistically significant relationship. This outcome is strong and survives a battery of robustness tests, including specifications for endogeneity and selectivity. We also find that the effect of CSR on profit shifting is larger for firms under the territorial tax system, where the incentives for profit shifting are higher.

The findings of this work could be useful for policy makers and tax authorities. Our work shows that firms with higher CSR scores are more likely to document higher profit shifting. Furthermore, past research has found that more socially responsible firms are treated with leniency in case corporate scandals erupt. Unfortunately, this could lead to socially wrong incentives. Specifically, some firms may strategically increase their CSR scores to avoid scrutiny and receive lower punishment for their wrongdoing to the society (including profit shifting activities, *inter*

alia). Therefore, it is in the shoulders of policy makers to devise mechanisms that will lead firms to optimally choose the socially beneficial alternatives without creating any negative externalities.

This work opens the window for further research in the future. As more detailed corporate data are expected to become available, partially because the CSR revolution is expanding in the Western World, but also because the above is expected to spread to other economies as they become wealthier. With that in mind, it will be possible for future scholars to explicitly study the paths of causality using firm level instruments that are much finer—yet unavailable now—than time invariant country level variables. This will further refine the estimates regarding the relationship between CSR and profit shifting, although a desideratum for clear causality claims is (quasi) natural experiments or randomized control trials. Other venues for future research are the development of more advanced methods to estimate profit shifting and the compilation of longer and richer time series CSR data. We trust that future research will look at these ideas and improve our understanding regarding CSR and profit shifting.

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Table 1: Description of variables

Variable	Definition	Source
EBT	Natural logarithm of subsidiary's pre-tax profits.	Orbis
Low	A dummy that equals one when the subsidiary's tax rate is below that of their parent, and zero otherwise.	Own calculation
Parent profits	This denotes the parent's pre-tax and pre-shifting profit. To construct it, multiply the asset weighted average profitability of firms in the same industry (based on 4-digit NACE codes) and country with the parent's total asset stock. Specifically, parent profits are defined as: $\tilde{\pi}_{it} = \tilde{p}_{jt} a_{it}$.	Orbis
Subsidiary total assets	Natural logarithm of subsidiary's total assets.	Orbis
Subsidiary leverage	Total debt to total assets for the subsidiary firm.	Orbis
Subsidiary population	Natural logarithm of the total population of the subsidiary's country.	World Bank
Subsidiary GDP capita	Natural logarithm of GDP per capita of the subsidiary's country.	World Bank
Profit shifting	The profit shifting measure calculated based on the method of Dharmapala and Riedel (2013).	Own calculation
Profit shifting 2	*Idem*, augmented with subsidiary and year fixed effects.	Own calculation
Profit shifting 3	*Idem*, augmented by controlling for subsidiary, and industry-year fixed effects.	Own calculation
CSR	Parent's composite index of corporate social responsibility. CSR is the equal weighted average of three pillar scores (environmental, social, and governance performance) from Thomson Reuters ASSET4 database. The pillar scores are aggregated from a number of individual indicators and ratings collected by ASSET4 on firm performance in relation to their wellbeing to the environment, society, and other stakeholders.	Thomson Reuters ASSET4
Parent total assets	Natural logarithm of parents' total assets.	Orbis
Parent leverage	Total debt to total assets for the parent firm.	Orbis
Parent ROA	Parent firm's returns on assets, defined as earnings before tax divided by total assets.	Orbis
Parent Fixed assets/TA	Parent firm's asset tangibility, defined as total fixed assets to total assets.	Orbis
Parent R&D/TA	Parent firm's R&D intensity, defined as the amount of R&D expenditure divided by total assets. Missing R&D is assumed to be zero.	Orbis
Subsidiary ROA	Subsidiary's returns on assets, defined as earnings before tax divided by total assets.	Orbis
Subsidiary Fixed assets/TA	Subsidiary's asset tangibility, defined as total fixed assets to total assets.	Orbis
Subsidiary R&D/TA	Subsidiary's R&D intensity, defined as the amount of R&D expenditure divided by total assets. Missing R&D is assumed to be zero.	Orbis
Territorial dummy	A dummy variable that equals one for parent firms whose countries are under a territorial tax system, and zero otherwise.	Own calculation
French legal origin	A dummy that takes the value one for all firms originating from a country under French legal origin.	Own calculation

Table 2: Summary statistics

Notes: This table reports summary statistics of the variables used in the analysis. The definition of variables is in Table 1. The values for EBT and parent's profits are in thousands of U.S. dollars, while the values for parent's and subsidiary's total assets are in millions of U.S. dollars.

Variable	Obs.	Mean	Std. dev.	Min	p25	p50	p75	Max
EBT	26,679	14,122.430	152,287.700	-1,554,860	267.888	1930.175	7,037.116	14,200,000
Low	26,752	0.728	0.445	0.000	0.000	1.000	1.000	1.000
Parent profits	26,752	1,087,074	4.726	3.728	379,269	1,209,842	3,066,355	57,024,981
Profit shifting	26,752	0.305	0.190	0.000	0.000	0.399	0.438	0.528
Profit shifting (ind)	26,752	0.333	0.207	0.000	0.000	0.435	0.478	0.576
Profit shifting (year)	26,752	0.277	0.173	0.000	0.000	0.362	0.398	0.480
CSR	26,752	0.748	0.187	0.064	0.672	0.810	0.886	0.956
Parent total assets	26,752	19,732	4.384	623.283	6,229.18	24,173.20	65,447.27	492,869.60
Parent leverage	26,752	0.923	0.229	0.360	0.771	0.929	1.088	1.529
Parent ROA	26,752	0.076	0.063	-0.084	0.039	0.065	0.106	0.302
Parent Fixed assets/TA	26,752	0.597	0.147	0.191	0.512	0.606	0.695	0.889
Parent R&D/TA	26,752	0.027	0.033	0.000	0.001	0.017	0.039	0.158
Subsidiary total assets	26,752	37.788	4.811	0.995	12.975	3.534	34.261	2,861.21
Subsidiary leverage	26,752	0.980	0.467	0.147	0.633	0.940	1.286	2.267
Subsidiary ROA	26,752	0.082	0.152	-0.431	0.013	0.070	0.150	0.575
Subsidiary Fixed assets/TA	26,752	0.262	0.245	0.000	0.059	0.183	0.409	0.913
Subsidiary R&D/TA	26,752	0.001	0.009	0.000	0.000	0.000	0.000	0.078
Territorial dummy	26,752	0.609	0.488	0.000	0.000	1.000	1.000	1.000
French legal origin	26,752	0.268	0.443	0.000	0.000	0.000	1.000	1.000

Table 3: Profit shifting estimation

This table reports estimates of profit shifting based on the method developed by Dharmapala and Riedel (2013). The dependent variable is *EBT*, the natural logarithm of subsidiary's pre-tax profits. *Low* is a dummy that takes value one when the subsidiary's tax rate is below from that of the parent company and zero otherwise. *Parent profits* denotes the parent's pre-tax and pre-shifting profits. *Subsidiary total assets* is the natural logarithm of subsidiary's total assets, *Subsidiary leverage* is the ratio of total debt to total assets for the subsidiary firm, *Subsidiary population* is the natural logarithm of the total population of the subsidiary's country, and *Subsidiary GDP per capita* is the natural logarithm of GDP per capita of the subsidiary's country. Each observation is a subsidiary firm tied to a foreign parent firm. Different types of fixed effects are utilized in each regression. Industry-year fixed effects are based on 2-digit NACE level. Country-year fixed effects are fixed effects for the subsidiary's country. Stars, ***, **, and *, indicate significance levels at the 1%, 5%, and 10%, respectively. t-statistics, based on robust standard errors clustered at the subsidiary level, are reported in parentheses. A complete description of variables along with their sources is in Table 1.

