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Corporate Tax Havens and Shareholder Value

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Abstract

Using a novel hand-collected dataset of 17,331 publicly listed firms from 52 countries and their international subsidiaries, we investigate the motives for establishing subsidiaries in tax havens. We document five results. First, a 1 percentage-point reduction in firms' home-country corporate tax rate is associated with a 1.2 percent increase in value of firms without tax haven subsidiaries while firms with tax haven subsidiaries are unaffected. Second, the signing of Tax Information Exchange Agreements (TIEAs) increases average shareholder value by 2.5 percent. Third, the positive effect is stronger for firms with more complex firm structure within the tax haven. Fourth, firms respond to TIEAs by engaging in *haven hopping*, i.e., moving their subsidiaries from tax havens that entered TIEAs to tax havens that did not. Fifth, TIEAs do not increase the average shareholder value of firms that engage in haven hopping. These results suggest that tax haven subsidiaries are used for entrenchment activities beyond pure tax savings.

Keywords: Tax havens, Firm value, Entrenchment, Tax avoidance

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1. Introduction

A tax haven is a state or territory in which corporate and personal tax rates are so low that foreign companies—or individuals—have incentives to establish shell companies to shield their income from higher tax liabilities at home. The Organisation for Economic Co-operation and Development (OECD) estimates that between USD 5 trillion and USD 7 trillion were held offshore in 2007; a study by *PriceWaterhouseCoopers* reveals that between USD 21 trillion and USD 32 trillion were held offshore in 2012. The US organization *Citizens for Tax Justice* finds that three in four Fortune 500 firms are active in tax havens and that the thirty US firms with highest offshore investment collectively hold USD 1.2 trillion in tax havens. In early 2014, the press uncovered prominent tax schemes involving companies such as Apple and Starbucks. In November 2014, the *Luxembourg Tax Leak* brought to light the private arrangements of almost 400 large international companies with the Luxembourg tax authority to pay less than 1% in tax—the official Luxembourg corporate tax rate is 29%. While these schemes will likely become a major policy issue in the European Union in the coming years, the US has shown a strong interest in regulating the use of offshore tax havens ever since it first signed tax information exchange agreements with tax havens some 15 years ago.[1]

The use of tax haven subsidiaries for tax-saving purposes is well recognized (e.g., Hines and Rice 1994, Graham and Tucker 2006). Typically, firms pursue no or few operational activities in tax havens. Yet to reduce their tax bills, firms may shift revenues from high-tax locations to tax haven subsidiaries, e.g., by registering patents or trademarks with tax haven subsidiaries and charging operational subsidiaries in high-tax locations for use of these assets.

What has been less studied—despite the large amount of tax shielding that takes place in multinational corporations and the enormous attention tax havens have received in policy making and the media—are other motives for multinational corporations to establish tax haven subsidiaries.[2] Among other motives, insiders may obtain personal benefits from establishing tax haven subsidiaries; these personal benefits may come at the cost of minority shareholders.

[1] The public debate largely focuses on the costs of tax havens for high-tax countries, yet some studies show that low-tax regimes have positive spillovers on nearby high-tax regimes (e.g., foreign direct investment, subsidiary investment and growth, and mitigation of tax competition; see Dharmapala 2008; Desai, Foley, and Hines 2004, 2006A; and Slemrod and Wilson 2006).

[2] As we will outline in more detail below, the empirical literature by and large centers on US firms, with a focus on tax motives (Dyreng and Lindsey 2009, Dyreng et al. 2013). Hanlon and Heitzman (2010) summarize academic research on motives and determinants of tax avoidance more broadly; Graham et al. (2014) provide evidence from a survey of tax executives.

One illustrative example of using tax havens to transfer resources from investors to a third party was uncovered in courts after the collapse of Enron in 2002. Enron CFO Andrew Fastow created a complex network of 881 offshore subsidiaries, of which 692 were located in the Cayman Islands, 119 in Turks and Caicos, 43 in Mauritius, and 8 in Bermuda. Not only did this network of subsidiaries allow Enron to avoid paying taxes, but the court case also revealed that Fastow and his friends transferred considerable resources to companies that they controlled outside of Enron. In particular, Fastow and his friends constructed Special Purpose Entities with names such as CHIWCO, LJM1, and LJM2 (LJM are the initials of Fastow's wife and children). These allowed Fastow and his friends to transfer at least USD 42 million to their own accounts, which contributed significantly to the Enron's downfall. In hindsight, the complex structure of these tax haven subsidiaries served a dual purpose, allowing Enron to save taxes and Fastow and his friends to enrich themselves at the cost of the shareholders.

The Enron case highlights the importance of a complex structure for entrenchment.[3] For aggressive tax planning, transfer of tangible and intangible assets to one or a few shell companies in tax havens is sufficient: a complex corporate structure in the tax haven is not pivotal. On the other hand, if entrenched managers and potentially controlling owners use tax haven subsidiaries for their own private interests, it is important to set up a complex structure that deters non-controlling shareholders and other monitors such as tax authorities and auditors from unveiling the flow of resources within the firm.

The main contribution of this paper is to provide novel evidence that tax haven activities are indeed driven by entrenchment motives that reach beyond pure tax-saving motives. For instance, controlling managers may pile cash in tax havens to finance future activities such as inefficient acquisitions (Hanlon, Lester, and Verdi 2014). Moreover, entrenchment can involve tunneling or outright theft, e.g., through third-party transactions. Such activities have been documented in environments that lack transparency and enforcement, such as in Russia (Desai, Dyck, and Zingales 2007 and Mironov 2013). Tax haven subsidiaries may facilitate such activities even when firms are headquartered in countries with high legal investor protection.

To illustrate our theoretical thinking, we offer a simple model that derives the main testable implications we investigate later in the paper. In the simplest version of our model, establishing a

[3] In our data, firms using tax haven subsidiaries are indeed more complex, measured by the number of subsidiaries and hierarchical depth.

tax haven subsidiary benefits a firm by saving it taxes but at the cost of establishing the subsidiary. From this observation, we predict that tax haven subsidiaries are used more in countries with higher tax rates and that decreases in tax rates benefit firms but less so if these firms have a tax haven subsidiary.

We extend the model, allowing for entrenched managers to divert a fraction of the firm's tax haven cash flow. Diversion comes at a cost that is increasing in corporate governance and decreasing in the complexity of tax haven subsidiary structure. From this set-up, we show that an improvement in external governance (such as tax authorities and outside investors receiving more information about tax haven activities) have two effects on shareholder value. First, there is a negative impact on shareholder value if an improvement in external governance reduces the amount of cash that can be transferred to a Tax Haven. Second, there is a positive effect from the increase in external governance because it reduces the entrenchment activities of the controlling managers. Moreover, an improvement in external governance is more beneficial to shareholders of firms with more complex tax haven subsidiary structures.

In order to test the predictions of the model, we employ a novel, hand-collected dataset covering 17,331 publicly listed firms from 52 countries and their circa 232,000 domestic and foreign subsidiaries. This dataset is a rich source for studying cross-country variation in the use of tax havens. With the intention of providing causal evidence for the tax-saving motive and the entrenchment motive, we also exploit reductions in corporate tax rates over the 2008–2013 period and the passage of Tax Information Exchange Agreements (TIEAs) between 2001 and 2011, respectively. TIEAs, as we will argue below, increase the cost of managerial entrenchment.

We document three sets of results. First, we explore cross-country differences and changes in tax rates to provide evidence that tax haven activities are linked to tax savings. In line with the model, we find that tax haven subsidiaries are more prominent among firms headquartered in countries with high tax rates, particularly income tax rates. Exploiting reductions in corporate tax rates over the past 7 years, we document that a 1 percentage point reduction in firms' home-country corporate tax rate is associated with a 1.2% increase in the value of firms without tax haven subsidiaries while firms with tax haven subsidiaries are unaffected. While these result are

not surprising, they confirm and extend existing knowledge about the link between tax savings and corporate tax haven activity.

Second, we exploit the passage of Tax Information Exchange Agreements (TIEAs) to test the effect of improved external governance on shareholder value. TIEAs are bilateral agreements between countries and tax havens facilitating the exchange of information relevant for civil and criminal tax investigations against individuals and firms. Thus, TIEAs increase the likelihood that firms' and individuals' tax haven operations—such as potential tax evasion and/or transfer of corporate resources to third parties—are detected. While TIEAs do not directly affect tax rates or tax rules in either of the involved countries, they facilitate detection and regulatory enforcement; they thereby may also improve external governance through facilitating the ability of non-controlling owners and market analysts to monitor corporate activity within the tax haven.

TIEAs provide a natural experiment to test if a managerial entrenchment motive embodied in corporations' activities in tax havens extends beyond the pure tax-saving motive. TIEAs do not directly affect corporate tax rates. Indirectly, information provided under these agreements may be helpful in detecting, for instance, transfer pricing schemes that are too aggressive, allowing tax authorities to reassess a firm's tax base. Thus, under the tax-savings motive on its own, TIEAs would have zero or negative impact on firm value. If managers also use tax havens to hide, tunnel, or destroy resources, TIEAs facilitate the detection of such activities by owners and monitors. If managers use tax havens to their own benefits and TIEAs do not impact the ability to save taxes, we conjecture that the introduction of TIEAs can increase shareholder value. TIEAs are not without criticism[4]; however, even a small increase in the probability of detection constitutes an additional cost to insiders engaged in entrenchment activities because information obtained through TIEAs can be used in civil and criminal tax investigations. Furthermore, managers may be fired based on suspicion or even rumors, whereas tax authorities need hard evidence that can be brought to court. Thus, under the entrenchment motive, shareholders should endorse TIEAs as they increase managers' cost of wasting corporate resources in their own interest.

[4] Among such criticism, Hanlon, Maydew, and Thornock (2015) list that (i) information is only exchanged upon request rather than automatically, (ii) bank secrecy laws remain unaffected from the passage of TIEAs, and (iii) exchanged information is limited to information collected by signatory countries. It is important to emphasize that almost all TIEAs cover tax haven activities by both individuals and firms.

TIEAs provide an ideal experimental setting not only because they enable us to separate the two main motives to use tax havens but also because they are bilateral: They affect some firms headquartered in one signatory country with operations in the other signatory country (the tax haven) while leaving other firms with operations in different tax havens or headquartered in different countries unaffected. More than 500 TIEAs were passed at different points in time over the past 15 years, affecting more than 300 publicly listed firms headquartered in different countries and at different points in time. Above all, counterfactuals—such as publicly traded companies that are headquartered in one signatory country but that do not have tax haven subsidiaries—are easily identified.[5]

Using annual data, we show that implementing a TIEA increases average shareholder value, measured by Tobin's Q, by 2.5% on average. We re-confirm this result using daily abnormal stock returns around the signing of TIEAs, reducing the concern that the signing of TIEAs coincides with similar policy changes that may occur within the same year.[6] This result, in line with our model, strongly suggests that minority shareholders and investors applaud the introduction of TIEAs, supporting the notion that corporate tax haven activities are used by managers and controlling owners for activities that benefit themselves beyond the pure tax-saving interest.

Our third set of results documents drivers of the effect of TIEAs on shareholder value. First, we show that the impact of TIEAs on shareholder value is more positive for firms with greater involvement in tax havens. We measure involvement in tax havens by the number of subsidiaries in tax havens and the percentage of firm subsidiaries in tax havens. Following our simple model, we argue that the complexity of a firm's structure within tax havens makes it even more difficult for the marginal investor to monitor controlling shareholders'/managers' tax haven activities. From a tax-saving perspective, the complex structure should it is less clear why a complex structure affect the ability to reduce taxes in home country. From a pure tax motive, then, we

[5] Few papers have exploited the passage of TIEAs. Johannesen and Zucman (2014) show that after the passage of TIEAs, bank deposits are shifted from affected to unaffected tax havens. German foreign direct investment and the number of German subsidiaries in tax havens declined after Germany passed TIEAs (Braun and Weichenrieder 2014). Bilicka and Fuest (2014) document that TIEAs are typically passed between countries and tax havens with stronger economic links, though we do not confirm this result when we measure economic links by the number of foreign subsidiaries in tax havens. Hanlon, Maydew, and Thornock (2015) document that TIEAs help reduce round-tripping tax evasion.

[6] A further endogeneity concern arises from the fact that TIEAs may be passed between specific countries and tax havens at specific times, e.g., as a function of economic links. Measuring economic links by the number of subsidiaries for any country-tax haven pair, we do not confirm that TIEAs are passed with tax havens harboring particularly many or few affected subsidiaries.

should expect the interaction of TIEAs and complexity to be zero or negative. Thus, the positive interaction effect between TIEAs and complexity within the tax haven provides additional support that tax havens are used for entrenchment activities.

Second, we document that the passage of TIEAs does not lead to significant increases in firms' efficiency, measured by gross margin and profit margin. Thus, our result does not seem driven by an increase in operational activities and/or a reduction in managerial slack. Similar, it could be that the positive effect of TIEAs on shareholder value arises from a reduction in uncertainty because TIEAs may facilitate monitoring. While beta is not a perfect measure of investors' discount rate, we find that the passage of TIEAs is not associated with a reduction in treated firms' beta.

Third, we provide evidence that roughly one third of treated firms engage in *haven hopping*: They strategically move subsidiaries from tax havens that entered TIEAs to tax havens that did not. It is difficult to explain haven hopping with the tax-savings motive, particularly as we do not observe a significant effect of TIEAs on effective tax rates. Haven hopping may suggest that our estimate of the true effect of TIEAs on firm value is understated, given that firms that move subsidiaries to tax havens that did not enter TIEAs do not become more transparent. Indeed, we find that the positive impact of TIEAs on treated firms is not present among firms that engage in haven hopping. As a side effect, haven hopping may also suggest that TIEAs benefit the least compliant tax havens.

Fourth, we show that the positive effect of TIEAs on firm value is smaller for firms with less institutional ownership. Institutional ownership is a proxy for the strength of monitoring and governance by non-controlling owner. Hence, our interpretation is that the positive shareholder effect of the introduction of TIEAs is stronger for weakly governed firms, consistent with the notion that weakly governed firms might be more exposed to entrenchment by controlling owners/managers.

Taken together, this paper provides novel evidence that corporate tax haven activities are driven by private motives of managers and/or controlling owners that extend beyond pure tax-saving interests. In addition to our key results outlined above, our cross-country setting with 52 countries allows us to provide new evidence on the link between country characteristics and the use of tax havens. For instance, we find that the use of tax havens is more prevalent in countries

with stronger regulatory enforcement even after controlling for economic development. While this evidence is far from causal, it suggests the notion that expropriation requires more complex mechanisms when regulatory enforcement is high. Thus, weaker regulatory enforcement in, for example, Russia (Desai, Dyck, and Zingales 2007) may allow for outright tunneling or theft while stricter regulatory enforcement may require complex firm structures with non-transparent elements such as tax haven subsidiaries.

Of course, the benefit of a cross-country study comes at the cost of having to abstract away from some institutional differences, such as the treatment of foreign income. For instance, Markle and Robinson (2012), studying 8,000 multinational firms from 28 countries, document a negative correlation between firms' tax rate in non-tax haven subsidiaries and the use of tax havens. This result is best explained by repatriation taxes and is confirmed in our data. In Germany, however, some foreign income is tax exempt, and indeed, manufacturing firms do not exhibit this negative relation (Gumpert, Hines, and Schnitzer 2011).

A further concern with finding a positive firm value reaction around the passage of TIEAs is that this finding may result from TIEAs signaling that tax havens avoided *something worse* from happening by signing a TIEA, such as economic sanctions against the haven and firms engaged in the haven. To alleviate this concern, we focus on the effect of the first TIEA signed by a haven. We compare the share price reaction of firms exposed to the TIEA to that of firms not directly exposed to that TIEA but exposed to the signatory tax haven through a subsidiary in that haven. If TIEAs signaled that a haven avoided *something worse*, this condition should affect all firms with exposure to that haven, no matter where these firms are headquartered. However, we find that only firms directly affected through the bilateral nature of TIEAs show a positive share price reaction around the first passage of a TIEA by a haven. Firms with exposure to the haven but no exposure to the TIEA show no share price reaction. This finding alleviates the aforementioned concern.

In order to ensure that our results are not driven by specific countries, we remove countries individually from our analysis; our results are robust. To alleviate the concern that firms with tax haven subsidiary differ from other firms, we match firms by country, industry, size, and age. We re-confirm our results. Moreover, all results are robust to removing financial firms and to using alternative lists of tax haven territories to define tax haven firms. Our results on entrenchment are

also robust to removing each event year individually from our analysis. Last, but not least, we find no evidence that TIEAs are explained by economic links between signatory countries, alleviating some of the concern that the passage of TIEAs is endogenous.