	(1)	(2)	(3)	(4)
Low (x) Parent profits	0.027***	0.027***	0.032***	0.030***
	(2.958)	(2.944)	(3.455)	(3.073)
Low	-0.263**	-0.278**	-0.337***	-0.366***
	(-2.231)	(-2.350)	(-2.793)	(-2.951)
Parent profits	0.008	0.011	0.002	0.003
	(0.896)	(1.189)	(0.261)	(0.325)
Subsidiary total assets	0.763***	0.776***	0.770***	0.766***
	(49.434)	(49.397)	(48.373)	(47.302)
Subsidiary leverage	-0.392***	-0.401***	-0.400***	-0.398***
	(-16.549)	(-16.880)	(-16.740)	(-16.439)
Subsidiary population	-1.456***	-0.708*	-0.889**	
	(-4.672)	(-1.884)	(-2.281)	
Subsidiary GDP per capita	0.073*	0.102**	0.055	
	(1.792)	(2.045)	(1.075)	
Observations	42,712	42,712	42,503	42,473
Adjusted R-squared	0.819	0.820	0.822	0.822
Subsidiary effects	Yes	Yes	Yes	Yes
Year effects	No	Yes	No	No
Industry-year effects	No	No	Yes	Yes
Country-year effects	No	No	No	Yes

Table 4: High vs. low CSR

This table reports differences of the main variables between the firms with high (above the median) CSR scores and firms with low (below the median) CSR scores. Stars, ***, **, and *, indicate significance levels at the 1%, 5%, and 10%, respectively.

	High CSR			Low CSR			Differences			
Variable	N	mean	p50	N	mean	p50	Mean	Sig.	Median	Sig.
Ln(EBT)	10,908	8.259	8.215	10,623	7.902	7.902	0.357	***	0.313	***
Low	13,356	0.759	1.000	13,396	0.698	1.000	0.061	***	0.000	***
Parent profits	13,356	14.495	14.599	13,396	13.304	13.280	1.191	***	1.320	***
Profit shifting	13,356	0.330	0.427	13,396	0.280	0.378	0.050	***	0.049	***
Profit shifting (ind)	13,356	0.360	0.466	13,396	0.305	0.412	0.055	***	0.054	***
Profit shifting (year)	13,356	0.300	0.388	13,396	0.254	0.343	0.046	***	0.045	***
CSR	13,356	0.882	0.886	13,396	0.613	0.672	0.269	***	0.214	***
Parent ln(Total assets)	13,356	10.547	10.789	13,396	9.234	9.118	1.313	***	1.671	***
Parent Leverage	13,356	0.951	0.973	13,396	0.895	0.897	0.055	***	0.075	***
Parent ROA	13,356	0.079	0.067	13,396	0.073	0.064	0.006	***	0.003	***
Parent Fixed assets/TA	13,356	0.613	0.620	13,396	0.580	0.586	0.033	***	0.034	***
Parent R&D/TA	13,356	0.031	0.023	13,396	0.023	0.010	0.008	***	0.013	***
Subsidiary ln(Total assets)	13,356	3.830	3.720	13,396	3.435	3.333	0.395	***	0.387	***
Subsidiary Leverage	13,356	0.990	0.951	13,396	0.969	0.927	0.021	***	0.024	***
Subsidiary ROA	13,356	0.085	0.071	13,396	0.079	0.069	0.006	***	0.002	***
Subsidiary Fixed assets/TA	13,356	0.253	0.171	13,396	0.271	0.195	-0.018	***	-0.024	***
Subsidiary R&D/TA	13,356	0.001	0.000	13,396	0.001	0.000	0.000	***	0.000	***
Territorial dummy	13,356	0.592	1.000	13,396	0.626	1.000	-0.034	***	0.000	***

Table 5: Baseline specification

The dependent variable is profit shifting and it is calculated according to the method of Dharmapala and Riedel (2013) shown in equation (1). *CSR* is a parent company's corporate social responsibility index and it is measured as the equal weight of three pillar scores (environmental, social, and governance performance). We include the following controls for both parent and subsidiary companies: *Total assets*— the natural logarithm of total assets, *leverage*— the ratio of total debt to total assets for the firm, *ROA*—a firm's returns on assets, defined as earnings before tax divided by total assets, *Fixed assets/TA*—a firm's asset tangibility, and *R&D/TA*—a firm's R&D intensity. Each observation is a subsidiary firm tied to a foreign parent firm. Different types of fixed effects are utilized in each regression. Industry-year fixed effects are based on 2-digit NACE level. Country-year fixed effects are fixed effects for the subsidiary's country. Stars, ***, **, and *, indicate significance levels at the 1%, 5%, and 10%, respectively. t-statistics, based on robust standard errors clustered at the subsidiary level, are reported in parentheses. A complete description of variables along with their sources is in Table 1.

	(1)	(2)	(3)	(4)
CSR t-1	0.030***	0.024**	0.030***	0.024**
	(3.158)	(2.488)	(3.089)	(2.437)
Parent ln(Total assets) t-1		0.014***		0.014***
		(3.975)		(3.856)
Parent Leverage t-1		-0.009		-0.009
		(-1.189)		(-1.208)
Parent ROA t-1		0.010		0.012
		(0.626)		(0.741)
Parent Fixed assets/TA t-1		-0.030***		-0.029***
		(-2.746)		(-2.681)
Parent R&D/TA t-1		0.118*		0.109
		(1.691)		(1.554)
Subsidiary ln(Total assets) t-1			0.002*	0.002*
			(1.732)	(1.706)
Subsidiary Leverage t-1			0.000	0.000
			(0.004)	(0.019)
Subsidiary ROA t-1			-0.011	-0.011
			(-1.479)	(-1.490)
Subsidiary Fixed assets/TA t-1			-0.009	-0.009
			(-1.477)	(-1.470)
Subsidiary R&D/TA t-1			-0.240*	-0.238*
			(-1.808)	(-1.796)
Observations	26,752	26,752	26,752	26,752
Adjusted R-squared	0.742	0.742	0.742	0.742
Parent FE	Yes	Yes	Yes	Yes
Parent Industry*Year FE	Yes	Yes	Yes	Yes
Parent Country*Year FE	Yes	Yes	Yes	Yes
Subsidiary Industry*Year FE	Yes	Yes	Yes	Yes
Subsidiary Country*Year FE	Yes	Yes	Yes	Yes

Table 6: Sensitivity tests

The dependent variables are various forms of profit shifting. *CSR* is a parent company's corporate social responsibility index and it is measured as the equal weight of three pillar scores (environmental, social, and governance performance). We include the following controls for both parent and subsidiary companies: *Total assets*— the natural logarithm of total assets, *leverage*— the ratio of total debt to total assets for the firm, *ROA*—a firm's returns on assets, defined as earnings before tax divided by total assets, *Fixed assets/TA*—a firm's asset tangibility, and *R&D/TA*—a firm's R&D intensity. Each observation is a subsidiary firm tied to a foreign parent firm. Different types of fixed effects are utilized in each regression. Industry-year fixed effects are based on 2-digit NACE level. Country-year fixed effects are fixed effects for the subsidiary's country. Stars, ***, **, and *, indicate significance levels at the 1%, 5%, and 10%, respectively. t-statistics, based on robust standard errors, are reported in parentheses. A complete description of variables along with their sources is in Table 1.

Estimation method	OLS			Bootstrap (500)	OLS
	Profit shifting 2	Profit shifting 3	Profit shifting	Profit shifting	Profit shifting
	(1)	(2)	(3)	(4)	(5)
CSR t-1	0.026**	0.022**	0.024**	0.024*	0.016**
	(2.437)	(2.437)	(2.296)	(1.901)	(2.119)
Parent ln(Total assets) t-1	0.015***	0.012***	0.014***	0.014***	0.015***
	(3.856)	(3.856)	(2.827)	(3.139)	(5.998)
Parent Leverage t-1	-0.010	-0.008	-0.009	-0.009	-0.010
	(-1.208)	(-1.208)	(-1.095)	(-0.895)	(-1.565)
Parent ROA t-1	0.013	0.011	0.012	0.012	0.011
	(0.741)	(0.741)	(0.658)	(0.503)	(0.893)
Parent Fixed assets/TA t-1	-0.032***	-0.026***	-0.029*	-0.029*	-0.044***
	(-2.681)	(-2.681)	(-1.698)	(-1.907)	(-5.223)
Parent R&D/TA t-1	0.119	0.099	0.109	0.109	0.092*
	(1.554)	(1.554)	(1.241)	(1.098)	(1.877)
Subsidiary ln(Total assets) t-1	0.002*	0.002*	0.002	0.002***	-0.001
	(1.706)	(1.706)	(1.523)	(3.465)	(-0.656)
Subsidiary Leverage t-1	0.000	0.000	0.000	0.000	-0.003
	(0.019)	(0.019)	(0.015)	(0.035)	(-1.440)
Subsidiary ROA t-1	-0.012	-0.010	-0.011	-0.011**	-0.003
	(-1.490)	(-1.490)	(-1.116)	(-2.405)	(-0.836)
Subsidiary Fixed assets/TA t-1	-0.010	-0.008	-0.009	-0.009***	-0.001
	(-1.470)	(-1.470)	(-1.258)	(-2.998)	(-0.330)
Subsidiary R&D/TA t-1	-0.260*	-0.216*	-0.238	-0.238***	0.028
	(-1.796)	(-1.796)	(-1.530)	(-3.410)	(0.252)
Observations	26,752	26,752	26,752	26,752	26,752
Adjusted R-squared	0.742	0.742	0.741	0.742	0.944
Standard errors clustered at:	Subsidiary	Subsidiary	Parent	Subsidiary	Subsidiary
Parent FE	Yes	Yes	Yes	Yes	Yes
Subsidiary FE	No	No	No	No	Yes
Parent Industry*Year FE	Yes	Yes	Yes	Yes	Yes
Parent Country*Year FE	Yes	Yes	Yes	Yes	Yes
Subsidiary Industry*Year FE	Yes	Yes	Yes	Yes	Yes
Subsidiary Country*Year FE	Yes	Yes	Yes	Yes	Yes

Table 7: Worldwide vs. territorial tax systems

The dependent variable is profit shifting and it is calculated according to the method of Dharmapala and Riedel (2013) shown in equation (1). *CSR* is a parent company's corporate social responsibility index and it is measured as the equal weight of three pillar scores (environmental, social, and governance performance). We include the following controls for both parent and subsidiary companies: *Territorial*—a dummy that equals one for countries with a territorial tax system, and zero for countries under a worldwide tax system, *Total assets*— the natural logarithm of total assets, *leverage*— the ratio of total debt to total assets for the firm, *ROA*—a firm's returns on assets, defined as earnings before tax divided by total assets, *Fixed assets/TA*—a firm's asset tangibility, and *R&D/TA*—a firm's R&D intensity. Each observation is a subsidiary firm tied to a foreign parent firm. Different types of fixed effects are utilized in each regression. Industry-year fixed effects are based on 2-digit NACE level. Country-year fixed effects are fixed effects for the subsidiary's country. Stars, ***, **, and *, indicate significance levels at the 1%, 5%, and 10%, respectively. t-statistics, based on robust standard errors clustered at the subsidiary level, are reported in parentheses. A complete description of variables along with their sources is in Table 1.

	Worldwide	Territorial	Pooled
	(1)	(2)	(3)
CSR t-1	0.005**	0.038**	0.000
	(2.219)	(2.400)	(0.017)
CSR t-1 × Territorial dummy			0.040**
			(2.230)
Parent ln(Total assets) t-1	0.024***	0.010	0.014***
	(30.259)	(1.611)	(4.024)
Parent Leverage t-1	-0.005***	-0.008	-0.008
	(-3.011)	(-0.567)	(-1.049)
Parent ROA t-1	-0.001	0.045	0.013
	(-0.290)	(1.498)	(0.824)
Parent Fixed assets/TA t-1	-0.001	-0.075***	-0.029***
	(-0.224)	(-3.194)	(-2.706)
Parent R&D/TA t-1	0.047***	0.355**	0.114
	(3.346)	(2.198)	(1.625)
Subsidiary ln(Total assets) t-1	-0.000***	0.002	0.002*
	(-2.844)	(1.574)	(1.712)
Subsidiary Leverage t-1	0.000	-0.004	0.000
	(1.496)	(-1.009)	(0.019)
Subsidiary ROA t-1	0.001	-0.008	-0.011
	(0.700)	(-0.845)	(-1.488)
Subsidiary Fixed assets/TA t-1	-0.000	-0.009	-0.009
	(-0.085)	(-1.165)	(-1.465)
Subsidiary R&D/TA t-1	0.002	-0.174	-0.238*
	(0.285)	(-0.667)	(-1.793)
Observations	9,450	17,302	26,752
Adjusted R-squared	0.982	0.777	0.742
Parent FE	Yes	Yes	Yes
Parent Industry*Year FE	Yes	Yes	Yes
Parent Country*Year FE	Yes	Yes	Yes
Subsidiary Industry*Year FE	Yes	Yes	Yes
Subsidiary Country*Year FE	Yes	Yes	Yes

Table 8: Causality running from profit shifting to CSR

The dependent variable is CSR_t, a parent company's corporate social responsibility index measured as the equal weight of three pillar scores (environmental, social, and governance performance). *Profit shifting* is calculated according to the method of Dharmapala and Riedel (2013) shown in equation (1). We include the following controls for both parent and subsidiary companies: *Total assets*— the natural logarithm of total assets, *leverage*— the ratio of total debt to total assets for the firm, *ROA*—a firm's returns on assets, defined as earnings before tax divided by total assets, *Fixed assets/TA*—a firm's asset tangibility, and *R&D/TA*—a firm's R&D intensity. Each observation is a subsidiary firm tied to a foreign parent firm. Different types of fixed effects are utilized in each regression. Industry-year fixed effects are based on 2-digit NACE level. Country-year fixed effects are fixed effects for the subsidiary's country. Stars, ***, **, and *, indicate significance levels at the 1%, 5%, and 10%, respectively. t-statistics, based on robust standard errors clustered at the subsidiary level, are reported in parentheses. A complete description of variables along with their sources is in Table 1.