A few papers have provided by and large country-specific evidence on the use of tax haven subsidiaries. Desai, Foley, and Hines (2006B) study US firms: they find that large firms, international firms, and firms with extensive intra-firm trade and high R&D intensity are more likely to use tax havens. US firms use large tax havens to reallocate taxable income and small tax havens to avoid taxation of foreign income in the US. Moreover, constrained firms are less likely to use tax haven subsidiaries (Dyreng and Markle 2013). In their international setting, Markle and Robinson (2012) document that tax haven firms are larger but surprisingly less R&D intensive. We find a positive relation between several measures of innovative activity (including R&D) and the use of tax havens. This relation is robust to adding additional controls (including country and industry fixed effects) and using alternative definitions of tax haven territories.

The paper closest to ours is Desai, Dyck, and Zingales (2007), who show that, in Russia, stronger tax enforcement reduces income diversion by insiders. Their model features a trade-off between tax enforcement's impact on taxes paid and the cost of income diversion to insiders. Empirically, they show that the Russian oil firm Sibneft earns positive abnormal returns over five tax enforcement actions in Russia, indicating that tax enforcement can have a positive impact on firm value. Mironov (2013) supports these findings: in Russia, tax enforcement correlates positively with operating performance. We contribute to this literature by showing that the enforcement channel is not restricted to weak institutional environments such as that in Russia.

A few papers have studied the link between tax savings and leverage. Heider and Ljungqvist (2012) document an asymmetric relation between changes in state-level tax rates and leverage adjustments. Faulkender and Smith (2014) construct a new measure of firm-specific foreign tax rates to show that US firms with a higher such tax rate are more levered. In a carefully collected sample of 44 tax sheltering cases, Graham and Tucker (2006) show that firms engaged in tax sheltering have lower leverage than matched firms. Leverage, studied in this stream of the literature, and the use of corporate tax havens, studied in the paper at hand, can be regarded as substitute tax-saving mechanisms.

Many papers have examined the relation between firm-specific accounting measures of tax avoidance and firm value. Representatively, Desai and Dharmapala (2005) show that tax avoidance (measured at the firm level by the book-tax gap) has no effect on firm value on average but a positive effect among strongly governed firms. Hanlon and Heitzman (2010) summarize this literature in great detail and put it into perspective; they highlight that accounting-based measures of tax avoidance are not ideal for international studies because differences, for instance, in the book-tax gap can be due to differences in accounting rules or due to differences in expropriation of outside shareholders. Compared to a vast literature on accounting measures, we measure tax avoidance by identifying firms with tax haven subsidiaries.

The paper is organized as follows. In Section 2, we propose a simple model to derive some of our key hypotheses. In Section 3, we describe the data and key variables. In Section 4, we provide indicative evidence using country- and firm-level correlations. In Sections 5 and 6, we establish evidence for the tax-savings motive and the entrenchment motive. Section 7 concludes.

2. A simple model

In this section we illustrate how the two main motives for establishing a tax haven subsidiary interact. The model provides a simple illustration of the main arguments of our paper and derives some of the central empirical hypotheses we investigate in a later part of the paper.

2.1 The tax motive for tax haven activities

We consider a firm headquartered in a non-tax haven called Home country. The firm has a revenue of *1* and will have to pay a fraction *t* in taxes if this revenue stays in Home country. The firm has the opportunity to establish a tax haven subsidiary at cost β. A tax haven subsidiary allows the firm to transfer a fraction *f* of the revenue to a tax haven where the tax rate is zero. For simplicity, we assume that *t*, *f*, and β are exogenously given in the following.

Let $\boldsymbol{V}$ be the security value of the firm. The owners of the firm will establish a tax haven subsidiary if and only if

$$\Delta \boldsymbol{V} \equiv (\mathbf{1}-\boldsymbol{f})(\mathbf{1}-\boldsymbol{t})+\boldsymbol{f}-\beta-(1-t)\geq 0$$

Or

$$ft \geq \beta$$

A tax haven subsidiary is established whenever the taxes saved are higher than the cost of establishing the subsidiary. Notice all owners will have the same interest even if they are entitled to different shares of the cash flow. We therefore get:

Result 1: *Firms in countries with higher tax rates are more likely to establish subsidiaries in tax havens.*

We now compare the impact on shareholder value of a change in tax rates on firms with and without tax haven subsidiaries. Assume that a change in corporate taxes does not change firms' tax haven activity.[7] Then we have:

Result 2: *A decrease in corporate tax rate, t, will have a higher positive effect on firm value for firms without tax haven subsidiaries than on firms with tax haven subsidiaries.*

Result 2 is formulated to fit with the empirical tests later. To save on notation, we prove the result by looking at the effect of an *increas*e in tax rates. Let $\boldsymbol{V^{NTH}}$ **(**$\boldsymbol{V^{TH}}$ **)** be the value of the firm without (with) a tax haven subsidiary:

$$\boldsymbol{V^{NTH}} \equiv \mathbf{1} - \boldsymbol{t}$$

$$\boldsymbol{V^{TH}} \equiv (\mathbf{1} - \boldsymbol{f})(\mathbf{1} - \boldsymbol{t}) + \boldsymbol{f}.$$

Result 2 then follows from:

$$\frac{\boldsymbol{dV^{NTH}}}{\boldsymbol{dt}} \equiv -\mathbf{1} < -1 + f = \frac{\boldsymbol{dV^{TH}}}{\boldsymbol{dt}}.$$

Similarly, a decrease in corporate tax rates should have a larger (and positive) effect on measures of shareholder value for firms that do not have tax haven operations than for firms that do. In Section 4.3 below, we test this result by studying the causal effect of changes in tax rates on shareholder value.

2.2 Introducing the entrenchment motive for tax haven activities

Tax havens not only allow firms to shield taxes that would be levied in the home country: As discussed in the introduction, they also allow managers to hide cash flows from shareholders. We now add an entrenchment motive for tax haven activities to analyze the combined impact on

[7] Allowing for firms that may choose not to use the tax haven after a decrease in corporate taxes in home countries does not change Result 2. This finding follows from evidence that a marginal tax change will not impact the behavior for all firms which had a strictly positive gain from being in a tax haven before the change.

shareholder value. To do this, we introduce controlling and non-controlling owners into our simple model. By *controlling owner*, we mean an individual or a group of individuals that make central decisions in the firm, including the decision to set up tax haven activities. We assume that controlling owners include managers of the firm or that managers fully internalize the preferences of controlling owners. Thus, in the following, we use the words *controlling owner* and *manager* interchangeably.

We extend the simple model above with the assumption that controlling owners are able to divert cash flows moved to the tax haven for their private use. This is a simplified way of modeling controlling owners' self-serving activities. This simplifying assumption may cover a variety of activities such as tunneling of cash flow to third parties (including themselves), financing pet projects, or empire building. The ability of a controlling owner to engage in self-serving activities creates a wedge between the interest of the controlling owner and the non-controlling owners who invest in the firm.

We introduce the following notation. Let λ be the controlling owner's cash flow stake. Notice if the controlling owner is a professional manager, then λ can be close to zero. (1- λ) is thus the share of cash flows that goes to the minority investors or non-controlling owners. As we are going to make empirical tests using Tobin's Q and abnormal returns as shareholder value, we will define shareholder value from the interest of investors without the private benefit that goes to controlling owners.

We assume that the controlling owner can divert cash flow d in the tax haven at a cost of $\frac{\gamma}{2k}d^2$. The marginal cost of diversion has two components. It is increasing in γ, which is determined by the quality of corporate governance in the tax haven, the legal protection of minority investors, and the ability of third parties such as auditors, institutional investors, or tax authorities in home country.

In addition, the cost of diversion is decreasing in k, which is the complexity of a firm's tax haven activities. Minority investors and third parties have more difficulty monitoring the activities of controlling shareholders when the subsidiary structure is complex. To keep our model simple and illustrative of the main empirical tests we conduct later in the paper, we make the strong assumption that k is exogenously given.

Let V_{th}^{co} be the controlling owner's value of a firm that has tax haven operations:

$$V_{th}^{co}=\lambda[(1-f)(1-t)] + \lambda\,(f-d)+d-\frac{\gamma}{2k}d^2.$$

The optimal level of diversion is $d^* = \frac{(1-\lambda)k}{\gamma}$. The controlling owner diverts *less* when the expected cost of diverting is higher and he internalizes a larger share of the cash flow. The controlling owner diverts *more* when the tax haven activities are more complex. To save on notation, we assume that the cash flow transferred to the tax haven is always bigger than the optimal diversion, i.e., $f > d^*$.

Define the net rent to the controlling owner of the entrenchment activities as

$$NR_d^{co}(k,\gamma,\lambda) \equiv d^*(1-\lambda) - \frac{\gamma}{2k}d^{*2} \geq 0$$

which is non-negative by revealed preferences.

The incentive for a minority owner to set up a tax haven subsidiary is

$$\Delta V^{mi} \equiv V_{th}^{mi} - V_{nth}^{mi} = (1-\lambda)[(1-f)(1-t)] + (1-\lambda)\,(f-d^*)-(1-\lambda)(1-t) \geq (1-\lambda)\beta$$

$$\Leftrightarrow f\,t \geq d* + \beta.$$

Minority shareholders want the firm to engage in tax haven activities if the amount saved in taxes is larger than the sum of the amount diverted by controlling owners and the cost of establishing a tax haven subsidiary.

The incentives for the controlling owner to set up a tax haven subsidiary is given by

$$\Delta V^{co} \equiv V_{th}^{co} - V_{nth}^{co} = \lambda(1-f)(1-t) + \lambda f + NR_d^{co}(k,\gamma,\lambda) - \lambda(1-t) \geq \lambda\beta$$

$$\Leftrightarrow f\,t \geq \beta - NR_d^{co}(k,\gamma,\lambda)/\lambda.$$

The controlling owner engages in tax haven activities if the amount saved in taxes is larger than the cost of establishing a tax haven minus the net rent from entrenchment divided by the controlling owner's share of cash flows. Notice that when the controlling owner internalizes a sufficiently small share of the cash flow, he always prefers establishing a tax haven subsidiary even if it is not in the interest of the minority owners. Since $NR_d^{co}(k,\gamma,\lambda)$ is positive, we get:

Result 3: *The controlling owner has larger incentives to engage in tax haven activities than the minority investors.*

We now introduce Tax Information Exchange Agreements (TIEAs). TIEAs empower tax authorities in home country countries to receive better information about the firm's tax haven activities. In our simple world, a TIEA triggers a reduction in *f*, the amount of cash transferred to a tax haven. As discussed in the introduction, a debate exists on whether TIEAs can or cannot affect firms' tax bill. We therefore allow for the case where TIEAs may have no effect on *f* at all.

The ability to receive more information about the financial flows of a firm's tax haven operations may also generate additional information about the firm's activities in the tax haven and to what extent these activities are aligned with the common interest for all shareholders. Through improved transparency, tax authorities, financial analysts, institutional investors, and other types of minority owners may receive better information about activities that, for example, pile up cash flow that could have been paid out to shareholders or that tunnel resources to third parties. Tax authorities are concerned about the legality of the transactions and financial flows. However, shareholders may fire managers, change their investment engagement, or raise public debates in the media based on evidence and suspicions that support the notion that managers are not maximizing shareholder value, even when these activities are perfectly legal. Thus TIEAs increase the transparency of the tax haven activities and, by doing so, increase the cost of diversion, γ.

Assume shareholder value is measured from the security value of the non-controlling owners. And define zero entrenchment activities as the situation where d* is zero before and after the TIEA. Finally, to save notation, we assume that a TIEA does not affect the incentives to have tax haven subsidiaries or not.

Result 4: *Assume that a TIEA is signed and it implies a reduction in* f *and an increase in* γ. *Then*

(a) TIEA has two opposing effects on shareholder value:

1. The reduction in f *decreases shareholder value.*

2. The increase in γ *increases share holder value.*

(b) The negative impact from a change in f *on shareholder value is unaffected by the complexity,* k, *of tax haven activities.*

(c) The positive impact on shareholder value of an increase in γ *increases in the complexity* k*, of tax haven activities.*

Proof:

Shareholder value is measured as the security value of the firm excluding the rent of entrenchment for the controlling owner.

V_{th}^{mi} = (1-f)(1-t) + (f - *d**)

a (1) $\frac{\partial V_{th}^{mi}}{\partial f}$=*t which is positive.*

a (2) $\frac{\partial V_{th}^{mi}}{\partial \gamma}$=- *(1-* λ$)\frac{\partial d*}{\partial \gamma} = \frac{d*^2}{k}$ *which is positive.*

(b) $\frac{\partial V_{th}^{mi}}{\partial f \partial k}=\frac{dt}{dk}=0$

(c) $\frac{\partial V_{th}^{mi}}{\partial \gamma \partial k}=(\frac{1-\lambda}{\gamma})$^2 *which is positive.*

q.e.d.

Result 4 yields a number of testable implications. The first part tells us that if tax havens are only used for tax saving in the interest of all owners, then a TIEA shall weakly reduce shareholder value. From this result, it follows that if we observe a positive impact on shareholder value when a TIEA is implemented, then it is evidence for the controlling owner using the tax haven to pursue self-serving activities that are not in the interest of the non-controlling investors. In Section 5 we investigate empirically the causal effect of TIEA on shareholder value and in particular the implications of Part (a) of Result 4.

Parts (b) and (c) provide testable relations between the introduction of TIEA and firm complexity. The model predicts that firms with complex tax haven structures will have a more positive (or less negative) effect from the introduction of TIEAs on shareholder value. Thus comparing two firms both having tax haven activities of which one has a more complex firm structure in the tax haven, the model predicts a more positive (or less negative) effect of a TIEA on the firm with the more complex tax haven structure. We will take this result to data by testing if the impact of TIEAs on shareholder value is more positive (or less negative) on firms with complex tax haven structures measured as the number of subsidiaries in tax havens.

3. Data

3.1 Subsidiary data

We hand-collect firm-level subsidiary data from Dun and Bradstreet's *Who Owns Whom 2013/2014* book series. This source lists public and private firms, the subsidiaries they hold to 50% or more, and subsidiaries of subsidiaries. The data also include subsidiaries' headquarter countries, including tax havens.[8] Starting with the *WorldScope* universe of publicly listed, active firms, we match subsidiary information for 17,331 publicly listed firms from 52 countries. In total, these firms have 231,850 subsidiaries at home and abroad. For part of our analysis, we supplement the *2013/14* data with *2008/2009* and *1998/1999* data.

We have three remarks on the quality of the ownership data. First, the data do not provide information on the relative size of subsidiaries. We therefore restrict our analysis to dummy variables indicating whether a firm is exposed to a certain tax haven or not. Second, the data do not include subsidiaries where the firm's ownership stake is less than 50%. It is possible that such joined ventures may be a vehicle through which resources can be tunneled to third parties. Hence, for this reason, we are likely to understate the true importance of entrenchment. Finally, the data do not distinguish operational subsidiaries from pure tax vehicles. However, as we will see in the following subsection, comparing the ratio of foreign subsidiaries to population and country size between tax havens and non-tax havens provides strong evidence that most—if not all—tax haven subsidiaries are not operational.

3.2 Tax havens

No universally agreed upon definition of a tax haven exists. A popular, short definition characterizes a tax haven as "*a country or territory where certain taxes are levied* ***at a low rate or not at all****"* (Wikipedia). A slightly more elaborate definition is given by Geoffrey Powell (former economic adviser to Jersey): "What ... identifies an area as a tax haven is the existence of a composite ***tax structure established deliberately to take advantage of, and exploit, a worldwide demand for opportunities to engage in tax avoidance****."* The key element of tax havens for our purpose is thus that they offer income and/or corporate tax rates so low that

[8] Similarly, Capital IQ and Orbis provide subsidiary information. However, comparing data on 20 randomly selected multinational firms in Dun & Bradstreet to data in Capital IQ and Orbis, we find that these sources report fewer subsidiaries in all cases. Missing subsidiaries tend to be subsidiaries headquartered in smaller countries and non-sovereign territories, but these are crucial for our analysis. Additionally, Capital IQ does not provide historical data. Orbis data date from 2005, yet some of our later analysis, based on events that occur in the early 2000s, requires pre-2005 data.

individuals and/or corporations from abroad are incentivized to engage in tax avoidance (e.g., Dharmapala and Hines 2006).

Lists of countries and territories that constitute tax havens are abundant. Table 1 summarizes four such lists and adds an additional list of countries that entered TIEAs at some point in time.

--- TABLE 1 ABOUT HERE ---

First, countries and non-sovereign states that have not substantially implemented internationally agreed tax standards constitute the OECD Grey List (see *List 1*). While this list is time-varying, we use the Grey List as of August 17, 2009. By that list, 34 territories are described as tax havens. These territories are predominantly located in Europe and the Caribbean, though some are located in Africa, the Middle East, and the Pacific. Larger independent countries such as Hong Kong and Ireland are not classified as tax havens though Singapore is. Second, while never enacted, the "Stop Tax Haven Abuse Act" (S.1533) is widely cited as a source of tax haven territories. The act lists 30 territories including Hong Kong and Singapore (see *List 2*). Third is the original OECD Tax Haven list, which includes 42 territories (see *List 3*). Fourth, Hines and Rice (1994) provide a more practical list based on true rather than official corporate tax rates (see *List 4*). Luxembourg, for instance, has an official corporate tax rate of 29% and does not fall, therefore, under any of the definitions used to establish the first three lists. Yet companies can enter private agreements on low taxes (1% and less) and Advanced Tax Agreements with the Luxembourg tax authorities, making it effectively a tax haven. Fifth, as we use TIEAs as an experiment, we provide a list of all low-tax regimes that entered such agreements according to the OECD (see *OECD Harmful Tax Practices*).[9] While most of our descriptive analysis is based on *List 1*, all results are robust to using other lists. Our analysis on entrenchment uses the list of havens that entered TIEAs.