	(1)	(2)	(3)	(4)	(5)
Profit shifting t-1	-0.000	-0.003	-0.000	-0.003	-0.007
	(-0.194)	(-1.319)	(-0.169)	(-1.321)	(-0.961)
Parent ln(Total assets) t-1		0.079***		0.079***	0.075***
		(13.433)		(13.429)	(11.600)
Parent Leverage t-1		0.068***		0.068***	0.066***
		(7.525)		(7.535)	(6.948)
Parent ROA t-1		0.165***		0.165***	0.153***
		(9.338)		(9.337)	(8.242)
Parent Fixed assets/TA t-1		-0.003		-0.002	-0.008
		(-0.180)		(-0.177)	(-0.528)
Parent R&D/TA t-1		0.581***		0.581***	0.577***
		(6.521)		(6.521)	(5.955)
Subsidiary ln(Total assets) t-1			0.000	0.000	0.001
			(1.466)	(0.537)	(0.484)
Subsidiary Leverage t-1			-0.001	-0.001	-0.002
			(-1.284)	(-1.407)	(-0.959)
Subsidiary ROA t-1			0.001	0.000	-0.002
			(0.437)	(0.069)	(-0.511)
Subsidiary Fixed assets/TA t-1			-0.001	-0.001	0.000
			(-0.540)	(-0.609)	(0.086)
Subsidiary R&D/TA t-1			0.006	0.008	-0.042
			(0.237)	(0.369)	(-0.481)
Observations	22,690	22,690	22,690	22,690	22,690
Adjusted R-squared	0.941	0.945	0.941	0.945	0.933
Parent FE	Yes	Yes	Yes	Yes	Yes
Subsidiary FE	No	No	No	No	Yes
Parent Industry*Year FE	Yes	Yes	Yes	Yes	Yes
Parent Country*Year FE	Yes	Yes	Yes	Yes	Yes
Subsidiary Industry*Year FE	Yes	Yes	Yes	Yes	Yes
Subsidiary Country*Year FE	Yes	Yes	Yes	Yes	Yes

Table 9: Endogeneity and selectivity using legal origins as exclusion restriction

This table shows the relationship between CSR and profit shifting when accounting for endogeneity and selectivity. *Profit shifting* is calculated according to the method of Dharmapala and Riedel (2013) shown in equation (1). *CSR* is a parent company's corporate social responsibility index and it is measured as the equal weight of three pillar scores (environmental, social, and governance performance). *High CSR* is a dummy variable that takes value 1 for firms with CSR scores at the highest quartile. Other controls, for both parent and subsidiary companies, include: *Total assets*— the natural logarithm of total assets, *leverage*— the ratio of total debt to total assets for the firm, *ROA*—a firm's returns on assets, defined as earnings before tax divided by total assets, *Fixed assets/TA*—a firm's asset tangibility, and *R&D/TA*—a firm's R&D intensity. Each observation is a subsidiary firm tied to a foreign parent firm. Different types of fixed effects are utilized in each regression. Stars, ***, **, and *, indicate significance levels at the 1%, 5%, and 10%, respectively. t-statistics, based on robust standard errors clustered at the subsidiary level, are reported in parentheses. A complete description of variables along with their sources is in Table 1.

Method	IV		Heckman Selection	
Dependent variable	*Profit shifting t*	*CSR t-1*	*Profit shifting t*	*High CSR (top 25%)*
	(1)	(2)	(3)	(4)
CSR t-1 (fitted)	0.147**			
	(2.201)			
High CSR (top 25%) t-1			0.036**	
			(1.980)	
French legal origin		0.099***		0.475***
		(16.707)		(20.958)
Parent ln(Total assets) t-1	0.039***	0.060***	0.014***	0.438***
	(8.643)	(30.197)	(2.623)	(53.875)
Parent Leverage t-1	-0.103***	0.116***	0.004	0.567***
	(-6.726)	(8.853)	(0.344)	(11.902)
Parent ROA t-1	0.047	0.443***	0.006	3.940***
	(1.113)	(11.135)	(0.198)	(21.056)
Parent Fixed assets/TA t-1	-0.020	-0.027	-0.022	0.813***
	(-1.016)	(-1.418)	(-1.171)	(10.300)
Parent R&D/TA t-1	0.234**	0.743***	-0.186	8.547***
	(2.374)	(7.297)	(-1.444)	(26.231)
Subsidiary ln(Total assets) t-1	-0.000	0.004***	-0.009***	0.007
	(-0.186)	(2.878)	(-14.636)	(1.132)
Subsidiary Leverage t-1	-0.006	-0.006	-0.014***	0.024
	(-1.349)	(-1.469)	(-7.352)	(1.115)
Subsidiary ROA t-1	-0.024**	-0.009	0.010*	0.097
	(-2.274)	(-0.978)	(1.685)	(1.451)
Subsidiary Fixed assets/TA t-1	-0.023***	0.005	0.009**	-0.093**
	(-2.635)	(0.684)	(2.259)	(-2.273)
Subsidiary R&D/TA t-1	-0.185	-0.313	0.187*	0.242
	(-0.974)	(-1.358)	(1.957)	(0.236)
Hazard lambda			-0.020*	
			(-1.925)	
Observations	26,752	26,752	26,752	26,752
Adjusted R-squared	0.492	0.524		
Kleibergen-Paap LM statistic		250.191***		
Cragg-Donald Wald F statistic		1264.105***		
Stock-Yogo critical values 10%		16.38		
F-statistics		279.130***		

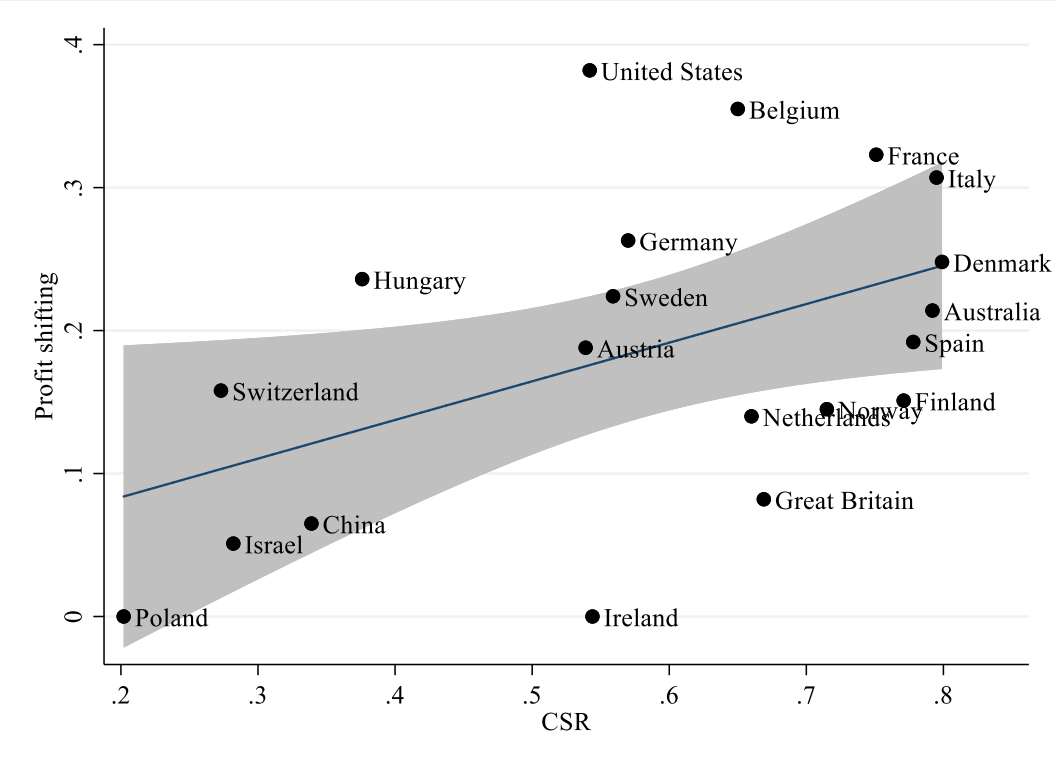
Table 10: Endogeneity and selectivity using industry-peer CSR as exclusion restriction

This table shows the relationship between CSR and profit shifting when accounting for endogeneity and selectivity. *Profit shifting* is calculated according to the method of Dharmapala and Riedel (2013) shown in equation (1). *CSR* is a parent company's corporate social responsibility index and it is measured as the equal weight of three pillar scores (environmental, social, and governance performance). *High CSR* is a dummy variable that takes value 1 for firms with CSR scores at the highest quartile. Other controls, for both parent and subsidiary companies, include: *Total assets*—the natural logarithm of total assets, *leverage*— the ratio of total debt to total assets for the firm, *ROA*—a firm's returns on assets, defined as earnings before tax divided by total assets, *Fixed assets/TA*—a firm's asset tangibility, and *R&D/TA*—a firm's R&D intensity. Each observation is a subsidiary firm tied to a foreign parent firm. Different types of fixed effects are utilized in each regression. Stars, ***, **, and *, indicate significance levels at the 1%, 5%, and 10%, respectively. t-statistics, based on robust standard errors clustered at the subsidiary level, are reported in parentheses. A complete description of variables along with their sources is in Table 1.

Method	IV		Heckman Selection	
Dependent variable	*Profit shifting t*	*CSR t-1*	*Profit shifting t*	*High CSR (top 25%)*
	(1)	(2)	(3)	(4)
CSR t-1 (fitted)	0.059**			
	(2.459)			
High CSR (top 25%) t-1			0.027*	
			(1.890)	
Industry-Peer CSR t-1		0.624***		2.969***
		(26.117)		(36.549)
Parent ln(Total assets) t-1	0.010***	0.064***	0.015***	0.457***
	(2.792)	(15.187)	(2.994)	(54.930)
Parent Leverage t-1	-0.004	0.019**	0.007	0.508***
	(-0.537)	(2.516)	(0.581)	(10.439)
Parent ROA t-1	-0.001	0.185***	0.015	3.897***
	(-0.044)	(12.397)	(0.526)	(20.980)
Parent Fixed assets/TA t-1	-0.033***	0.010	-0.020	0.694***
	(-3.220)	(0.904)	(-1.061)	(8.536)
Parent R&D/TA t-1	0.029	0.656***	-0.183	9.636***
	(0.460)	(8.787)	(-1.416)	(28.479)
Subsidiary ln(Total assets) t-1	0.002*	0.0003*	-0.009***	0.001
	(1.769)	(1.725)	(-14.575)	(0.081)
Subsidiary Leverage t-1	-0.000	-0.001	-0.014***	0.033
	(-0.080)	(-1.159)	(-7.373)	(1.544)
Subsidiary ROA t-1	-0.012	-0.003	0.010	0.162**
	(-1.621)	(-1.342)	(1.638)	(2.376)
Subsidiary Fixed assets/TA t-1	-0.010	-0.001	0.008**	-0.016
	(-1.572)	(-0.555)	(2.080)	(-0.372)
Subsidiary R&D/TA t-1	-0.244*	0.055*	0.188**	0.092
	(-1.850)	(1.681)	(1.970)	(0.088)
Hazard lambda			-0.016*	
			(-1.828)	
Observation	26,752	26,752	26,752	26,752
Adjusted R-squared	0.742	0.937		
Kleibergen-Paap LM statistic		298.485***		
Cragg-Donald Wald F statistic		4591.700***		
Stock Yogo Critical values 10%		16.38		
F-statistics		682.110***		

Figure 1: Corporate social responsibility and profit shifting

This figure shows the relationship between corporate social responsibility (CSR) and profit shifting. This graph utilizes average values of CSR and profit shifting for countries of the parent companies for the years 2009-2016. *Profit shifting* and it is calculated according to the method of Dharmapala and Riedel (2013) shown in equation (1). *CSR* is a parent company's corporate social responsibility index and it is measured as the equal weight of three pillar scores (environmental, social, and governance performance).



Appendix

This appendix contains auxiliary information to the main text. Tables A1 and A2 provide information about the distributions of subsidiary and parent firms. Table A3 shows the evolution of CSR over the years (average values), while Table A4 provides the correlations of the main variables used in our analysis. Table A5 runs the same specification as our baseline model for all firms but those MNEs from the United States. Table A6 reports results where we interact U.S. only firms and those under the territorial tax system. Table A7 repeats our baseline specification but now using changes instead of levels. In Table A8, we test the reverse causality issue, where again we use changes instead of levels. In Table A9 we re-run the most conservative form of our baseline specification using a Tobit model. Table 10 presents an alternative profit shifting estimation, where instead of using parent earnings defined as $\tilde{\pi}$, we use true pre-tax parent earnings, π. Finally, in Table A11 we repeat the exercise of baseline Table 5, with the alternative measure of profit shifting.

Table A1: Information regarding subsidiary firms

This table reports the number of unique subsidiary firms in each country, along with average CSR and profit shifting scores. For example, there are 351 unique subsidiaries in Belgium—fully owned or partially owned by MNEs outside Belgium,—which equals 5.84% of our sample.

Country	Country code	Subsidiaries	Subsidiaries %	CSR	Profit shifting measure
Albania	AL	1	0.02%	0.767	0.416
Austria	AT	89	1.48%	0.741	0.376
Australia	AU	190	3.16%	0.721	0.245
Bosnia and Herzegovina	BA	2	0.03%	0.626	0.416
Bangladesh	BD	1	0.02%	0.916	0.060
Belgium	BE	351	5.84%	0.757	0.123
Bulgaria	BG	51	0.85%	0.774	0.415
Brazil	BR	33	0.55%	0.787	0.105
Botswana	BW	1	0.02%	0.783	0.198
Canada	CA	1	0.02%	0.885	0.509
Chile	CL	4	0.07%	0.806	0.451
China	CN	388	6.45%	0.781	0.346
Colombia	CO	9	0.15%	0.801	0.238
Czech Republic	CZ	226	3.76%	0.736	0.409
Germany	DE	638	10.61%	0.754	0.302
Denmark	DK	96	1.60%	0.741	0.272
Estonia	EE	23	0.38%	0.725	0.293
Spain	ES	425	7.07%	0.739	0.286
Finland	FI	48	0.80%	0.735	0.359
France	FR	618	10.28%	0.718	0.207
Great Britain	GB	646	10.74%	0.731	0.402
Ghana	GH	1	0.02%	0.904	0.124
Greece	GR	64	1.06%	0.799	0.359
Croatia	HR	39	0.65%	0.808	0.398
Hungary	HU	97	1.61%	0.753	0.410
Ireland	IE	92	1.53%	0.735	0.399
India	IN	11	0.18%	0.863	0.136
Iceland	IS	3	0.05%	0.746	0.385
Italy	IT	377	6.27%	0.729	0.219
Jamaica	JM	1	0.02%	0.719	0.000
Japan	JP	27	0.45%	0.834	0.168
Kenya	KE	1	0.02%	0.904	0.000
Korea (South)	KR	97	1.61%	0.765	0.361
Cayman Islands	KY	1	0.02%	0.668	0.419
Kazakhstan	KZ	1	0.02%	0.689	0.377
Lithuania	LT	9	0.15%	0.745	0.412
Luxembourg	LU	23	0.38%	0.833	0.243
Latvia	LV	26	0.43%	0.800	0.411
FYROM	MK	1	0.02%	0.743	0.383
Malta	MT	3	0.05%	0.907	0.381

(Table A1 continues on next page)

(Table A1 continued from previous page)