In order to further investigate the caveat that subsidiaries in tax havens may include operations rather than purely serving as tax-saving vehicles, we extend Table 1 by geographic data and foreign subsidiary counts for tax havens and (for comparison) to the United States. We find that, relative to population and area, foreign subsidiaries are substantially more common in

[9] The *2013/2014* version of *Who Owns Whom* no longer lists certain territories such as the Isle of Man and the US Virgin Islands as separate headquarter countries. This may lead to an understatement of the use of tax haven subsidiaries in our descriptive analysis. However, earlier editions of *Who Owns Whom* do list such territories, alleviating the concern that some of our tests on entrenchment understate the true effect.

tax havens. In the United States, on average, one finds 1 foreign subsidiary per 9,946 inhabitants or per 307 square kilometers. Among sovereign tax havens, one finds 1 subsidiary per 5,567 inhabitants or per 19 square kilometers. Among smaller non-sovereign tax havens, 1 subsidiary exists per 671 inhabitants or per 2 square kilometers. In the extreme, in the British Virgin Islands and the Cayman Islands, a single foreign subsidiary exists per 19 and 50 inhabitants, respectively, or per less than 0.1 square kilometers.

3.3 Country characteristics

Part of our analysis is a description of the use of tax havens by country characteristics. We measure economic development, taxes faced at home, and entrenchment.

Economic development is the natural logarithm of GDP per capita in USD in 2013 (data obtained from the World Bank). Two direct measures of the benefits of saving taxes are the *Corporate Tax Rate* and the *Income Tax Rate,* for which we obtain the maximum brackets in 2013 from government agencies and audit firms. *Tax Evasion* is obtained from the Global Competitiveness Report conducted by the World Economic Forum. Countries' tax evasion is rated on a scale from 1 (strongly disagree) to 7 (strongly agree) to the statement "Tax evasion is minimal." Arguably, tax evasion may indirectly measure the benefits of saving taxes or may measure entrenchment.

Entrenchment is hard to measure, yet the quality of the institutional environment provides an indirect proxy. First, we use *ICRG (Property Rights Protection),* which captures political, economic, and financial risk in 2013 and is obtained from the International Country Risk Guide. The measure ranges from 1 to 6 and increases in protection of property rights. Second, *Corruption Level* is based on Transparency International's Corruption Perception Index as of 2013, an index that measures corruption levels on a scale from 1 (high corruption) to 10 (low corruption).

3.4 Firm-level variables

Here, we describe key dependent variables that capture firm value. We postpone a description of other variables to a later stage. Following Demsetz and Lehn (1985) and Morck, Shleifer, and Vishny (1988), we use Tobin's Q to measure firm value. *Tobin's Q* is obtained from Osiris as (Enterprise Value+Total Liabilities)/(Total Shareholder Equity (Book Value) + Total Liabilities)

though all results are robust to similar definitions of Tobin's Q. In additional tests, we construct cumulative abnormal returns around the passage of Tax Information Exchange Agreements using a 1-factor CAPM estimated for a rolling estimation period starting 292 days before and ending 40 days before event days. We use the local market index as a benchmark. All firm-level variables are winsorized at the 1st and 99th percentiles, though results are robust to other specifications.

4. Country-level and firm-level correlations

We now link the use of tax havens to country- and firm-level characteristics.

4.1 Country characteristics

Table 2 provides summary statistics by country. Countries are sorted by percentage of publicly listed firms that have at least one subsidiary headquartered in a tax haven as defined by the OECD Grey List (*List 1*).

--- TABLE 2 ABOUT HERE ---

Table 2 reveals that besides Singapore—where 100% of sample firms are classified as tax haven firms (because Singapore is classified a tax haven by the OECD Grey List)—the use of tax haven subsidiaries by public traded firms is most frequent in Switzerland, Norway, Malaysia, and the Netherlands: More than one in five firms headquartered in these countries have at least one tax haven subsidiary. Some countries do not have any firm with tax haven subsidiary, most notably Argentina, Greece, and Russia. Notice, however, that one in six Greek firms make use of tax haven subsidiaries by Lists 2, and 3. 9.7% of US firms use tax haven subsidiaries; fewer Chinese firms (1.2%) use tax haven subsidiaries, though this figure increases to 11.6% when using List 4, which includes Hong Kong and Macau. The average country has between 6.9% and 19.6% tax haven firms (by the TIEA List and List 4, respectively).

Figure 1 illustrates correlations between the use of tax haven subsidiaries at the country level and country-level measures variables. The *y*-axis denotes the percentage of publicly listed firms that have at least one tax haven subsidiary using the OECD Grey List as of August 17, 2009. Hong Kong, Singapore, and Ireland are omitted because these jurisdictions constitute tax havens by at least one of the tax haven definitions. The *x*-axis denotes country-level characteristics.

--- FIGURE 1 ABOUT HERE ---

Panel A shows the correlation between use of tax haven subsidiaries and, respectively. corporate tax rates (left figure) and income tax rates (right figure). While the relation between corporate tax rates of firms' home countrycountries and the use of tax haven subsidiaries is merely slightly positive, the use of tax haven subsidiaries is more widespread in countries with higher income tax rates. While not causal, this result indicates that tax haven subsidiaries may have a higher marginal benefit in high tax environments, as suggested by our model (Result 1).

Panel B shows that the use of tax haven subsidiaries is more prevalent in countries with stronger property rights protection and lower corruption levels. Again, while not causal, it is costlier to divert resources from shareholders in countries with strong property right protection and little corruption. The opaque nature of tax haven subsidiaries facilitates stealing when stealing is costly at home. On the other hand, when corruption is large and shareholder protection is absent, managers do not need a tax haven either to reduce taxes or to divert resources from shareholders (see evidence from Russia in Desai, Dyck, and Zingales 2007 or Mironov 2013).

The left side of Panel C shows that tax haven firms are more widespread in countries with low levels of tax evasion. Again, where avoiding taxes directly in the home country is easy, a tax haven subsidiary is of less use.

The right figure in Panel C of Figure 1 shows that the use of tax havens is more prevalent in countries that are economically more advanced as measured by the natural logarithm of GDP per capita. Thus, our simple correlations with country variables may be flawed by not controlling for economic development. We address this concern in Online Appendix 1 by running a logit regression where the dependent variable is the percentage of firms that use tax haven subsidiaries. In addition to the country characteristics discussed above, we control for economic development. We find that the use of tax havens correlates with tax rates, protection of property rights, low corruption levels, and low tax evasion after controlling for economic development. Moreover, protection of property rights and low corruption levels are robust to additionally controlling for overall taxes. A related concern is that our correlations are driven by outliers—such as countries with few observations in our dataset. Panel B of Online Appendix 1 confirms our results, weighing observations by the number of sample firms.

Overall, Figure 1, supported by Online Appendix 1, provides our first indicative evidence for underlying motives for the use of tax haven subsidiaries. The correlations support the notion that

the use of tax havens is driven by the aim of minimizing overall taxes; but they also raise the possibility that tax haven activities serve a goal that is aligned with the private interests of controlling owners beyond the pure tax-saving motive.

4.2 Firm characteristics

Before we focus on establishing a causal link between the use of tax havens and firm value, we introduce firm-level data. Firm-level summary statistics are presented in Table 3. We restrict the sample to those 10,513 publicly listed firms for which we can construct Tobin's Q. All accounting measures are constructed at the firm-year level and then summarized by firm over the 2004–2013 period to obtain one observation per firm.[10] Panel A shows summary statistics for each variable and splits firms into firms with and without tax haven subsidiaries. While we use the definition of the OECD Grey List, our results are robust to using any other list. Panel B focuses on the subset of firms with at least one foreign subsidiary. Panels C and D provide the results of multivariate probit regressions with country and industry fixed effects.

--- TABLE 3 ABOUT HERE ---

Roughly one in six sample firms (17.23%) have at least one tax haven subsidiary. Firms with tax haven subsidiaries tend to be larger, older, and grow more slowly, but are more profitable (measured by profit margin and ROA). Overall, they have a lower Tobin's Q.

Moreover, tax haven firms are 2.2% points more highly levered. The marginal benefit of saving taxes through tax haven subsidiaries may be larger for highly levered firms, given that additional leverage may come with substantial additional costs of distress. Graham and Tucker (2006) document that tax sheltering is associated with a decrease in leverage, yet their 44 sample observations are matched. Table 3, however, provides univariate splits without matching for firm characteristics. Firms with tax haven subsidiaries also face higher effective tax rates: Again, this finding most likely does not mean that tax haven subsidiaries increase effective tax rate; rather, it could indicate that some firms are unable to reduce taxes at home, increasing the benefits from using tax haven subsidiaries. Interestingly, firms with tax haven subsidiaries hold less cash, though this result is turned around in the multivariate setting. Moreover, tax haven firms pay higher dividends, which, however, could be correlated with size, age, and leverage.

[10] Our univariate split and multivariate results are robust to using 2013 data (where sales growth is constructed from 2012–2013 data).

In line with the idea that it is easier to transfer revenues through intangible assets such as patents registered in low tax countries, tax haven firms are firms with a higher fraction of intangible assets, patents, and trademarks, and are more likely to have trademarks or patents.

Panel B repeats the previous analysis on firms with at least one foreign subsidiary and confirms most of the univariate results above. Additionally, Panel B introduces a measure of the cost of repatriating foreign revenue. Many jurisdictions (such as the US) impose repatriation taxes on revenues shifted from abroad to the home country; such repatriation taxes typically increase in the difference between (low) taxes paid abroad and (high) taxes paid at home. We document that tax haven firms are firms that face much lower average taxes abroad than non-tax haven firms; also, their average foreign taxes are much lower than their home taxes.

In order to more formally study characteristics of firms that use tax haven subsidiaries, we employ firm-level probit regressions with industry and country fixed effects and control for various firm characteristics (Panels C and D). The dependent variable is an indicator variable equal to one if a firm has at least one subsidiary in a tax haven on the OECD Grey List.

Adding country and industry fixed effects does not change the correlation between using a tax haven subsidiary and size, return on assets, effective tax rate, leverage, being a dividend payer, and cash documented above (Panel C, Columns (1)-(6)). Controlling for all of these at once, the results for size, leverage, and being a dividend payer are statistically significant, while having more cash over assets becomes positively associated with having a tax haven subsidiary. Adding the difference between taxes paid abroad and taxes paid at home as an additional control provides further evidence for the repatriation argument discussed above.

Panel D further investigates whether the transferability of assets, measured by intangible assets, R&D, and the use of patents and trademarks, explains the use of tax havens. Indeed, after controlling for all of the factors outlined in Panel C, firms with assets that allow for easier transfer of revenues are more likely to have tax haven subsidiaries. Online Appendix 2 further splits our sample into US and non-US firms: all previous results are by and large confirmed.

Overall, this sub-section provides correlations between firm characteristics and the use of tax haven subsidiaries. While these correlations confirm the tax-savings motive, this analysis also highlights that tax haven firms are different, suggesting the importance of matching by firm characteristics in later analysis.

5. Causal relationship between home-country corporate tax rates and firm value

Common sense suggests that tax savings are the key motive for establishing tax haven subsidiaries. We have so far documented that the use of tax havens correlates with country-level tax rates and that firms with tax haven subsidiary are firms that face relatively low taxes abroad, i.e., that face relatively higher repatriation taxes. We now seek to provide causal evidence.

Result 2 of our model suggests that a decrease in corporate tax rates increases firm value but more so for firms without tax haven subsidiaries. We test this result by exploiting that some countries reduced their maximum corporate tax bracket over the period 2008–2013.

Illustratively, Figure 2 plots changes in corporate tax rates between 2008 and 2013 against changes in firm value and changes in the use of tax haven subsidiaries, respectively. Changes in the corporate tax rate are obtained from KPMG' *Corporate and Indirect Tax Rate Survey 2014*; a negative value denotes a reduction in corporate tax rates over the five-year period. On the left, the *y*-axis denotes changes in the difference in Tobin's Q from 2008 to 2013 for a balanced panel of roughly 4,000 firms that we could track over that time period. Specifically, firms are identified as tax haven firms in 2008. We then take the difference between Tobin's Q of firms with tax haven subsidiaries in 2008 and firms without tax haven subsidiaries in 2008 and deduct it from the respective difference in Tobin's Q in 2013. A negative value denotes that firms with tax haven subsidiary have become relatively less valuable over the five-year period. In line with our prediction, we find that the difference in firm value between tax haven and non-tax haven firms becomes more negative in countries that reduce corporate tax rates more substantially: Tax reductions benefit firms but less so when firms use tax havens.[11]

--- Figure 2 ABOUT HERE ---

In order to test this more formally at the firm level, Table 4 investigates the effect of changes in the corporate tax rate on firm value in a panel of publicly listed firms from 2008 to 2013. The left-hand side is *Tobin's Q*. The key control variable is *Change in Tax Rate*, the percentage change in corporate tax rates over the previous year. *Tax Haven Subsidiary* is an indicator variable equal to one if a firm has at least one subsidiary in a tax haven (as defined by the OECD Grey List). Columns (1) and (2) use the full sample, while Columns (3) and (4) use a sample of firms with tax haven subsidiaries and control firms matched by industry, headquarter country,

[11] We restrict our sample to countries in which we can track at least 5 firms with accounting data from 2008 to 2013.

the natural logarithm of assets, and the natural logarithm of firms' age (measured by years since founding). All regressions control for the natural logarithm of assets, the natural logarithm of assets squared, firm fixed effects, and time fixed effects. Standard errors are clustered at the country and year level (2-way clustering).[12]

--- TABLE 4 ABOUT HERE ---

Indeed, while a reduction in corporate tax rates leads to an increase in firm value, this result only holds for the subset of firms that do not have tax haven subsidiaries.[13] In the matched sample, a 1 percentage point decrease in the corporate tax rate is associated with a 1.2% increase in the value of firms without tax haven subsidiaries but no increase in the value of tax haven firms.

When faced with a reduction in corporate tax rates, the marginal benefit of having a tax haven subsidiary may decrease. In the right panel of Figure 2, the *y*-axis denotes the difference between the percentage of firms with tax haven subsidiaries in 2013 and the percentage of firms with tax haven subsidiaries in 2008. We focus on firms that we can track from 2008 to 2013 though we do not require that accounting data is available. A positive value means that the fraction of firms with tax haven subsidiaries has increased over the five-year period. In line with the idea that tax haven subsidiaries become more valuable when corporate tax rates are relatively higher, the percentage of firms with tax haven subsidiary increases less over the five-year sample period in countries that reduce corporate tax rates.

In sum, this section tests the relationship between use of tax havens and the impact of corporate tax reductions on shareholder value. In line with our theoretical model, we show causal evidence that the tax-saving motive is an important component in understanding why firms establish tax haven subsidiaries.

6. Entrenchment motive: Evidence from Tax Information Exchange Agreements

In this section, we analyze whether entrenchment explains the use of tax havens beyond the tax-savings motive. We exploit the passage of Tax Information Exchange Agreements (TIEAs).

[12] Our results are robust to other specifications, such as omitting controls from the matched regressions and clustering along other dimensions.

[13] A negative *Change in Tax Rate* coefficient indicates that an increase in the tax rate leads to a reduction in firm value. Yet, knowing that the sample by and large contains tax reductions, we chose to interpret the coefficients in terms of tax reductions. All results are robust to removing countries that did not change their corporate tax rate.

6.1 Introduction to Tax Information Exchange Agreements (TIEAs)

TIEAs are bilateral agreements between territories aimed at promoting the exchange of tax-relevant information in civil and criminal tax investigations. Regarding firms, such tax-relevant information comprises bank details and ownership details of companies, funds, and trusts. Similarly, TIEAs allow for the exchange of tax information on individuals' accounts. It is important to emphasize that TIEAs do not change tax laws in any of the countries signing the agreement. Thus, if firms' tax policy follows the rules in both signatory countries, TIEAs do not require any change in firms' tax policies.[14]

As we discuss in the introduction and show in Result 4 of our theoretical model, TIEAs provide a powerful natural experiment to test for the presence of entrenchment activities in the use of tax havens. If tax havens are only used for tax saving, a TIEA shall have zero or negative impact on shareholder value as shown in Result 4 of our theoretical analysis.