Country	Country code	Subsidiaries	Subsidiaries %	CSR	Profit shifting measure
Mexico	MX	5	0.08%	0.651	0.172
Malaysia	MY	16	0.27%	0.779	0.407
Nigeria	NG	3	0.05%	0.844	0.000
Netherlands	NL	48	0.80%	0.754	0.362
Norway	NO	125	2.08%	0.757	0.247
Oman	OM	1	0.02%	0.740	0.360
Panama	PA	1	0.02%	0.810	0.450
Pakistan	PK	3	0.05%	0.855	0.000
Poland	PL	213	3.54%	0.790	0.413
Portugal	PT	116	1.93%	0.795	0.363
Romania	RO	134	2.23%	0.774	0.421
Serbia	RS	27	0.45%	0.760	0.423
Russian Federation	RU	285	4.74%	0.734	0.375
Sweden	SE	163	2.71%	0.753	0.326
Slovenia	SI	20	0.33%	0.810	0.422
Slovakia	SK	88	1.46%	0.732	0.368
Turkey	TR	2	0.03%	0.831	0.405
Taiwan	TW	2	0.03%	0.809	0.407
Ukraine	UA	22	0.37%	0.809	0.434
United States	US	9	0.15%	0.759	0.000
Viet Nam	VN	13	0.22%	0.667	0.399
South Africa	ZA	1	0.02%	0.606	0.000
Zambia	ZM	1	0.02%	0.698	0.000
Total		6,013	100.0%		

Table A2: Parent distribution

This table reports the number of unique parent firms in each country, along with average CSR and profit shifting scores. For example, there are 116 unique parent firms from Great Britain, making up about 22.8% of the parent firms on our sample. These 116 British parent firms fully (or partially) own 923 subsidiaries around the world.

Owner country	Parents	Parents %	Subsidiaries	Subsidiaries %	CSR	Profit shifting measure
Austria	2	0.39%	38	0.6%	0.539	0.188
Australia	2	0.39%	5	0.1%	0.792	0.214
Belgium	5	0.98%	81	1.3%	0.650	0.355
Switzerland	1	0.2%	7	0.1%	0.273	0.158
China	3	0.59%	11	0.2%	0.339	0.065
Germany	34	6.68%	915	15.2%	0.570	0.263
Denmark	2	0.39%	18	0.3%	0.799	0.248
Spain	14	2.75%	130	2.2%	0.778	0.192
Finland	6	1.18%	73	1.2%	0.771	0.151
France	35	6.88%	1,149	19.1%	0.751	0.323
Great Britain	116	22.79%	923	15.4%	0.669	0.082
Hungary	1	0.2%	7	0.1%	0.376	0.236
Ireland	3	0.59%	26	0.4%	0.544	0.000
Israel	1	0.2%	3	0.0%	0.282	0.051
Italy	3	0.59%	40	0.7%	0.795	0.307
Netherlands	14	2.75%	189	3.1%	0.660	0.140
Norway	2	0.39%	10	0.2%	0.715	0.145
Poland	3	0.59%	17	0.3%	0.202	0.000
Sweden	20	3.93%	255	4.2%	0.559	0.224
United States	242	47.54%	2,116	35.2%	0.542	0.382
Total	509	100%	6,013	100.0%		

Table A3: CSR over the years

This table reports the number of observations, along with average scores for CSR and profit shifting, by year. Additionally, it also shows the number of unique parent firms by year. For example, compared to 2009 (the initial year of our study), where we had 166 unique parent firms, in 2016, this number has increased around 2.5 times, indicating that more than 270 new unique firms entered the sample.

Year	Subsidiaries	Percent	Unique parents	CSR	Profit shifting measure
2009	1,643	6.14	166	0.714	0.332
2010	2,518	9.41	288	0.750	0.314
2011	3,324	12.43	332	0.755	0.314
2012	3,354	12.54	336	0.753	0.306
2013	3,609	13.49	347	0.753	0.307
2014	3,713	13.88	355	0.751	0.293
2015	4,195	15.68	377	0.743	0.292
2016	4,396	16.43	438	0.747	0.301
Total	26,752	100		0.748	0.305

Table A4: Correlation matrix

This table presents correlations of the variables used in the study. The sample includes data for the period 2009-2016 where each observation is a subsidiary firm tied to a foreign parent firm. Star indicates statistical significance at the 1% level. Sample size (N = 26,752).

		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
EBT	(1)	1							
Low	(2)	0.034*	1						
Parent profits	(3)	0.204*	0.265*	1					
Profit shifting	(4)	0.069*	0.981*	0.416*	1				
CSR	(5)	0.129*	0.049*	0.434*	0.125*	1			
Parent ln(Total assets)	(6)	0.188*	0.261*	0.866*	0.390*	0.518*	1		
Parent Leverage	(7)	-0.006	-0.093*	0.065*	-0.079*	0.218*	0.229*	1	
Parent ROA	(8)	0.089*	0.051*	0.014	0.059*	-0.001	-0.125*	-0.287*	1
		(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
Parent Fixed assets/TA	(9)	1							
Parent R&D/TA	(10)	-0.244*	1						
Subsidiary ln(Total assets)	(11)	0.081*	0.055*	1					
Subsidiary Leverage	(12)	-0.050*	-0.005	-0.033*	1				
Subsidiary ROA	(13)	-0.01	0.076*	-0.040*	-0.254*	1			
Subsidiary Fixed assets/TA	(14)	0.152*	-0.153*	0.232*	-0.115*	-0.149*	1		
Subsidiary R&D/TA	(15)	-0.016*	0.132*	0.092*	-0.038*	-0.008	0.005	1	
Parent territorial dummy	(16)	0.091*	-0.387*	-0.067*	0.037*	-0.052*	0.108*	-0.064*	1

Table A5: Results excluding U.S. parent firms

The dependent variable is profit shifting and it is calculated according to the method of Dharmapala and Riedel (2013) shown in equation (1). *CSR* is a parent company's corporate social responsibility index and it is measured as the equal weight of three pillar scores (environmental, social, and governance performance). We include the following controls for both parent and subsidiary companies: *Total assets*— the natural logarithm of total assets, *leverage*— the ratio of total debt to total assets for the firm, *ROA*—a firm's returns on assets, defined as earnings before tax divided by total assets, *Fixed assets/TA*—a firm's asset tangibility, and *R&D/TA*—a firm's R&D intensity. Each observation is a subsidiary firm tied to a foreign parent firm. Different types of fixed effects are utilized in each regression. Industry-year fixed effects are based on 2-digit NACE level. Country-year fixed effects are fixed effects for the subsidiary's country. Stars, ***, **, and *, indicate significance levels at the 1%, 5%, and 10%, respectively. t-statistics, based on robust standard errors clustered at the subsidiary level, are reported in parentheses. A complete description of variables along with their sources is in Table 1.

	(1)	(2)	(3)	(4)
CSR t-1	0.041***	0.038**	0.040***	0.037**
	(2.639)	(2.450)	(2.582)	(2.400)
Parent ln(Total assets) t-1		0.011*		0.011*
		(1.746)		(1.663)
Parent Leverage t-1		-0.009		-0.009
		(-0.646)		(-0.616)
Parent ROA t-1		0.042		0.043
		(1.405)		(1.440)
Parent Fixed assets/TA t-1		-0.075***		-0.074***
		(-3.234)		(-3.184)
Parent R&D/TA t-1		0.363**		0.351**
		(2.257)		(2.194)
Subsidiary ln(Total assets) t-1			0.002	0.002
			(1.553)	(1.544)
Subsidiary Leverage t-1			-0.004	-0.004
			(-1.121)	(-1.096)
Subsidiary ROA t-1			-0.010	-0.010
			(-1.024)	(-1.020)
Subsidiary Fixed assets/TA t-1			-0.009	-0.009
			(-1.174)	(-1.159)
Subsidiary R&D/TA t-1			-0.184	-0.179
			(-0.712)	(-0.690)
Observations	17,491	17,491	17,491	17,491
Adjusted R-squared	0.777	0.777	0.777	0.777
Parent FE	Yes	Yes	Yes	Yes
Parent Industry*Year FE	Yes	Yes	Yes	Yes
Parent Country*Year FE	Yes	Yes	Yes	Yes
Subsidiary Industry*Year FE	Yes	Yes	Yes	Yes
Subsidiary Country*Year FE	Yes	Yes	Yes	Yes

Table A6: US firms vs. firms under the territorial rule

The dependent variable is profit shifting and it is calculated according to the method of Dharmapala and Riedel (2013) shown in equation (1). *CSR* is a parent company's corporate social responsibility index and it is measured as the equal weight of three pillar scores (environmental, social, and governance performance). We include the following controls for both parent and subsidiary companies: *Territorial*—a dummy that equals one for countries with a territorial tax system, and zero for countries under a worldwide tax system, *Total assets*— the natural logarithm of total assets, *leverage*— the ratio of total debt to total assets for the firm, *ROA*—a firm's returns on assets, defined as earnings before tax divided by total assets, *Fixed assets/TA*—a firm's asset tangibility, and *R&D/TA*—a firm's R&D intensity. Each observation is a subsidiary firm tied to a foreign parent firm. Different types of fixed effects are utilized in each regression. Industry-year fixed effects are based on 2-digit NACE level. Country-year fixed effects are fixed effects for the subsidiary's country. Stars, ***, **, and *, indicate significance levels at the 1%, 5%, and 10%, respectively. t-statistics, based on robust standard errors clustered at the subsidiary level, are reported in parentheses. A complete description of variables along with their sources is in Table 1.

	US sample	Territorial	Pooled
	(1)	(2)	(3)
CSR t-1	0.005**	0.038**	-0.000
	(2.028)	(2.400)	(-0.002)
CSR t-1 × Territorial dummy			0.041**
			(2.244)
Parent ln(Total assets) t-1	0.024***	0.010	0.014***
	(31.093)	(1.611)	(4.004)
Parent Leverage t-1	-0.005***	-0.008	-0.008
	(-3.154)	(-0.567)	(-1.030)
Parent ROA t-1	-0.001	0.045	0.013
	(-0.170)	(1.498)	(0.811)
Parent Fixed assets/TA t-1	0.000	-0.075***	-0.030***
	(0.042)	(-3.194)	(-2.740)
Parent R&D/TA t-1	0.046***	0.355**	0.113
	(3.362)	(2.198)	(1.611)
Subsidiary ln(Total assets) t-1	-0.000**	0.002	0.002*
	(-2.554)	(1.574)	(1.755)
Subsidiary Leverage t-1	0.000	-0.004	0.000
	(0.672)	(-1.009)	(0.067)
Subsidiary ROA t-1	0.000	-0.008	-0.011
	(0.281)	(-0.845)	(-1.394)
Subsidiary Fixed assets/TA t-1	-0.001**	-0.009	-0.009
	(-2.006)	(-1.165)	(-1.474)
Subsidiary R&D/TA t-1	0.005	-0.174	-0.246*
	(0.873)	(-0.667)	(-1.845)
Observations	9,261	17,302	26,563
Adjusted R-squared	0.980	0.777	0.739
Parent FE	Yes	Yes	Yes
Parent Industry*Year FE	Yes	Yes	Yes
Parent Country*Year FE	Yes	Yes	Yes
Subsidiary Industry*Year FE	Yes	Yes	Yes
Subsidiary Country*Year FE	Yes	Yes	Yes

Table A7: Changes in profit shifting and changes in corporate social responsibility

The dependent variable is the change of profit shifting measure from period (t-1) to t. The main independent variable is the (lagged) change of CSR from period (t-2) to (t-1). Model (2) also includes the lagged level of the dependent variable as a regressor to take into consideration cases where changes in the dependent variable are small. All other control variables are (lagged) changes from period (t-2) to (t-1). Stars, ***, **, and *, indicate significance levels at the 1%, 5%, and 10%, respectively. t-statistics, based on robust standard errors clustered at the subsidiary level, are reported in parentheses. A complete description of variables along with their sources is in Table 1.

	(1)	(2)
Δ CSR from t-2 to t-1	0.024***	0.020***
	(3.688)	(3.140)
Profit shifting t-1		-0.046***
$\Delta\left(\mathrm{Var}_{(t-2)\to(t-1)}\right)$		
Δ Parent ln(Total assets)	-0.004	-0.002
	(-1.277)	(-0.741)
Δ Parent leverage	-0.002	0.002
	(-0.422)	(0.384)
Δ Parent ROA	-0.002	-0.003
	(-0.167)	(-0.268)
Δ Parent Fixed assets / TA	0.003	0.001
	(0.313)	(0.065)
Δ Parent R&D / TA	-0.260***	-0.351***
	(-6.218)	(-7.798)
Δ Subsidiary ln(Total assets)	-0.000	0.001
	(-0.000)	(0.730)
Δ Subsidiary leverage	-0.001	-0.002
	(-0.472)	(-0.868)
Δ Subsidiary ROA	-0.004	-0.005
	(-1.007)	(-1.171)
Δ Subsidiary Fixed assets / TA	-0.002	-0.001
	(-0.281)	(-0.189)
Δ Subsidiary R&D / TA	-0.022	-0.071
	(-0.058)	(-0.187)
Constant	-0.002***	0.012***
	(-6.906)	(11.782)
Observations	19,844	19,844
Adjusted R-squared	0.001	0.021

Table A8: Changes in corporate social responsibility and changes profit shifting

The dependent variable is the change of CSR measure from period (t-1) to t. The main independent variable is the (lagged) change of profit shifting from period (t-2) to (t-1). Model (2) also includes the lagged level of the dependent variable as a regressor to take into consideration cases where changes in the dependent variable are small. All other control variables are (lagged) changes from period (t-2) to (t-1). Stars, ***, **, and *, indicate significance levels at the 1%, 5%, and 10%, respectively. t-statistics, based on robust standard errors clustered at the subsidiary level, are reported in parentheses. A complete description of variables along with their sources is in Table 1.