In Section 2 we argued that TIEAs also make it more costly for managers to engage in entrenchment activities. This engagement can take several forms: First, if managers or owners transfer money illegally to third-party firms owned by themselves, friends, or straw men, a TIEA increases the likelihood that these transfers are detected by tax authorities. Thus, a TIEA may increase the likelihood of criminal charges against entrenched managers or owners. Second, if complex firm structures are used by managers to pile up cash (see, e.g., Hanlon et al. 2014), a TIEA may increase the likelihood that institutional investors, analysts, or other minority owners detect that managers are withholding money that could be paid out to shareholders (at the potential cost of repatriation taxes). More information may induce owners to fire managers pursuing their own interest even if activities are legal in both home country and tax haven. If managers or controlling owners use complex subsidiary structures in tax havens to pursue their own interests, a TIEA will reduce entrenchment activities and increase shareholder value as we also show in Result 4 in Section 2.

Since 2000, over 500 TIEAs have been signed (see Panel A of Figure 3). While most of these agreements have been signed after 2008, the number of treated firms in our sample increased substantially in 2001 and 2002, as well as in the years following 2008. This time series variation

[14] See, e.g., *oecd.org/tax/exchange-of-tax-information/taxinformationexchangeagreementstieas.htm* and *https://www.gov.uk/government/publications/tax-information-exchange-agreements-overview* for more information.

in the passage of agreements is important for our identification strategy as it rules out alternative explanations such as the financial crisis that may affect tax haven firms differentially.

--- FIGURE 3 ABOUT HERE ---

As we are interested in implications of tax enforcement for publicly listed firms, we focus on TIEAs that involve one sovereign non-haven territory.[15] Some countries are not among the signatory countries, e.g., Brazil and Russia.[16] Online Appendix 3 lists TIEAs involving exactly one tax haven country (or non-sovereign nation) and one non-tax haven country (Source: OECD *Harmful Tax Practices*) and affecting at least one sample firm. Listed are 362 agreements between non-tax haven signatories (Panel A) and tax haven signatories (Panel B). Some sample firms may be affected by more than one TIEA: we focus on the first treatment.

6.2 Methodology

We estimate the effect of tax enforcement on firm value using a difference-in-difference approach that follows Bertrand and Mullainathan (2003). Specifically, we estimate

$$y_{it} = \alpha_i + \alpha_t + \beta_1 TREATED_{it} + \mathbf{X}_{it} + \varepsilon_{it} \qquad (1)$$

where *i* denotes firms, *t* denotes time, y_{it} is the dependent variable of interest (e.g., Tobin's Q), α_i and α_t are firm and year fixed effects, $TREATED_{it}$ is a dummy that equals one if a firm has been affected by a Tax Information Exchange Agreement signed between its headquarter country and a tax haven in which that firm has a subsidiary, $\mathbf{X}_{it}$ is a vector of controls, and ε_{it} is an error term. Besides year and firm fixed effects, controls comprise size, age, and size squared. Because treatment is staggered over time (see Figure 3), alternative events affecting treated firms at the same time—such as the financial crisis—are less likely to drive our results. Standard errors are clustered at the country and year level (2-way clustering), though results are robust to alternative specifications.

Figure 4 illustrates our identification strategy. Firms 1 through to 4 are headquartered in Headquarter Country 1 (HQ Country 1). Firms A through to D are headquartered in Headquarter

[15] For instance, at least one third of TIEAs are between two tax havens or between tax havens and economically small non-sovereign territories, such as between the Faroe Islands and Greenland.

[16] These countries would provide some interesting cross-country predictions: In Russia, for instance, tax avoidance or tax fraud do not require complex tax haven constructs but can be achieved through outright theft (Desai, Dyck, and Zingales 2007; Mironov 2013). Thus, a TIEA signed by Russia might have no impact on Russian tax haven firms.

Country 2 (HQ Country 2). These firms have subsidiaries at home and in two tax havens (TH 1 and TH 2). In Panel A, at time *t*, HQ Country 1 and Tax Haven 2 enter a Tax Information Exchange Agreement (TIEA) and Firms 3 and 4 become treated while all remaining firms in both countries act as control firms. In Panel B, at some later point in time, *t+s*, HQ Country 2 and Tax Haven 1 also enter a TIEA, which means that (besides Firms 3 and 4) Firms A and C become treated while Firms 1, 2, B, and D are control firms. In robustness tests, one treated firm is matched to one control firm that is headquartered in the same country, operates in the same industry, and is similar in age and size. This match is based on data 5 years prior to treatment.

--- FIGURE 4 HERE ---

In a variation, we run (1) on treated firms and matched control firms and additionally include post-treatment dummies for control firms. In a further variation of (1) above, y_{it} denotes daily returns. Accordingly, $TREATED_{it}$ denotes days around the signing to TIEAs.[17]

Econometrically, the nature of TIEAs—they are bilateral and staggered over time— alleviates some common event study concerns. First, the signing of TIEAs is a bilateral action resulting from a political process that is generally exogenous to those firm-level variables important for this study. Additionally, in Online Appendix 4, we confirm that the passage of TIEAs between country pairs is not easily explained by economic links between non-haven countries and tax havens. We run logit regressions explaining the passage of TIEAs between pairs of tax haven territories and non-tax haven countries. The left-hand-side variable is a dummy variable equal to one if a pair consisting of a non-haven country (as listed in Table 2) and a tax haven territory (as listed in Table 1) has passed a TIEA by 2013 and zero otherwise. The key right-hand-side control is the economic link between respective pairs. In columns (1), (3), and (5), economic links are measured by the sum of the number of subsidiaries of public and private firms from Country 1 in Country 2 and the number of subsidiaries of public and private firms from Country 2 in Country 1. In columns (2), (4), and (6), economic ties are measured by the maximum of the number of subsidiaries of public and private firms from Country 1 in Country 2 and the number of subsidiaries of public and private firms from Country 2 in Country 1, accounting for the fact that the passage of a TIEA may be driven by the stronger partner. Columns (7) to (8) repeat the

[17] In that variation, rather than including firm fixed effects and time fixed effects, we demean the dependent variable by firm and include day fixed effects.

analysis using the number of subsidiaries of publicly listed firms between country pairs. We include fixed effects for non-tax haven countries (Columns (1) and (2)), tax haven territories (Columns (3) and (4)), and both (Columns (5)-(8)). Economic links do not significantly explain the passage of TIEAs, alleviating the concern that TIEAs are explained by economic links.

Second, even if the passage of TIEAs is not explained by economic links, the passage may be driven by general changes in the regulatory environment in firms' home countries, i.e., by time trends. For instance, the passage of TIEAs may be part of a one-off regulatory effort to increase tax enforcement. Our difference-in-difference methodology takes such potentially omitted variables into account: We compare treated firms to control firms headquartered in the same country before and after the passage of TIEAs, and TIEAs are passed at different points in time.

Third, some concerns about the exogeneity of the passage of TIEAs remain when considering other unobservable or non-measurable determinants of the passage of TIEAs. For instance, the signing of a TIEA may be driven by the fact that public firms headquartered in one signatory country use specific tax havens for very aggressive tax avoidance. For instance, the US regulator may be aware that US firms use their Cayman Island subsidiaries for very aggressive tax avoidance and therefore decide to sign an agreement. However, we argue that such considerations typically work against us finding a positive effect of TIEAs on firm value: If investors could predict country-tax haven pairs that enter TIEAs, the effect of TIEAs would be priced before the signing is announced. Additionally, the illustrative consideration outlined above would suggest that the signing of a TIEA between the US and the Cayman Islands increases the cost of using the Cayman Islands to reduce corporate taxes. All else being equal, this cost would destroy some of the value potentially created by TIEAs.

6.3 The impact of TIEAs on firm value

In Table 5, Panel A, we study the effect of TIEAs on firm value using OLS regressions for a panel of firms from 1996 to 2013 following Equation (1). Column (1) uses the full sample of firms. In columns (2) and (3), one non-treated (control) firm is matched to each treated firm five years prior to the year a TIEA is signed. In columns (4) and (5), 10 firms are matched to treated firms. Firms are matched by country, industry, log of assets, and log of age with replacement.

--- TABLE 5 ABOUT HERE ---

We find that the passage of TIEAs does indeed lead to an increase in firm value. In the full sample, Tobin's Q increases by 2.5% after treatment. The effect is still significant and similar in magnitude for samples of 1 control firm (2.6%) and 10 control firms (2.3%). In Column (1), the counterfactual constitutes all non-treated firms as well as treated firms prior to the passage of a TIEA. In columns (2) and (4), treated firms before the passage and control firms from the same headquarter country both before and after the passage of TIEAs act as control group. In Columns (3) and (5), we add a dummy for non-treated firms after the TIEA. This measure allows us to rule out headquarter country-specific shocks that correlate with the passage of TIEAs—such as changes in tax enforcement—as explaining our results. The coefficient on control firms after the passage of TIEAs is very close to zero and statistically insignificant, suggesting that no such shocks are at play. We conclude that TIEAs only affect treated firms and that this result is not driven by country-specific characteristics. This finding supports Result 4 of our model.

Of course, one immediate concern is that we capture a time trend: Firms with subsidiaries in treated havens may become more valuable year after year regardless of the passage of TIEAs. We therefore analyze firm value year by year around the passage of TIEAs. Figure 5 plots the evolution of firm value of treated firms around the passage of TIEAs. The *x*-axis denotes years around the passage of TIEAs. The *y*-axis shows the coefficient from an interaction between year-to-event dummies and a treatment indicator variable. The increase in firm value occurs abruptly between year -1 and year +1 around the treatment date, alleviating the concern.

--- FIGURE 5 ABOUT HERE ---

To further alleviate the concern of time trends, we study daily abnormal returns around the signing of TIEAs. Such event study using daily data also reduces the concern that an annual measure such as Tobin's Q captures some policy changes that occur on an annual basis, as well as the concern that Tobin's Q may increase mechanically due to some change in accounting practices associated with the passage of TIEAs.

While it is impossible to nail down precisely the first announcement of most TIEAs by the press, anecdotal evidence suggests that TIEAs are not discussed in public long before they are signed. Indeed, when we randomly select 10 TIEAs and search for their first mentioning in Factiva, we find that four of these ten agreements are not mentioned in the press. Three agreements are mentioned in the five days preceding the signature date, one on the signature day,

and two during the five days after the signature date. Figure 6 shows cumulative returns around the passage of TIEAs and re-confirms the positive effect on affected firms' value, alleviating concerns about Tobin's Q.

--- FIGURE 6 ABOUT HERE ---

The magnitudes in Figure 6 have to be interpreted with caution. First, raw returns also reflect risk (indeed, tax haven firms tend to have a higher beta). Second, TIEAs may have been signed during bull markets on average. In order to control for risk and general market movement, we study daily returns and abnormal returns in a multivariate framework (see Table 5, Panel B). We include firm and day fixed effects and cluster by firm and day to allow for correlation across firms on the same day as well as correlation across days within the same firm. We study a range of event windows around the signature date to account for the fact that TIEAs may be announced shortly before or after the signature day. We confirm our previous results: Firms affected by TIEAs have positive daily returns around the signature date, also after controlling for market risk. The magnitude of the effect is similar to that of the Tobin's Q regressions once we control for market risk.

In sum, we show in this subsection that a positive shock to the transparency of tax haven activities increases the shareholder value of firms with tax haven subsidiaries. In our simple theoretical framework of Section 2, this is evidence that tax havens are used for activities that go beyond pure tax saving. In the next section, we provide further tests that support the notion that the positive shareholder value effect is linked to entrenched owners engaging in activities that are not aligned with the interest of all shareholders.

6.4 Evidence for entrenchment

In this subsection, we investigate channels of the firm value effect documented above. Specifically, TIEAs may increase firm value because they facilitate monitoring, thereby reducing managerial slack or outright stealing. We study whether TIEAs have a larger effect on firms with larger exposure to tax havens, whether firms actively avoid TIEAs by shifting operations to other tax havens, and whether TIEAs lead to operational gains.

6.4.1 TIEAs and complexity of firms' structure within tax havens

Operating tax haven subsidiaries involves complexity. However, we argue that complex organizational structures in tax havens are more useful for hiding entrenchment activities than for pursuing (legal) tax-saving activities. A common way to pursue aggressive tax planning is to transfer material or immaterial assets—such as patents or trademarks—to a tax haven subsidiary and then charge the mother company for the use of these assets. Oftentimes, this action requires no more than one subsidiary in a tax haven; adding additional subsidiaries does not in general provide a first-order improvement in the ability to save taxes.[18] Hiding other activities from shareholders and other monitors, however, benefits from a complex structure with many tax haven subsidiaries. Complexity may be discounted by shareholders because complexity facilitates entrenchment or because complexity increases uncertainty about operations. We discuss the reduction in uncertainty below and focus on entrenchment for now.

In Table 6, we first document that firms with subsidiaries in tax havens tend to be more complex than firms without tax haven subsidiaries. We provide a range of measures of complexity, including the number of subsidiaries and the number of hierarchical levels. Indeed, Panel A shows that firms with at least one tax haven subsidiary have significantly more subsidiaries and have a significantly more complex subsidiary structure measured by the number of hierarchical levels; this still holds after controlling for country and industry fixed effects and various firm characteristics, including size (Panel B).

--- Table 6 ABOUT HERE ---

We now link firms' complexity within the tax haven to the magnitude of the treatment effect (Panel C). As discussed above, a complex structure within a given tax haven makes it harder for minority investors and outsiders to monitor and control the actions pursued by insiders, including managers and controlling owners. In Result 4 of our theoretical model, we showed that the increase in shareholder value from more transparency is increasing in firm complexity. We test this result using two measures of firms' complexity within tax havens. The first, in columns (1) through (5), is the logarithm of the number of subsidiaries in tax havens. The second, in columns (6) through (10), is the share of subsidiaries that are headquartered in tax havens. Interacting treatment with complexity within a given tax haven, we find that TIEAs have a significantly

[18] In some cases, tax saving can be more efficient if there are more than one subsidiary. One example is the so-called Dutch Sandwich, comprised of two Irish and one Dutch subsidiary. However, this example represents a special case: of its two countries, the Netherlands is not a tax haven in any list, and Ireland is defined as a tax haven in one out of five lists in Table 1.

more positive effect for both measures. We both run the standard specification and the matching specifications with 1 and 10 matches. The interaction term is significant at a 1 percent level and very robust across the different specifications.

We conclude that firms with more complex firm structures in tax havens are rewarded more by investors when affected by a TIEA. This finding cannot be explained by a pure tax-saving motive and therefore, Table 6 provides additional evidence that tax haven activities are driven by entrenchment activities that go beyond pure tax saving.

6.4.2 Haven hopping

One alternative response to TIEAs is to engage in *haven hopping*: Managers might strategically close tax haven subsidiaries in treated tax havens and open new tax haven subsidiaries in unaffected tax havens.

We investigate this possibility in Table 7. Panel A follows firms through the first wave of TIEAs from 1998 to 2008 and the second wave from 2008 to 2013, respectively. We categorize firms as having no tax haven subsidiary, having a tax haven subsidiary in at least one subsequently affected tax haven, and having tax haven subsidiaries but exclusively in non-affected tax havens at the beginning of the sample period. We then establish whether firms change categories over the sample period.

--- Table 7 ABOUT HERE ---

Most importantly, one third of firms that have a subsidiary in a subsequently affected haven at the beginning of the sample period close that subsidiary and move exclusively to non-affected tax havens (33% from 1998 to 2008, and 31% from 2008 to 2013). At the same time, only 10% and 7% of firms with tax haven subsidiaries move into affected tax havens from 1998 to 2008 and from 2008 to 2013, respectively. Moreover, most firms that do not have tax haven subsidiaries at the beginning of our sample period do not move into tax havens; however, among those firms that do open such subsidiaries, most open them in unaffected tax havens.

When such strategic haven hopping is sought by managers to continue entrenchment and shareholders to some extent foresee it, the value of firms that engage in haven hopping should be less responsive to the passage of TIEAs. While obtaining announcement dates of firms' decisions to engage in different tax havens can be difficult, Panel B investigates whether the change in

treated firms' value is partly explained by haven hopping. We follow our main specification (Table 5) but additionally interact treated firms with a dummy that equals one if a firm engages in haven hopping. While statistically just around the 10% level, we find that treated firms that engage in haven hopping are less positively affected by the passage of TIEAs than are firms that do not engage in haven hopping. Thus, the positive impact of TIEAs on average shareholder value is driven by companies that do not engage in heaven hopping.

In sum, we show that some managers chose to react to TIEAs by moving subsidiaries to other non-treated tax havens and that doing so is against the interests of the shareholders. Taken together, this finding constitutes strong evidence that some firms strategically avoid tax havens on entering TIEAs. The fact that such strategic moves are not associated with an increase in firm value is consistent with the notion that tax havens may be used for entrenchment.

6.4.3 Operational effects of TIEAs

We now investigate whether operational explanations exist for our main result that TIEAs have a positive effect on shareholder value. For instance, one could think that TIEAs improve monitoring, which in turn reduces managerial slack. Table 8 follows the methodology outlined in Equation (1) but tests for the effect of TIEAs on profit margin and gross margin. Moreover, we test for further drivers of Tobin's Q: specifically, we analyze the effective tax rate and risk (measured by beta), as well as leverage.[19]

--- Table 8 ABOUT HERE ---

Overall, our results indicate that treated firms do not increase their profit margin or gross margin. While the gross margin does go up (at 10% significance level), this result does not hold when matching treated firms to control firms.