	(1)	(2)
Δ Profit shifting from t-2 to t-1	-0.010	-0.007
	(-1.166)	(-0.808)
CSR t-1		-0.116***
		(-33.161)
$\Delta(\mathrm{Var}_{(t-2)\to(t-1)})$		
Δ Parent ln(Total assets)	0.024***	-0.001
	(4.978)	(-0.130)
Δ Parent leverage	0.030***	0.032***
	(4.295)	(4.954)
Δ Parent ROA	-0.021*	-0.026**
	(-1.788)	(-2.397)
Δ Parent Fixed assets / TA	-0.039***	-0.024**
	(-3.633)	(-2.379)
Δ Parent R&D / TA	0.683***	0.471***
	(9.207)	(6.887)
Δ Subsidiary ln(Total assets)	-0.002	-0.005***
	(-1.018)	(-2.759)
Δ Subsidiary leverage	0.000	0.002
	(0.050)	(0.632)
Δ Subsidiary ROA	-0.002	-0.001
	(-0.433)	(-0.298)
Δ Subsidiary Fixed assets / TA	0.003	0.002
	(0.417)	(0.327)
Δ Subsidiary R&D / TA	-0.594	-0.637
	(-1.367)	(-1.484)
Constant	0.007***	0.095***
	(14.063)	(32.606)
Observations	16,965	16,965
Adjusted R-squared	0.007	0.111

Table A9: Tobit model

The dependent variable is profit shifting and it is calculated according to the method of Dharmapala and Riedel (2013) shown in equation (1). *CSR* is a parent company's corporate social responsibility index and it is measured as the equal weight of three pillar scores (environmental, social, and governance performance). We include the following controls for both parent and subsidiary companies: *Total assets*— the natural logarithm of total assets, *leverage*— the ratio of total debt to total assets for the firm, *ROA*—a firm's returns on assets, defined as earnings before tax divided by total assets, *Fixed assets/TA*—a firm's asset tangibility, and *R&D/TA*—a firm's R&D intensity. Each observation is a subsidiary firm tied to a foreign parent firm. Stars, ***, **, and *, indicate significance levels at the 1%, 5%, and 10%, respectively. t-statistics, based on robust standard errors clustered at the subsidiary level. A complete description of variables along with their sources is in Table 1.

	Coefficient	t-statistic
CSR t-1	0.023***	12.622
Parent ln(Total assets) t-1	0.013***	87.512
Parent Leverage t-1	0.004**	2.557
Parent ROA t-1	0.005	0.432
Parent Fixed assets/TA t-1	-0.032***	-14.108
Parent R&D/TA t-1	0.080***	3.603
Subsidiary ln(Total assets) t-1	0.002***	7.500
Subsidiary Leverage t-1	0.002	1.422
Subsidiary ROA t-1	-0.014***	-4.906
Subsidiary Fixed assets/TA t-1	-0.009***	-3.599
Subsidiary R&D/TA t-1	-0.291***	-12.524
Constant	-0.717***	-491.419
Observations	26,752	
Parent FE	Yes	
Parent Industry*Year FE	Yes	
Parent Country*Year FE	Yes	
Subsidiary Industry*Year FE	Yes	
Subsidiary Country*Year FE	Yes	

Table A10: Profit shifting measure evaluation: Profit shifting estimation using the true pre-tax parent earnings

This table reports estimates of profit shifting based on the method developed by Dharmapala and Riedel (2013). The dependent variable is *EBT*, the natural logarithm of subsidiary's pre-tax profits. *Low* is a dummy that takes value one when the subsidiary's tax rate is below from that of the parent company and zero otherwise. *True pre-tax parent earnings* denotes the parent's pre-tax and pre-shifting earnings. *Subsidiary total assets* is the natural logarithm of subsidiary's total assets, *Subsidiary leverage* is the ratio of total debt to total assets for the subsidiary firm, *Subsidiary population* is the natural logarithm of the total population of the subsidiary's country, and *Subsidiary GDP per capita* is the natural logarithm of GDP per capita of the subsidiary's country. Each observation is a subsidiary firm tied to a foreign parent firm. Different types of fixed effects are utilized in each regression. Industry-year fixed effects are based on 2-digit NACE level. Country-year fixed effects are fixed effects for the subsidiary's country. Stars, ***, **, and *, indicate significance levels at the 1%, 5%, and 10%, respectively. t-statistics, based on robust standard errors clustered at the subsidiary level, are reported in parentheses. A complete description of variables along with their sources is in Table 1.

	(1)	(2)	(3)	(4)
Low (x) True pre-tax parent earnings	0.037***	0.035***	0.039***	0.037***
	(3.629)	(3.452)	(3.760)	(3.425)
Low	-0.406***	-0.400***	-0.442***	-0.477***
	(-3.053)	(-3.003)	(-3.245)	(-3.414)
True parent profits	0.008	0.013	0.001	-0.001
	(0.830)	(1.274)	(0.137)	(-0.127)
Subsidiary total assets	0.759***	0.772***	0.767***	0.762***
	(48.157)	(48.169)	(47.020)	(45.835)
Subsidiary leverage	-0.385***	-0.395***	-0.391***	-0.388***
	(-15.572)	(-15.877)	(-15.620)	(-15.277)
Subsidiary population	-1.345***	-0.504	-0.574	
	(-4.093)	(-1.278)	(-1.398)	
Subsidiary GDP per capita	0.084**	0.118**	0.082	
	(1.973)	(2.268)	(1.527)	
Observations	38,725	38,725	38,526	38,484
Adjusted R-squared	0.822	0.822	0.824	0.824
Subsidiary effects	Yes	Yes	Yes	Yes
Year effects	No	Yes	No	No
Industry-year effects	No	No	Yes	Yes
Country-year effects	No	No	No	Yes
Country-pair-year effects	No	No	No	No

Table A11: Profit shifting measure evaluation: Impact of CSR on modified profit shifting measure (baseline specification)

The dependent variable is profit shifting and it is calculated according to the method of Dharmapala and Riedel (2013) shown in equation (1) using the true pre-tax parent earnings, π, instead of $\tilde{\pi}$. *CSR* is a parent company's corporate social responsibility index and it is measured as the equal weight of three pillar scores (environmental, social, and governance performance). We include the following controls for both parent and subsidiary companies: *Total assets*— the natural logarithm of total assets, *leverage*— the ratio of total debt to total assets for the firm, *ROA*—a firm's returns on assets, defined as earnings before tax divided by total assets, *Fixed assets/TA*—a firm's asset tangibility, and *R&D/TA*—a firm's R&D intensity. Each observation is a subsidiary firm tied to a foreign parent firm. Different types of fixed effects are utilized in each regression. Industry-year fixed effects are based on 2-digit NACE level. Country-year fixed effects are fixed effects for the subsidiary's country. Stars, ***, **, and *, indicate significance levels at the 1%, 5%, and 10%, respectively. t-statistics, based on robust standard errors clustered at the subsidiary level, are reported in parentheses. A complete description of variables along with their sources is in Table 1.

	(1)	(2)	(3)	(4)
CSR t-1	0.044***	0.038***	0.043***	0.037***
	(3.256)	(2.775)	(3.163)	(2.704)
Parent ln(Total assets) t-1		0.009*		0.009*
		(1.771)		(1.658)
Parent Leverage t-1		0.001		0.000
		(0.047)		(0.036)
Parent ROA t-1		0.049**		0.051**
		(2.078)		(2.162)
Parent Fixed assets/TA t-1		-0.046***		-0.045***
		(-2.948)		(-2.877)
Parent R&D/TA t-1		0.246**		0.234**
		(2.302)		(2.184)
Subsidiary ln(Total assets) t-1			0.003*	0.003*
			(1.793)	(1.782)
Subsidiary Leverage t-1			0.001	0.001
			(0.239)	(0.243)
Subsidiary ROA t-1			-0.012	-0.012
			(-1.108)	(-1.119)
Subsidiary Fixed assets/TA t-1			-0.013	-0.013
			(-1.587)	(-1.577)
Subsidiary R&D/TA t-1			-0.348**	-0.346**
			(-1.999)	(-1.988)
Observations	25,376	25,376	25,376	25,376
Adjusted R-squared	0.742	0.742	0.742	0.742
Parent FE	Yes	Yes	Yes	Yes
Parent Industry*Year FE	Yes	Yes	Yes	Yes
Parent Country*Year FE	Yes	Yes	Yes	Yes
Subsidiary Industry*Year FE	Yes	Yes	Yes	Yes
Subsidiary Country*Year FE	Yes	Yes	Yes	Yes