TIEAs might have an indirect impact on effective tax rates either because firms reduce activity in the gray area between legal and illegal tax avoidance or because home country tax authorities use TIEAs to adjust the home country tax base; however, both these channels would predict a decrease in Tobin's Q. Our analysis suggests that effective tax rates are unaffected by TIEAs.

[19] Our test of drivers of the result on Tobin's Q will be incomplete as some drivers of Tobin's Q are harder to observe. For instance, with a model where firm value is determined by a growing annuity in mind, Tobin's Q is also affected by survival (reflected in the number of annuity payments).

Part of the increase in firm value may stem from a reduction in investors' uncertainty. While the discount rate applied by investors is hard to measure, one of its components is firms' exposure to the market. We find no significant effect of TIEAs on firms' beta.

Finally, if tax haven operations were a substitute tax-savings mechanism to leverage, firms might respond to TIEAs by levering up. Of course, this effect would only happen if TIEAs had an impact on effective tax rates; and the impact of increased leverage on firm value would be negative due to an increase in expected bankruptcy costs. We do not observe an increase in leverage after the passage of TIEAs.

This subsection provides evidence that the increase in firm value associated with the passage of TIEAs is not driven by operational efficiency gains or reductions in uncertainty on their own.

6.5 Cross-sectional results

Having established that the use of tax haven subsidiaries is at least partly driven by entrenchment, we now turn our attention to characteristics of firms that benefit more from the passage of TIEAs. In Table 9, we re-run our main specification and interact treatment with a range of cross-sectional firm characteristics.

--- Table 9 ABOUT HERE ---

First, we focus on intangible assets in Panel A. We established above that firms with intangible assets are more likely to use tax haven subsidiaries (Table 3, Panel D). Arguably, these firms benefit from the fact that they do not have to shift physical assets to tax havens in order to claim lower tax rates. Of course, while these firms may find it less costly to save taxes by shifting revenues, the unobservable nature of assets being shifted also makes such activities harder to observe. The passage of TIEAs does not challenge tax savings; however, it challenges potential entrenchment involved in shifting revenues from intangible assets into tax havens. Indeed, we document that firms with patents and trademarks—measured by numbers and indicator variables—are more positively affected by the passage of TIEAs.

Second, some firms are less monitored prior to the passage of TIEAs; outside shareholders of such firms may benefit even more from additional monitoring imposed by the passage of TIEAs. Indeed, we document that our result is driven by firms with lower institutional ownership. This finding is in line with the notion that institutional investors, to some extent, act as monitors.

Confirming this notion, we find that firms that are less levered and more fast-growing (measured by cash flow growth) are more positively affected by the passage of TIEAs (Panel B). This result accords with the view of leverage as a monitoring device and with anecdotal evidence that internal control systems do not catch up in fast-growing firms.

7. Conclusion

Tax haven subsidiaries can be used to reduce corporate taxes and to shield cash from outsiders such as minority shareholders. In keeping with the tax motive—and perhaps not surprisingly—we find that a 1 percentage point reduction in home-country corporate tax rates is associated with a 1.2% increase in value of firms without tax haven subsidiaries, while firms with tax haven subsidiaries are unaffected. Consistent with the entrenchment motive, we document that the passage of TIEAs between countries and tax havens increases average shareholder value by 2.5%. While outright theft is hard to observe, this increase in firm value is unlikely to be driven by a reduction in managerial slack or by a reduction in uncertainty, as indicated by our results on operational efficiency and beta. Suggesting entrenchment, the documented positive effect of TIEAs on firm value is more pronounced in firms with strong exposure to tax havens and not present among firms that avoid TIEAs by engaging in *haven hopping*. Last but not least, firms that are more likely to suffer from agency problems, such as weakly governed firms, are more positively affected by the passage of TIEAs. In sum, we establish that investors endorse regulatory initiatives that have the potential of illuminating corporate activities in tax havens.

The amount of cash held offshore by multinational corporations has grown significantly over the past years, reaching tens of trillions of US dollars. Our paper provides new insights into drivers of corporate decisions to move activities to tax havens. Our paper also provides relevant implications to policy makers. Specifically, the OECD's emphasis on providing more transparency on offshore tax havens benefits shareholders. From shareholders' perspectives, our results support plans to further extend the current set of TIEAs to incorporate as many countries and tax havens as possible.

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Table 1: Tax haven list

This table lists countries and non-sovereign nations that are classified as tax havens by at least one of five sources: first, by the OECD Grey List (*List 1*; as of August 17, 2009); second, by the "Stop Tax Haven Abuse Act" (*List 2*; S.1533; not enacted); third, by the original OECD Tax Haven List (*List 3*); fourth, by Hines and Rice (1994) (*List 4*); fifth, by entering a Tax Information Exchange Agreement (*TIEA*; OECD Harmful Tax Practices). *Sovereign* is a dummy variable equal to one if a tax haven is a sovereign state and zero otherwise (Crown Dependency, etc.). *Population (in 000s)* denotes the population in 2013 (World Factbook). *Area (km2)* denotes the land area in square kilometers (World Factbook). *Pop Dens (ppl/km2)* is *population* divided by *area*. *#Foreign Subs* is the number of subsidiaries of public and private firms headquartered in the respective territory in 2013 that are ultimately owned (>50%) by a foreign parent firm (Dun & Bradstreet's *Who Owns Whom 2013/2014*). *Pop/ForSub* and *km2/ForSub* denote *population* and *area* per foreign subsidiary, respectively.

Country Name	Region	List 1	List 2	List 3	List 4	TIEA	Sovereign	Pop (000s)	Area (km2)	Pop Dens (ppl/km2)	#Foreign Subs	Pop/ ForSub	km2/ ForSub
Andorra	Europe	1	0	1	1	1	1	85	455	187	6	14,180	76
Anguilla	Caribbean	1	1	1	1	1	0	13	91	148	20	673	5
Antigua&Barb.	Caribbean	1	1	1	1	1	1	89	440	202	16	5,567	28
Aruba	Caribbean	1	1	1	1	1	0	102	180	569	41	2,497	4
Bahamas	Caribbean	1	1	1	1	1	1	319	9,992	32	219	1,457	46
Bahrain	MiddleEast	1	1	1	1	1	1	1,318	760	1,734	173	7,617	4
Barbados	Caribbean	0	1	1	1	1	1	283	430	659	182	1,556	2
Belize	CentralAm.	1	1	1	1	1	1	334	22,810	15	32	10,447	713
Bermuda	Pacific	0	1	1	1	1	0	65	50	1,296	844	77	0
BritishVirginIsl.	Caribbean	1	1	1	1	1	0	28	153	182	1,486	19	0
CaymanIslands	Caribbean	1	1	1	1	1	0	58	240	240	1,152	50	0
ChannelIslands	Europe	1	1	1	1	1	0	164	190	862	2	81,929	95
CookIslands	Pacific	1	1	1	1	1	0	14	240	59	20	708	12
CostaRica	CentralAm.	1	1	1	0	1	1	4,805	51,060	94	295	16,289	173
Cyprus	Europe	0	1	1	1	0	1	839	9,240	91	1,698	494	5
Dominica	Caribbean	1	1	1	1	1	1	72	285	251	10	7,168	29
Gibraltar	Europe	1	1	1	1	1	1	30	7	4,412	354	85	0
Grenada	Caribbean	1	1	1	1	1	1	105	340	310	18	5,860	19
Guatemala	CentralAm.	0	0	0	0	1	1	15,807	108,889	145	243	65,048	448
HongKong	EastAsia	0	1	1	1	0	1	6,131	1,042	5,884	12,387	495	0
Ireland	Europe	0	0	0	1	0	1	4,587	68,890	67	8,988	510	8
IsleofMan	Europe	0	1	1	1	1	0	84	570	148			
Jordan	MiddleEast	1	0	0	1	0	1	6,318	88,780	71	106	59,604	838
Lebanon	MiddleEast	1	0	0	1	0	1	4,425	10,230	433	133	33,270	77
Liberia	WestAfrica	1	1	1	1	1	1	4,190	96,320	44	38	110,275	2,535
Liechtenstein	Europe	1	1	1	1	1	1	37	160	229	144	255	1
Luxembourg	Europe	0	0	0	1	0	1	531	2,590	205	5,154	103	1
Macao	EastAsia	0	0	0	1	1	0	608	28	21,696	205	2,963	0
Maldives	IndianOcean	1	0	1	1	0	1	338	300	1,128	20	16,922	15
Malta	Europe	0	1	1	1	0	1	419	320	1,311	585	717	1
MarshallIsl.	Pacific	1	0	1	1	1	1	53	180	292	13	4,043	14
Mauritius	IndianOcean	0	0	1	0	1	1	1,291	2,030	636	345	3,743	6
Monaco	Europe	1	0	1	1	1	1	38	2	18,790	183	205	0
Montserrat	Caribbean	1	0	1	1	1	0	5	102	51	5	1,033	20
Nauru	Pacific	1	1	1	0	0	1	9	21	449			
Niue	Pacific	1	0	1	0	0	1	1	260	5			
Panama	CentralAm.	1	1	1	1	1	1	3,802	74,340	51	611	6,223	122
Samoa	Pacific	1	1	1	1	1	1	189	2,830	67	231	818	12
SanMarino	Europe	0	0	1	1	1	1	31	60	521	7	4,464	9

Seychelles	IndianOcean	0	0	1	1	1	1	88	460	192	17	5,194	27
Singapore	EastAsia	1	1	1	1	0	1	5,399	700	7,713	12,195	443	0
St.Kitts&Nevis	Caribbean	1	1	1	1	1	1	305	999	305	14	21,769	71
St.Lucia	Caribbean	1	1	1	1	1	1	181	610	297	35	5,168	17
St.Vinc.&Gren.	Caribbean	1	1	1	1	1	1	109	389	281	9	12,153	43
Tonga	Pacific	1	0	1	0	0	1	105	720	146	4	26,235	180
Turks&Caicos	Caribbean	1	1	1	1	1	0	31	616	51	11	2,860	56
USVirginIsl.	Caribbean	0	0	1	1	0	0	105	343	307			
Uruguay	SouthAm.	0	0	0	0	1	1	3,324	176,215	19	422	7,878	418
Vanuatu	Pacific	1	0	1	1	1	1	247	12,190	20	20	12,363	610
Sovereign(mean/*sum*/<u>median</u>)		**57%**	**70%**	**57%**	**84%**	**81%**		**1,790**	**20,145**	**1,278**	***44,907***	**<u>5,567</u>**	**<u>19</u>**
Non-Sovereign (mn/*sum*/<u>med</u>)		**75%**	**67%**	**75%**	**92%**	**100%**		**106**	**234**	**2,134**	***8,013***	**<u>671</u>**	**<u>2</u>**
For Comparison													
USA	NorthAm.	0	0	0	0	0	1	318,968	9,857,306	32	32,071	9,946	307

Table 2: Country-level summary statistics and the use of tax haven subsidiaries around the world

This table provides country-level summary statistics. The sample consists of 52 countries for which at least one publicly listed firm with non-missing size and industry affiliation in Datastream/Worldscope could be matched to Dun & Bradstreet's *Who Owns Whom 2013/2014*. *# Parent Firms* denotes the number of publicly listed firms headquartered in the respective country. *# Subsidiary Firms* denotes the number of subsidiaries owned to 50% or more by the parent firms. *List 1* through to *List 4* and *TIEA* denote the % of parent firms that have at least one subsidiary in a tax haven where tax havens are countries or non-sovereign states on respective lists (see Table 1); this percentage is 100% if the country is defined as a tax haven by the respective list. *Log (GDP per capita)* is the natural logarithm of GDP per capita in USD in 2013 (Source: World Bank). *Corporate Tax Rate* is the maximum corporate tax bracket and *Income Tax Rate* is the maximum income tax bracket in 2013, obtained through various sources (largely government agencies and audit firms). *Tax Evasion* is obtained from the Global Competitiveness Report conducted by the World Economic Forum: Countries' tax evasion is rated on a scale from 1 (strongly disagree) to 7 (strongly agree) to the statement "Tax evasion is minimal." *ICRG (Property Rights Protection)* captures political, economic, and financial risk in 2013 and is obtained from the International Country Risk Guide; the measure ranges from 1 to 6 and increases in protection. *Corruption Level* is based on Transparency International's Corruption Perception Index as of 2013 (Source: Transparency International), an index that measures corruption levels on a scale from 1 (high corruption) to 10 (low corruption). Countries are sorted by the % of public firms that have at least one subsidiary headquartered in a tax haven by List 1 (OECD Grey List, August 2009).

Country	# Parent Firms	# Subsidiary Firms	% of Firms with Tax Haven Subsidiary (100% if country is TH by respective list)					Log (GDP per capita)	Corporate Tax Rate	Income Tax Rate	Tax Evasion	ICRG	Corruption Index
			List 1	*List 2*	*List 3*	*List 4*	*TIEA*						
Singapore	400	4,883	100.00%	100.00%	100.00%	100.00%	4.25%	11.27	19.0%	20.0%	5.05	3.00	9.20
Switzerland	148	6,106	39.86%	45.95%	45.95%	50.00%	29.73%	10.90	25.0%	13.2%	4.49	7.00	9.00
Norway	120	2,623	22.50%	25.00%	25.00%	26.67%	3.33%	11.07	28.0%	47.8%	3.96	7.00	7.90
Malaysia	664	4,345	21.84%	24.85%	24.85%	24.85%	2.11%	10.05	25.0%	26.0%	4.34	4.00	5.10
Netherlands	76	3,201	19.74%	30.26%	30.26%	36.84%	22.37%	10.75	25.0%	52.0%	3.40	7.00	8.90
Japan	2,382	32,983	17.46%	25.90%	25.94%	26.15%	2.81%	10.51	38.0%	50.0%	4.41	7.00	7.30
Chile	35	188	17.14%	20.00%	20.00%	14.29%	17.14%	10.02	20.0%	40.0%	4.20	6.00	6.90
Portugal	18	724	16.67%	22.22%	22.22%	33.33%	27.78%	10.15	25.0%	54.0%	2.18	7.00	6.10
France	367	12,482	16.35%	20.16%	21.25%	27.79%	17.71%	10.59	33.3%	45.0%	3.86	7.00	6.90
Denmark	77	1,414	15.58%	20.78%	20.78%	25.97%	7.79%	10.67	25.0%	51.7%	3.70	7.00	9.30
Finland	92	2,437	15.22%	21.74%	21.74%	27.17%	5.43%	10.60	20.0%	51.0%	3.53	7.00	9.00
Austria	47	2,324	14.89%	23.40%	23.40%	27.66%	10.64%	10.70	25.0%	50.0%	3.60	7.00	8.10
SaudiArabia	27	96	14.81%	14.81%	18.52%	14.81%	14.81%	10.85	20.0%			1.00	3.50
Bangladesh	7	9	14.29%	28.57%	28.57%	28.57%	0.00%	8.06		25.0%		5.00	2.10
Spain	93	3,038	13.98%	15.05%	17.20%	23.66%	15.05%	10.37	30.0%	52.0%	1.91	7.00	6.50
UK	1,162	33,021	13.60%	18.59%	18.76%	26.33%	10.50%	10.50	24.0%	45.0%	4.67	7.00	7.70
India	983	4,136	12.82%	15.46%	16.38%	15.97%	3.15%	8.60	30.0%	33.0%	2.16	4.00	3.40
Germany	471	12,137	11.68%	15.50%	15.50%	18.26%	6.58%	10.68	29.8%	45.0%	3.41	7.00	7.90
Philippines	87	773	11.49%	14.94%	14.94%	14.94%	10.34%	8.79	30.0%	32.0%	1.83	6.00	2.30
USA	3,572	54,577	11.42%	15.37%	15.57%	18.03%	8.62%	10.88	39.0%	39.6%	4.47	7.00	7.30
Venezuela	9	45	11.11%	11.11%	11.11%	11.11%	11.11%	9.82	34.0%	34.0%	1.56	5.00	1.90
Pakistan	18	30	11.11%	16.67%	16.67%	16.67%	5.56%	8.43	35.0%	35.0%		5.00	2.50
Colombia	9	22	11.11%	11.11%	11.11%	11.11%	11.11%	9.46	33.0%	33.0%	2.11	4.00	3.80
HongKong	347	2,105	10.66%	100.00%	100.00%	100.00%	9.51%	10.88	16.5%	15.0%			
Belgium	77	1,536	10.39%	14.29%	14.29%	32.47%	25.97%	10.62	34.0%	55.0%	2.27	7.00	7.30

Indonesia	124	528	9.68%	12.90%	12.90%	12.90%	0.81%	9.17	25.0%	30.0%	2.53	1.00	2.60
Australia	1,217	11,124	8.79%	10.85%	10.85%	11.67%	1.31%	10.72	30.0%	45.0%	4.58	7.00	8.70
Italy	126	3,013	8.73%	11.11%	11.11%	26.19%	19.84%	10.44	31.4%	43.0%	1.77	7.00	4.80
Mexico	12	319	8.33%	8.33%	8.33%	8.33%	16.67%	9.76	30.0%	30.0%	2.46	4.00	3.60
Sweden	286	7,020	7.69%	14.34%	14.69%	16.08%	5.94%	10.68	22.0%	57.0%	3.39	7.00	9.30
Korea	759	3,486	7.38%	14.23%	14.23%	14.76%	1.05%	10.43	22.0%	41.8%			
NewZealand	68	396	7.35%	8.82%	8.82%	8.82%	0.00%	10.42	28.0%	33.0%	5.00	7.00	9.30
Thailand	260	1,141	7.31%	8.85%	8.85%	8.85%	0.38%	9.56	20.0%	35.0%	3.41	5.00	3.50
Egypt	16	32	6.25%	6.25%	6.25%	6.25%	6.25%	9.29	20.0%	20.0%	3.57	2.00	2.80
Brazil	33	300	6.06%	6.06%	6.06%	12.12%	12.12%	9.62	34.0%	27.5%	2.14	6.00	3.50
Ireland	37	786	5.41%	8.11%	8.11%	100.00%	8.11%	10.71	25.0%	41.0%	3.55	7.00	7.70
Israel	205	1,464	5.37%	7.32%	7.32%	9.27%	3.41%	10.40	26.5%	52.0%	3.69	7.00	6.00
Vietnam	21	48	4.76%	4.76%	4.76%	4.76%	0.00%	8.57	25.0%	35.0%		1.00	2.70
Canada	776	3,980	4.12%	7.22%	7.22%	9.28%	4.90%	10.67	31.0%	50.0%	3.77	7.00	8.70
SouthAfrica	256	2,252	3.13%	5.08%	5.47%	7.03%	2.34%	9.43	28.0%	40.0%	2.40	7.00	4.90
Turkey	69	373	1.45%	1.45%	1.45%	2.90%	1.45%	9.85	20.0%	35.0%	2.07	3.00	4.60
China	1,100	6,106	1.18%	12.00%	12.00%	12.09%	0.27%	9.38	25.0%	45.0%			
Poland	380	1,839	0.53%	0.79%	0.79%	1.84%	0.79%	10.06	19.0%	32.0%	2.19	7.00	4.60
Argentina	23	105	0.00%	0.00%	0.00%	0.00%	0.00%	10.02	35.0%	35.0%	2.41	6.00	2.90
CzechRep.	14	63	0.00%	0.00%	0.00%	0.00%	0.00%	10.22	19.0%	15.0%	2.54	7.00	5.20
Greece	99	1,004	0.00%	16.16%	16.16%	19.19%	5.05%	10.13	33.0%	42.0%	2.36	7.00	4.70
Hungary	15	215	0.00%	6.67%	6.67%	6.67%	0.00%	10.05	19.0%	16.0%	1.97	7.00	5.10
Kazakhstan	1	2	0.00%	0.00%	0.00%	0.00%	0.00%	10.04	17.5%	10.0%		2.00	2.20
Nigeria	10	15	0.00%	0.00%	0.00%	0.00%	0.00%	8.66	30.0%	24.0%		1.00	2.70
Peru	1	3	0.00%	0.00%	0.00%	0.00%	0.00%	9.36	30.0%	30.0%	2.66	3.00	3.60
Russia	103	900	0.00%	1.94%	1.94%	1.94%	0.00%	10.10	20.0%	13.0%	1.43	5.00	2.10
Ukraine	32	101	0.00%	0.00%	0.00%	0.00%	0.00%	9.07	25.0%	15.0%		2.00	2.50
Sum / *Country Mean*	17,331	231,850	*11.14%*	*16.25%*	*16.42%*	*20.26%*	*7.20%*	*10.04*	*26.55%*	*36.01%*	*3.12*	*5.43*	*5.47*

Table 3: Firm-level summary statistics

This table presents firm-level summary statistics and characteristics of firms with tax haven subsidiaries in 2013. Panels A and B report the number of sample firms, the mean, the mean if such firm has at least one tax haven subsidiary or no tax haven subsidiary (using the OECD Grey List to identify tax havens; see Table 1), and the difference in means with significance at 1%, 5%, and 10% levels, denoted by ***, **, and *, respectively. Panel A considers all firms, while Panel B focuses on firms with at least one foreign subsidiary. *TH Subsidiary (Dummy)* is a dummy variable equal to one if a firm has a tax haven subsidiary in 2013. *TH Subsidiary w/Acc Info* is constructed the same way but restricted to firms with non-missing total assets and non-missing data required to construct Tobin's Q. All other accounting measures are restricted to firms for whom *Tobin's Q* is available. Means of accounting variables are constructed from one observation per firm; firm-level observations are means over up to the last 10 years (2004–2013). *Tobin's Q* is obtained from Osiris as (Total Equity+Total Liabilities)/(Total Shareholder Equity (Book Value) + Total Liabilities). *Sales Growth* is the average year-by-year growth in sales. *ROA(%)* is Profit & Loss before Tax / Total Assets in %. *Cash Flows over Sales* is Operating Cash Flow over Total Sales in %. *Profit Margin* and *Gross Margin* are Profit&Loss before Tax and Gross Profit over Operating Revenue, respectively. *Effective Tax Rate* is Income Taxes / Earnings before Interest, Tax, Depreciation, and Amortization in %. *Leverage* is Total Liabilities and Debt / Total Assets. *Dividend Payer Dummy* is a dummy equal to 1 if a firm pays a non-zero dividend. *Dividend Payout* is the fraction of income paid out in dividends, assuming that firms with missing dividend information do not pay a dividend. *Intangible Assets* and *R&D* are intangible assets and R&D as a fraction of total assets. *# Trademarks* and *# Patents* denote the number of registered trademarks and patents in 2013. *ID Trademark* and *ID Patent* are dummy variables equal to one if a firm has a trademark and patent, respectively. l*n(Assets)* is the natural logarithm of total assets; *Age* is time between foundation and 2013. *Mean Foreign Tax* is the average maximum corporate tax rate faced by foreign subsidiaries weighing each subsidiary equally. *Dif(Foreign-Home Tax)* is the *Mean Foreign Tax* less the maximum tax rate at home. Accounting data and trademarks & patent data are obtained from Osiris and Orbis. Tax data is obtained from various sources including government agencies and KPMG Audit. Panels C and D show the results of firm-level probit regressions on the subset of firms headquartered in countries that accommodate at least one firm with tax haven subsidiary and one firm without tax haven subsidiary. The dependent variable *TH Sub* is an indicator variable equal to one if a firm has at least one subsidiary headquartered in a tax haven where tax havens are countries or non-sovereign nations on the OECD Grey List. Panels C and D include industry fixed effects and country fixed effects. All accounting measures are winsorized at 1% and 99% levels. T-statistics for tests of significance based on robust standard errors are reported below coefficients. ***, **, and * indicate significance at the 1%, 5%, and 10% levels.

	Panel A: All sample firms						**Panel B: Firms with ≥1 foreign subsidiary**					
			Does firm have TH Sub?						**Does firm have TH Sub?**			
Variable	**#Firms**	**Mean**	**yes**	**no**	**Difference**		**#Firms**	**Mean**	**Yes**	**No**	**Difference**	
TH Subsidiary (Dummy)	17,331	13.25%					7,578	40.25%				
TH Subsidiary w/Acc Info	10,513	17.23%					5,272	31.85%				
Tobin's Q	10,513	1.64	1.48	1.67	(0.18)	***	5,272	1.63	1.49	1.70	(0.21)	***
Sales Growth	9,722	11.9%	8.7%	12.6%	-3.9%	***	5,010	11.0%	8.8%	12.1%	-3.3%	***
ROA(%)	9,221	4.3%	5.3%	4.1%	1.2%	***	4,793	4.8%	5.4%	4.5%	0.9%	***
Cash Flows over Sales	9,450	8.8%	10.7%	8.4%	2.4%	***	4,924	8.4%	10.8%	7.2%	3.6%	***
Profit Margin	9,964	4.6%	6.6%	4.2%	2.4%	***	5,121	4.7%	6.6%	3.7%	2.9%	***
Gross Margin	9,861	42.2%	41.8%	42.3%	-0.6%		5,081	42.5%	41.9%	42.8%	-0.9%	
Effective Tax Rate	8,051	21.4%	23.1%	21.0%	2.0%	***	4,045	23.3%	23.7%	23.1%	0.6%	
Leverage	9,940	47.3%	49.2%	46.9%	2.3%	***	5,079	48.5%	49.6%	48.0%	1.5%	**
Cash over Total Assets	10,308	17.3%	15.7%	17.7%	-1.9%	***	5,190	16.8%	15.3%	17.5%	-2.2%	***
Dividend Payer Dummy	10,513	49.8%	65.2%	46.6%	18.6%	***	5,272	55.5%	66.1%	50.5%	15.5%	***
Dividend Payout	10,513	12.7%	15.0%	12.2%	2.9%	***	5,272	12.6%	14.4%	11.7%	2.7%	***
Intangible Assets	9,889	10.9%	13.0%	10.5%	2.5%	***	5,038	13.8%	13.8%	13.8%	0.0%	
R&D	10,513	1.5%	1.7%	1.5%	0.3%	**	5,272	2.1%	1.9%	2.2%	-0.4%	**
#Trademarks	10,513	7.0	14.2	5.5	8.7	***	5,272	11.6	15.3	9.9	5.4	***
ID Trademark	10,513	39.9%	52.2%	37.3%	14.9%	***	5,272	56.4%	56.0%	56.6%	-0.6%	
#Patents	10,513	64.7	170.4	42.7	127.7	***	5,272	115.7	183.7	83.8	99.9	***
ID Patent	10,513	41.0%	49.9%	39.1%	10.8%	***	5,272	53.9%	53.5%	54.1%	-0.6%	
ln(Assets)	10,513	11.9	13.1	11.7	1.4	***	5,272	38.5	43.5	36.2	7.2	***
Age	10,513	33.6	41.6	32.0	9.7	***	5,272	12.6	13.3	12.2	1.0	***
Mean Foreign Tax							5,206	26.5%	24.3%	27.5%	-3.3%	***
Dif (Foreign-Home Tax)							5,205	-4.8%	-6.4%	-4.1%	-2.4%	***

Panel C: All firms

	(1) TH Sub (Dummy)	(2) TH Sub (Dummy)	(3) TH Sub (Dummy)	(4) TH Sub (Dummy)	(5) TH Sub (Dummy)	(6) TH Sub (Dummy)	(7) TH Sub (Dummy)	(8) TH Sub (Dummy)	(9) TH Sub (Dummy)
Log (Assets)	0.269***						0.269***		0.234***
	(20.40)						(16.37)		(12.43)
Return on Assets		1.103***					0.129		-0.147
		(6.41)					(0.48)		(-0.44)
Effective tax rate			0.712***				0.148		0.159
			(5.18)				(0.85)		(0.76)
Leverage				0.417***			0.314***		0.206
				(6.10)			(2.72)		(1.43)
Cash / Total Assets					-0.979***		0.426**		0.237
					(-7.36)		(2.26)		(0.97)
Dividend Payer (Dummy)						0.768***	0.255***		0.325***
						(16.00)	(3.99)		(4.10)
Foreign – Home Tax								-7.354***	-8.984***
								(-17.19)	(-14.25)
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	10005	8765	7670	9468	9802	10005	7004	4946	3581
Pseudo R2	0.203	0.098	0.108	0.099	0.104	0.131	0.217	0.145	0.234

Panel D: All firms - Transferable assets

	(1) TH Sub (Dummy)	(2) TH Sub (Dummy)	(3) TH Sub (Dummy)	(4) TH Sub (Dummy)	(5) TH Sub (Dummy)	(6) TH Sub (Dummy)	(7) TH Sub (Dummy)	(8) TH Sub (Dummy)
Intangible Assets	0.691***							
	(4.66)							
R&D/Assets		2.427***						
		(3.96)						
Trademark (Dummy)			0.366***				0.294***	
			(7.48)				(5.78)	
Ln(#Trademarks)				0.133***				0.107***
				(8.00)				(6.13)
Patent (Dummy)					0.361***		0.272***	
					(6.91)		(4.99)	
Ln(#Patents)						0.083***		0.061***
						(6.97)		(4.88)
Log (Assets)	0.262***	0.266***	0.250***	0.250***	0.251***	0.254***	0.241***	0.242***
	(15.80)	(16.15)	(15.10)	(15.03)	(15.12)	(15.25)	(14.40)	(14.53)
Return on Assets	0.108	0.218	0.120	0.117	0.166	0.146	0.150	0.133
	(0.40)	(0.79)	(0.45)	(0.44)	(0.61)	(0.54)	(0.55)	(0.49)
Effective tax rate	0.168	0.179	0.178	0.162	0.140	0.183	0.166	0.184
	(0.96)	(1.03)	(1.02)	(0.93)	(0.80)	(1.05)	(0.95)	(1.05)
Leverage	0.319***	0.331***	0.368***	0.381***	0.336***	0.345***	0.373***	0.390***
	(2.73)	(2.86)	(3.15)	(3.27)	(2.90)	(2.97)	(3.20)	(3.34)
Cash / Total Assets	0.516***	0.226	0.353*	0.323*	0.356*	0.312	0.314	0.258
	(2.69)	(1.13)	(1.85)	(1.69)	(1.86)	(1.62)	(1.63)	(1.33)
Dividend Payer (Dummy)	0.263***	0.275***	0.246***	0.261***	0.252***	0.238***	0.246***	0.247***
	(4.08)	(4.27)	(3.83)	(4.02)	(3.95)	(3.72)	(3.83)	(3.82)
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	6871	7004	7004	7004	7004	7004	7004	7004
Pseudo R2	0.219	0.219	0.226	0.227	0.224	0.225	0.230	0.231

Table 4: Corporate tax rates and firm value

This table investigates the effect of changes in the corporate tax rate on firm value in a panel of publicly listed firms from 2008 to 2013. The left-hand side is *Tobin's Q*, obtained from Osiris as (Total Equity+Total Liabilities)/(Total Shareholder Equity (Book Value) + Total Liabilities). The key control variable is *Change in Tax Rate*, the percentage change in corporate tax rates over the previous year obtained from KPMG's *Corporate and Indirect Tax Rate Survey 2014*. Tax Haven Subsidiary is an indicator variable equal to one if a firm has at least one subsidiary in a tax haven (as defined by the OECD Grey List) using Dun & Bradstreet's *Who Owns Whom 2008/2009*. Columns (1) and (2) use the full sample while Columns (3) and (4) use a sample of firms with tax haven subsidiary and control firms matched by industry, headquarter country, the natural logarithm of assets, and the natural logarithm of firms' ages (measured by years since founding). All regressions control for the natural logarithm of assets, the natural logarithm of assets squared, firm fixed effects, and time fixed effects. All continuous variables are winsorized at 1% and 99% levels. T-statistics for tests of significance of coefficients based on robust standard errors clustered at the country and year level (2-way clustering) are reported below coefficients. ***, **, and * indicate significance at the 1%, 5%, and 10% levels.

	(1)	(2)	(3)	(4)
DV:	**Tobin's Q**	**Tobin's Q**	**Tobin's Q**	**Tobin's Q**
Sample:	**All**	**All**	**Matched**	**Matched**
Change in Tax Rate	-0.858	-0.872	-0.871**	-1.217***
	(-1.52)	(-1.55)	(-2.31)	(-3.14)
Change in Tax Rate		0.696*		1.027**
*** Tax Haven Subsidiary**		(1.79)		(2.68)
Ln(Assets)	0.071**	0.071**	0.211***	0.211***
	(2.15)	(2.15)	(8.74)	(8.68)
Ln(Assets) sqr	-0.004***	-0.004***	-0.009***	-0.009***
	(-3.11)	(-3.12)	(-5.23)	(-5.22)
Firm FE	Y	Y	Y	Y
Time FE	Y	Y	Y	Y
Observations	37414	37414	5587	5587
Adj. R2	0.813	0.813	0.851	0.851

Table 5: Tax Information Exchange Agreements and firm value

This table studies the effect of Tax Information Exchange Agreements (TIEAs) on firm value using OLS regressions. Panel A uses annual data from 1996-2013 and measures firm value by Tobin's Q. Panel B uses daily data from 2003 to 2013 and measures firm value by stock returns. Subsidiary data is obtained from Dun & Bradstreet's *Who Owns Whom 2008/2009* and *1998/1999.* In Panel A, the left-hand side variable is the natural logarithm of Tobin's Q, calculated as before. The key control *Treated after* is an indicator variable equal to one in the years after a firm has been directly affected by a TIEA for the first time. A firm is directly affected (*treated*) if it is headquartered in a country that signs a TIEA and has a subsidiary in the other signatory country or non-sovereign nation (a tax haven). Column (1) uses the full sample of firms. In columns (2) and (3), one non-treated (control) firm is matched to each treated firm five years prior to the year a TIEA is signed. In columns (4) and (5), up to 10 firms are matched to treated firms with replacement. *Control after* is an indicator variable equal to one in the years after a firm is control firm to a firm affected by a TIEA for the first time. Firms are matched with replacement by country and industry and then additionally by the natural logarithm of assets and the natural logarithm of their age, measured as the number of years since the founding year. All regressions control for the natural logarithm of assets, the natural logarithm of assets squared, firm fixed effects, and time fixed effects. *Treated=Control* provides the p-value from testing that the coefficient on *Treated after* equals that on *Control after*. T-statistics for tests of significance of coefficients based on robust standard errors clustered at the country and year level (2-way clustering) are reported below coefficients. In Panel B, the dependent variable is firms' raw return (Columns (1)–(4)), and alpha calculated using a 1-factor CAPM estimated for a rolling estimation period starting 292 days before the respective day and ending 40 days before the respective day using the local market index as benchmark (Columns (5)–(8)). *Treated* is a dummy equal to one if a firm is directly affected by a TIEA for the first time (through being headquartered in one signatory country and having at least one subsidiary in the other signatory country) during respective *treatment periods*. A *treatment period* of [-*t*,*t*] denotes that a firm is treated within the next or has been treated within the previous *t* days because its headquarter country signs a TIEA with a relevant tax haven. All regressions include firm, year, and month fixed effects. Firm fixed effects are accounted for by demeaning the dependent variable. Dependent variables are multiplied by 100. *Treated* measures the average daily effect during the treatment period; *Economic Effect* documents the overall economic effect during the treatment period (=*Treated* coefficient * number of days in the *treatment period*). All continuous variables are winsorized at 1% and 99% levels. T-statistics for tests of significance of coefficients based on robust standard errors clustered at the firm and day level (2-way clustering) are reported below coefficients. ***, **, and * indicate significance at the 1%, 5%, and 10% levels.

Panel A: Tobin's Q

	(1) ALL Ln(Tobin's Q)	(2) 1 Match Ln(Tobin's Q)	(3) 1 Match Ln(Tobin's Q)	(4) 10 Match Ln(Tobin's Q)	(5) 10 Matches Ln(Tobin's Q)
Treated after	0.025***	0.020**	0.026**	0.021**	0.023***
	(3.22)	(2.78)	(2.68)	(2.32)	(2.87)
Control after			-0.009		-0.005
			(-0.77)		(-0.42)
Ln(Assets)	0.098***	0.045	0.047	0.127***	0.128***
	(3.82)	(1.30)	(1.33)	(10.57)	(10.53)
Ln(Assets) Sqr	-0.003***	-0.002*	-0.002*	-0.006***	-0.006***
	(-4.12)	(-1.93)	(-1.95)	(-9.81)	(-9.89)
Ln(Age)	-0.103	0.020	0.019	-0.006	-0.007
	(-1.32)	(0.31)	(0.30)	(-0.10)	(-0.11)
Firm FE	Y	Y	Y	Y	Y
Time FE	Y	Y	Y	Y	Y
Observations	85141	4899	4899	14613	14613
Adj. R2	0.712	0.769	0.769	0.745	0.745
Treated=Control			0.091		0.071

Panel B: Daily stock returns

	(1) Raw Return	(2) Raw Return	(3) Raw Return	(4) Raw Return	(5) Alpha	(6) Alpha	(7) Alpha	(8) Alpha
Treatment period	[-15;15]	[-10;10]	[-5;5]	[-1;3]	[-15;15]	[-10;10]	[-5;5]	[-1;3]
Treated	0.141**	0.203**	0.221*	0.436**	0.133**	0.217***	0.247**	0.258*
	(2.43)	(2.56)	(1.91)	(2.42)	(2.43)	(3.02)	(2.02)	(1.73)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Month FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	20522997	20522997	20522997	20522997	20106275	20106275	20106275	20106275
Adj. R2	0.001	0.001	0.001	0.001	0.000	0.000	0.000	0.000
Economic Effect	4.37%	4.26%	2.43%	2.18%	4.12%	4.56%	2.71%	1.29%

Table 6: Tax Information Exchange Agreements and firm complexity

This table investigates differences in firm structure between firms with and without tax haven subsidiary (Panels A and B) and tests whether firms with more complex haven operations are differentially affected by Tax Information Exchange Agreements (TIEAs). Subsidiary data is obtained from Dun & Bradstreet's *Who Owns Whom 2013/2014* (Panels A–C) and supplemented by *Who Owns Whom 2008/2009* and 1998/1999 (Panel C). In Panel A, the first measure of complexity is *Number of Subsidiaries*, the number of subsidiaries and subsidiaries of subsidiaries owned to 50% or more. *>x Subsidiaries* is a dummy equal to one if a firm has strictly more than *x* subsidiaries. Mean and Median depth indicate the mean and median hierarchical level at which to find a firm's subsidiaries, respectively. *≥y Layers* is a dummy variable equal to one if a firm has at least *y* hierarchical layers. By that definition, a firm with at least one subsidiary that owns a subsidiary in turn is a firm with at least 2 layers, i.e., *≥2 Layers=1*. Panel A follows Table 3 (Panels A and B) in splitting the sample into firms with and firms without tax haven subsidiary. Panel B provides results of OLS and probit regressions where the dependent variable is one of the complexity measure and the key control is a dummy equal to one if a firm has a tax haven subsidiary and zero otherwise. Besides including industry and country fixed effects, firm-level controls outlined in Table 3 are included. Panel C repeats the main analysis (Table 5) but treatment is additionally interacted with the complexity of firms' tax haven operations. Complexity of tax haven operations is measured by the natural logarithm of the number of tax haven subsidiaries (Columns 1–5) and the percentage of a firm's subsidiaries that are headquartered in tax havens (Columns 6–10). For matched subsamples, firms are matched with replacement by country and industry and additionally by the natural logarithm of assets and the natural logarithm of age, measured as the number of years since the founding year. Controls include changes in firm size, changes in firm size squared, and country fixed effects. All continuous variables are winsorized at 1% and 99% level. T-statistics for tests of significance of coefficients based on robust standard errors clustered at the country and year level (2-way clustering) are reported below coefficients. ***, **, and * indicate significance at the 1%, 5%, and 10% levels.

Panel A: Firm-level summary statistics for complexity measures

	All Sample Firms						Firms with ≥1 Foreign Subsidiary					
			Does firm have TH Sub?						Does firm have TH Sub?			
Variable	**#Firms**	**Mean**	**yes**	**no**	**Difference**		**#Firms**	**Mean**	**Yes**	**No**	**Difference**	
Number Subsidiaries	10,513	16.44	47.91	9.89	38.02	***	5,272	27.3	51.2	16.2	35.0	***
>1 Subsidiary	10,513	78.4%	95.8%	74.8%	21.0%	***	5,272	90.9%	96.6%	88.2%	8.4%	***
>3 Subsidiaries	10,513	56.5%	86.8%	50.2%	36.6%	***	5,272	75.9%	89.1%	69.7%	19.3%	***
>5 Subsidiaries	10,513	44.0%	78.9%	36.8%	42.1%	***	5,272	64.6%	81.7%	56.5%	25.2%	***
>10 Subsidiaries	10,513	28.9%	63.6%	21.7%	41.9%	***	5,272	46.7%	67.2%	37.1%	30.1%	***
>20 Subsidiaries	10,513	17.0%	47.2%	10.7%	36.5%	***	5,272	29.8%	50.5%	20.1%	30.4%	***
Mean Depth	10,513	1.31	1.72	1.23	0.49	***	5,272	1.51	1.76	1.39	0.37	***
Median Depth	10,513	1.25	1.58	1.18	0.40	***	5,272	1.41	1.62	1.31	0.30	***
≥2 Layers	10,513	44.3%	78.4%	37.2%	41.2%	***	5,272	65.2%	81.5%	57.6%	23.8%	***
≥3 Layers	10,513	20.8%	49.2%	14.9%	34.3%	***	5,272	35.7%	52.4%	27.9%	24.6%	***
≥4 Layers	10,513	10.9%	31.6%	6.6%	25.0%	***	5,272	19.9%	34.1%	13.3%	20.7%	***

Panel B: Complexity and the use of tax haven subsidiaries

	(1) Ln(#Subs) OLS	(2) >1 Sub (Dummy) Probit	(3) >3 Subs (Dummy) Probit	(4) >5Subs (Dummy) Probit	(5) >10Subs (Dummy) Probit	(6) >20Subs (Dummy) Probit	(7) Ln(Mean Depth) OLS	(8) Ln(Median Depth) OLS	(9) ≥2Layers (Dummy) Probit	(10) ≥3Layers (Dummy) Probit	(11) ≥4Layers (Dummy) Probit
Tax Haven Firm (Dummy)	0.913*** (24.42)	0.951*** (10.01)	1.023*** (14.26)	1.066*** (15.91)	1.055*** (16.69)	1.138*** (16.39)	0.129*** (14.72)	0.104*** (10.57)	1.020*** (15.28)	0.938*** (13.91)	1.027*** (13.37)
Log (Assets)	0.240*** (24.64)	0.173*** (11.66)	0.271*** (16.57)	0.315*** (16.64)	0.351*** (15.60)	0.412*** (16.28)	0.033*** (17.67)	0.029*** (14.48)	0.276*** (15.72)	0.329*** (16.24)	0.336*** (13.77)
Return on Assets	0.219* (1.94)	0.419* (1.75)	0.596*** (2.66)	0.813*** (3.37)	0.311 (1.14)	0.271 (0.76)	0.058*** (2.58)	0.062** (2.49)	0.483** (2.10)	0.240 (0.85)	0.221 (0.63)
Eff. Tax Rate	0.189** (2.13)	0.235 (1.30)	0.447*** (2.73)	0.619*** (3.72)	0.684*** (3.82)	0.705*** (3.28)	0.030* (1.69)	0.023 (1.17)	0.561*** (3.42)	0.743*** (3.81)	0.711*** (2.84)
Leverage	0.320*** (5.99)	0.266** (2.54)	0.352*** (3.56)	0.491*** (4.70)	0.653*** (5.52)	0.784*** (5.44)	0.073*** (6.77)	0.070*** (5.81)	0.495*** (4.76)	0.566*** (4.61)	0.550*** (3.54)
Cash / Total Assets	-0.459*** (-5.03)	-0.345* (-1.89)	-0.549*** (-3.22)	-0.682*** (-3.75)	-0.981*** (-4.56)	-0.870*** (-3.13)	-0.040** (-2.21)	-0.045** (-2.23)	-0.252 (-1.37)	-0.736*** (-3.11)	-0.466 (-1.51)
Div Payer (Dummy)	0.203*** (5.72)	0.242*** (3.64)	0.265*** (4.34)	0.278*** (4.48)	0.355*** (5.28)	0.333*** (4.00)	0.003 (0.50)	-0.006 (-0.80)	0.170*** (2.77)	0.159** (2.16)	0.178* (1.95)
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	5628	5534	5613	5613	5595	5571	5627	5627	5605	5598	5494
Adj./Pseudo R2	0.544	0.189	0.266	0.325	0.380	0.457	0.401	0.288	0.300	0.392	0.433

Panel C: Tax Information Exchange Agreements and complexity of tax haven structure

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Complexity Measure: Log(Number Tax Haven Subsidiaries)					Complexity Measure: %Tax Haven Subsidiaries				
Sample	**ALL**	**1 Match**	**1 Match**	**10 Match**	**10 Matches**	**ALL**	**1 Match**	**1 Match**	**10 Match**	**10 Matches**
Dependent Var	**Ln Tobin's Q**	**Ln Tobin's Q**	**Ln Tobin's Q**	**Ln Tobin's Q**	**Ln Tobin's Q**	**Ln Tobin's Q**	**Ln Tobin's Q**	**Ln Tobin's Q**	**Ln Tobin's Q**	**Ln Tobin's Q**
Treated after	-0.009	-0.011	-0.017	-0.017	-0.011	-0.013	-0.017	-0.011	-0.013	-0.012
	(-0.43)	(-0.57)	(-0.80)	(-0.86)	(-0.59)	(-0.88)	(-1.22)	(-0.82)	(-0.97)	(-0.97)
Treated after * Complexity	0.024**	0.024***	0.028***	0.027***	0.029***	0.690***	0.784***	0.860***	0.713***	0.908***
	(2.78)	(3.11)	(3.35)	(3.32)	(4.77)	(3.77)	(4.43)	(4.32)	(3.95)	(5.07)
Control after			0.009		-0.007			-0.009		-0.006
			(0.51)		(-1.10)			(-0.73)		(-0.99)
Control after * Complexity			-0.007		-0.004			-0.074		-0.204*
			(-0.82)		(-0.52)			(-1.05)		(-2.09)
Controls	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Time FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
N	65983	3578	3578	9790	9790	65971	3566	0.772	9778	0.747
Adjusted R2	0.713	0.770	0.770	0.746	0.746	0.713	0.772	0.937	0.747	0.601
Treated=Control			0.025		0.002			0.002		0.000

Table 7: Tax Information Exchange Agreements and haven hopping

This table investigates whether firms moved their subsidiaries out of tax havens subsequent to tax havens entering Tax Information Exchange Agreements (TIEAs; Panel A) and whether doing so mitigates the effect of TIEAs on firm value (Panel B). Panel A is a conversion matrix tracking firms between (i) 1998 and 2008 and (ii) 2008 and 2013, respectively. Subsidiary data is obtained from Dun & Bradstreet's *Who Owns Whom 2013/2014*, *2008/2009*, and *1998/1999*. The sample is a balanced panel of firms with subsidiary data for 1998 and 2008, as well as 2008 and 2013, respectively. In part (i) of Panel A, each row gives the number of firms in 1998 and each column gives the number of firms in 2008. Shown are the number of firms without tax haven subsidiary, with tax haven subsidiaries in a tax haven that signed a TIEA between 1998 and 2008, with only tax haven subsidiary in tax havens that did not sign a TIEA between 1998 and 2008, and the number of sample firms. Numbers and percentages denote the number of firms and the percentage of the group moving from a category in 1998 to a category in 2008. For instance, out of 2,350 sample firms, 2,274 firms (97%) did not have a tax haven subsidiary in 1998, and 2,091 of these 2,274 firms (92%) did not have a tax haven subsidiary in 2008 either. Part (ii) of Panel A reports the same for firms in 2008 and 2013. Part (i) ignores firms affected by TIEAs after 2008; Part (ii) ignores firms affected by TIEAs prior to 2008. Panel B repeats our main analysis (Table 5), but treatment is additionally interacted with being a *haven hopper*. The left-hand-side variable is Tobin's Q. The left-hand-side variable is the natural logarithm of Tobin's Q, calculated as (Total Equity+Total Liabilities)/(Total Shareholder Equity (Book Value) + Total Liabilities). *Treated after* is an indicator variable equal to one in the years after a firm has been directly affected by a TIEA. A firm is directly affected (*treated*) if it is headquartered in a country that signs a TIEA and has a subsidiary in the other signatory country or non-sovereign nation (a tax haven). *Haven Hopper* is a dummy variable equal to one if a firm is treated by a TIEA and subsequently moves out of tax havens that entered TIEAs and into tax havens that did not enter TIEAs. All continuous variables are winsorized at 1% and 99% levels. T-statistics for tests of significance of coefficients based on robust standard errors clustered at the country and year level (2-way clustering) are reported below coefficients.

Panel A: Haven hopping

(i) Haven hopping between 1998 and 2008

1998 \ 2008	None	Affected TH Sub	Only Other TH Sub	Sum 1998	
None	2091 [92%]	4 [0%]	179 [8%]	**2274**	**[97%]**
Affected TH Sub	0 [0%]	10 [67%]	5 [33%]	**15**	**[1%]**
Only Other TH Sub	0 [0%]	6 [10%]	55 [90%]	**61**	**[3%]**
Sum 2008	**2091** **[89%]**	**20** **[1%]**	**239** **[10%]**	**2350** **[100%]**	

(ii) Haven hopping between 2008 and 2013

2008 \ 2013	None	Affected TH Sub	Only Other TH Sub	Sum 2008	
None	3360 [95%]	23 [1%]	139 [4%]	**3522**	**[90%]**
Affected TH Sub	0 [0%]	83 [69%]	37 [31%]	**120**	**[3%]**
Only Other TH Sub	0 [0%]	18 [7%]	251 [93%]	**269**	**[7%]**
Sum 2013	**3360** **[86%]**	**124** **[3%]**	**427** **[11%]**	**3911** **[100%]**	**[100%]**

Panel B: Haven hopping and firm value

	(1) ALL Ln(Tobin's Q)	(2) 1 Match Ln(Tobin's Q)	(3) 1 Match Ln(Tobin's Q)	(4) 10 Match Ln(Tobin's Q)	(5) 10 Matches Ln(Tobin's Q)
Treated after	0.026***	0.021**	0.027*	0.022**	0.024***
	(3.33)	(2.24)	(1.78)	(2.46)	(3.08)
Treated after * Haven Hopper	-0.015	-0.024*	-0.022*	-0.020*	-0.019
	(-1.63)	(-1.87)	(-1.97)	(-1.84)	(-1.63)
Control after			-0.008		-0.005
			(-0.36)		(-0.41)
Ln(Assets)	0.098***	-0.124	-0.124	0.127***	0.128***
	(3.82)	(-1.22)	(-1.22)	(10.63)	(10.58)
Ln(Assets) Sqr	-0.003***	0.002	0.002	-0.006***	-0.006***
	(-4.12)	(0.77)	(0.77)	(-9.85)	(-9.92)
Ln(Age)	-0.103	0.027	0.026	-0.006	-0.007
	(-1.32)	(0.46)	(0.45)	(-0.09)	(-0.11)
Firm FE	Y	Y	Y	Y	Y
Time FE	Y	Y	Y	Y	Y
N	85141	4899	4899	14613	14613
Adjusted R2	0.712	0.769	0.769	0.745	0.745

Table 8: Tax Information Exchange Agreements and determinants of firm value

This table studies the effect of Tax Information Exchange Agreements (TIEAs) on various contributors to firm value using OLS regressions for a panel of firms from 1995 to 2013. The analysis follows exactly Table 7 but the left-hand side is *Profit Margin* (Profit&Loss before Tax / Operating Revenue in %), *Gross Margin* (Gross Profit / Operating Revenue in %), *Effective Tax Rate* (Income Taxes / Earnings before Interest, Tax, Depreciation and Amortization in %), *Beta* (estimated in a 1-factor model of monthly excess stock returns on the headquarter country's main market index's excess return over 24 months), and *Leverage* (Total Liabilities and Debt / Total Assets). Odd-numbered columns report results for the whole sample; even-numbered columns report results for a sample of treated and control firms. Control firms are matched by country and industry and then additionally by the natural logarithm of assets and the natural logarithm of their age, measured as the number of years since the founding year. All regressions control for the natural logarithm of assets, the natural logarithm of assets squared, firm fixed effects, and time fixed effects. *Treated=Control* provides the p-value from testing that the coefficient on *Treated after* equals that on *Control after*. All continuous variables are winsorized at 1% and 99% levels. T-statistics for tests of significance of coefficients based on robust standard errors clustered at the country and year level (2-way clustering) are reported below coefficients. ***, **, and * indicate significance at the 1%, 5%, and 10% levels.

Dependent Variable	**Profit Margin (%)**		**Gross Margin (%)**		**Effective Tax Rate**		**Beta**		**Leverage**	
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**	**(10)**
	ALL	**Match 1**	**ALL**	**Match 1**	**ALL**	**Match 1**	**ALL**	**Match 1**	**ALL**	**Match 1**
Treated after	-0.827	-0.185	0.672*	0.767	-0.006	-0.001	0.003	-0.042	0.002	-0.001
	(-1.41)	(-0.37)	(1.86)	(0.92)	(-0.41)	(-0.04)	(0.05)	(-1.20)	(0.08)	(-0.18)
Control after		-1.061		-0.346		0.004		0.003		0.005
		(-1.68)		(-0.48)		(0.29)		(0.08)		(0.74)
Controls	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Time FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
N	71810	4664	72119	4649	80226	4732	38940	2193	83512	4884
Adjusted R2	0.484	0.464	0.843	0.883	0.309	0.357	0.339	0.379	0.678	0.788
Treated=Control		0.411		0.474		0.809		0.506		0.615

Table 9: Tax Information Exchange Agreements and cross-sectional results

This table follows Table 5 in studying the effect of Tax Information Exchange Agreements (TIEAs) on firm value using OLS regressions. The left-hand-side variable is the natural logarithm of Tobin's Q. Set-up and controls follow Table 5, but the treatment dummy is additionally interacted with firm characteristics. These interaction terms are generally continuous measures with the exception of patent dummies equal to one if a firm has at least one patent (Panel A Columns (3)–(4)); trademark dummies equal to one if a firm has at least one trademark (Panel A Columns (7)–(8)); and institutional ownership dummies equal to one if a firm has above-median institutional ownership by country and industry. Variable construction follows Table 3.

Panel A: Patents and trademarks

Interaction with…	**Ln(Patents) Continuous**		**Patent Dummy**		**Ln(Trademarks) Continuous**		**Trademark Dummy**	
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**
	ALL	**Match 1**	**ALL**	**Match 1**	**ALL**	**Match 1**	**ALL**	**Match 1**
Treated after	-0.013	-0.017	-0.024	-0.016	0.001	-0.001	-0.017	-0.015
	(-0.54)	(-0.76)	(-1.20)	(-0.79)	(0.03)	(-0.09)	(-1.10)	(-0.84)
Treated after * Interaction	0.011***	0.010***	0.065***	0.050**	0.008**	0.007***	0.045***	0.043**
	(2.85)	(3.48)	(2.90)	(2.43)	(2.29)	(3.01)	(2.87)	(2.11)
Controls	Y	Y	Y	Y	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y	Y	Y	Y	Y
Time FE	Y	Y	Y	Y	Y	Y	Y	Y
N	82349	4786	82349	4786	82349	4786	82349	4786
Adjusted R2	0.715	0.774	0.715	0.773	0.715	0.773	0.715	0.773

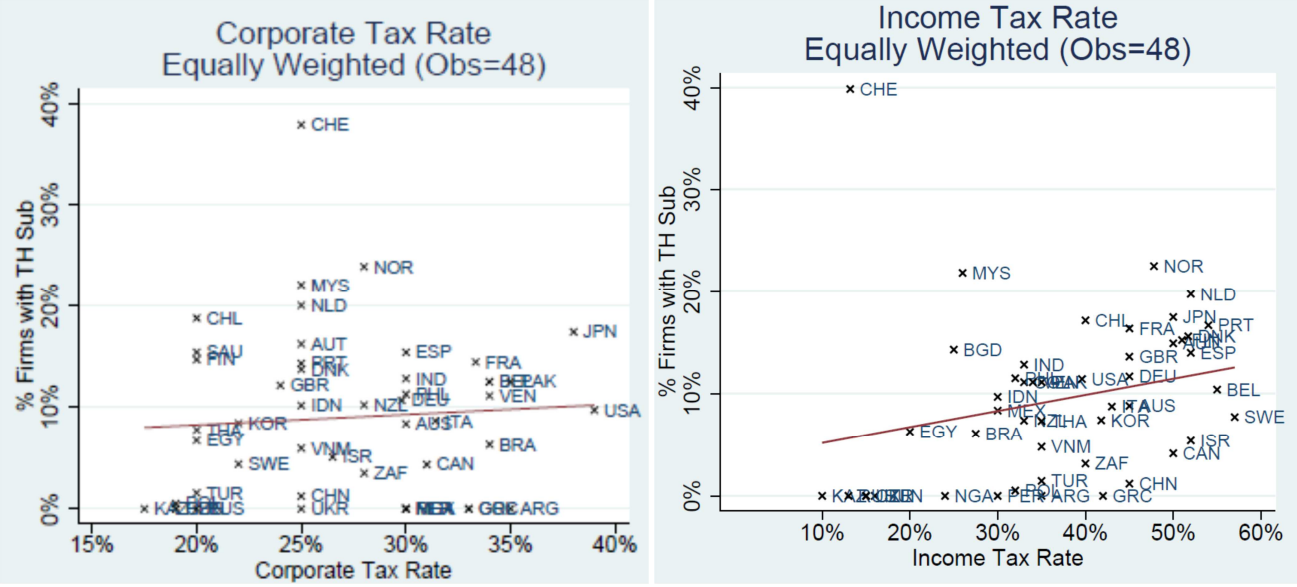
Panel B Ownership, leverage, growth, and Beta

Interaction with…	**Institutional Ownership**		**Leverage Continuous**		**Cash Flow Growth Continuous**		**Beta**	
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**
	ALL	**Match 1**	**ALL**	**Match 1**	**ALL**	**Match 1**	**ALL**	**Match 1**
Treated after	0.069***	0.057**	0.243***	0.241***	0.031***	0.030***	-0.036***	-0.032**
	(3.12)	(2.96)	(2.90)	(3.74)	(3.42)	(3.18)	(-3.23)	(-2.61)
Treated after * Interaction	-0.053**	-0.038*	-0.364**	-0.370***	0.039***	0.046***	0.051***	0.049***
	(-2.42)	(-1.81)	(-2.42)	(-3.35)	(3.98)	(5.55)	(5.50)	(3.55)
Controls	Y	Y	Y	Y	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y	Y	Y	Y	Y
Time FE	Y	Y	Y	Y	Y	Y	Y	Y
N	38802	3574	83512	4884	69156	4316	45029	2502
Adjusted R2	0.711	0.762	0.716	0.777	0.731	0.789	0.740	0.794

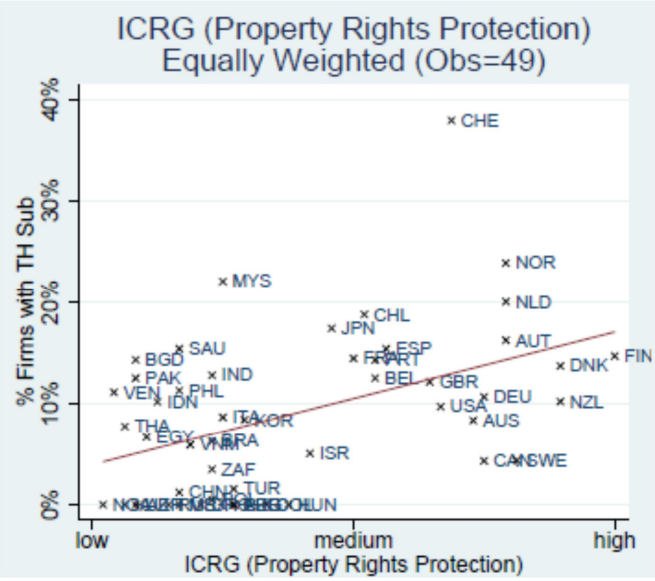
Figure 1: The use of tax haven subsidiaries and country characteristics

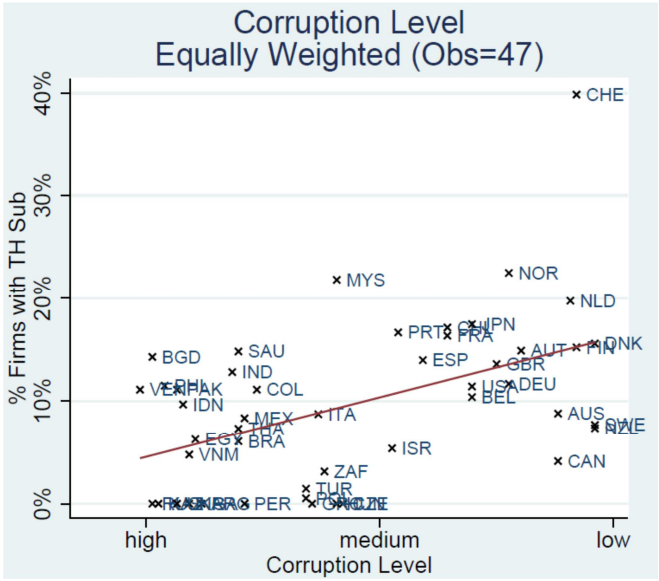
This figure illustrates the use of tax haven subsidiaries at the country level. The *y*-axis denotes the percentage of publicly listed firms that have at least one tax haven subsidiary. Subsidiary data is collected from Dun & Bradstreet's *Who Owns Whom 2013/2014* book series. Tax havens are sovereign countries or non-sovereign nations that appear on the OECD Grey List (as of August 17, 2009); Hong Kong, Singapore and Ireland are omitted because they constitute tax havens by that list or other official tax haven lists. The *x*-axis denotes country-level characteristics. *Corporate Tax Rate* is the maximum corporate tax rate bracket, and *Income Tax Rate* is the maximum income tax bracket in 2013, obtained through various sources (largely government agencies and audit firms). *ICRG (Property Rights Protection)* captures political, economic, and financial risk in 2013 and is obtained from the International Country Risk Guide; the measure ranges from 1 to 6 and increases in protection. *Corruption Level* is based on Transparency International's Corruption Perception Index as of 2013 (Source: Transparency International), an index that measures corruption levels on a scale from 1 (high corruption) to 10 (low corruption). *Tax Evasion* is obtained from the Global Competitiveness Report conducted by the World Economic Forum: countries' tax evasion is rated on a scale from 1 (strongly disagree) to 7 (strongly agree) to the statement "Tax evasion is minimal." *Log (GDP per capita)* is the natural logarithm of GDP per capita in USD in 2013 (Source: World Bank). Each country observation is represented by an "X"; the line of best fit for equally weighted observations is shown.

Panel A: Corporate tax rate and income tax rate

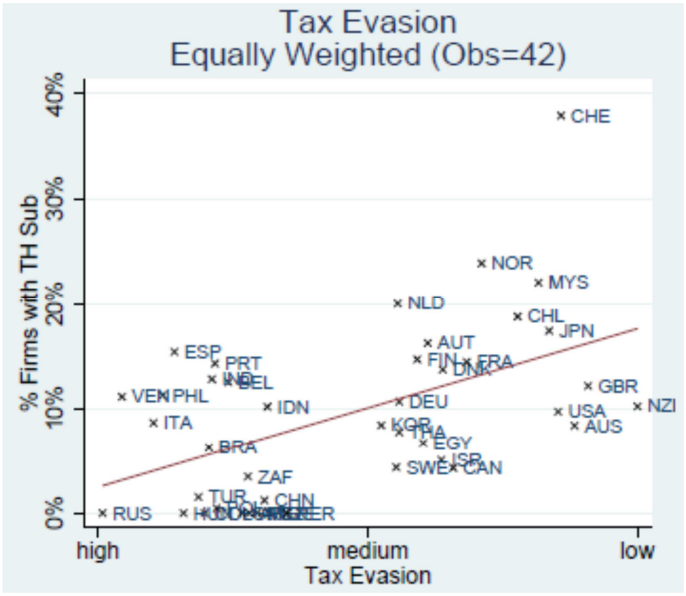


Panel B: Property rights protection and corruption level





Panel C: Tax evasion and log(GDP per capita)



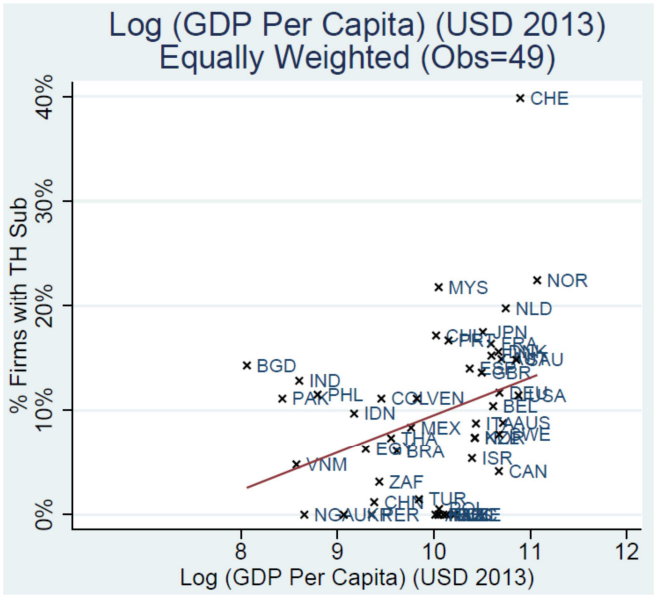


Figure 2: Value and use of tax haven subsidiaries around changes in corporate tax rates

This figure plots changes in the corporate tax rate between 2008 and 2013 against changes in firm value and changes in the use of tax haven subsidiaries, respectively. Changes in the corporate tax rate are obtained from KPMG' *Corporate and indirect Tax Rate Survey 2014*; a negative value denotes a reduction in corporate tax rates over the five-year period. On the left, the *y*-axis denotes changes in the difference in Tobin's Q from 2008 to 2013. Specifically, the difference between Tobin's Q of firms with tax haven subsidiaries in 2008 and firms without tax haven subsidiaries in 2008 is deducted from the respective difference in 2013. A negative value denotes that firms with tax haven subsidiary have become relatively less valuable over the five-year period. Subsidiary data is collected from Dun & Bradstreet's *Who Owns Whom 2013/2014* book series. Tax havens are sovereign countries or non-sovereign nations that appear on the OECD Grey List (as of August 17, 2009). *Tobin's Q* is obtained from Osiris as (Enterprise Value+Total Liabilities)/(Total Shareholder Equity (Book Value) + Total Liabilities). On the right, the y-axis denotes the difference between the percentage of firms with tax haven subsidiaries in 2013 and the percentage of firms with tax haven subsidiaries in 2008. A positive value means that the fraction of firms with tax haven subsidiaries has increased over the five-year period. Each country observation is represented by an "X"; the line of best fit for equally weighted observations is shown.

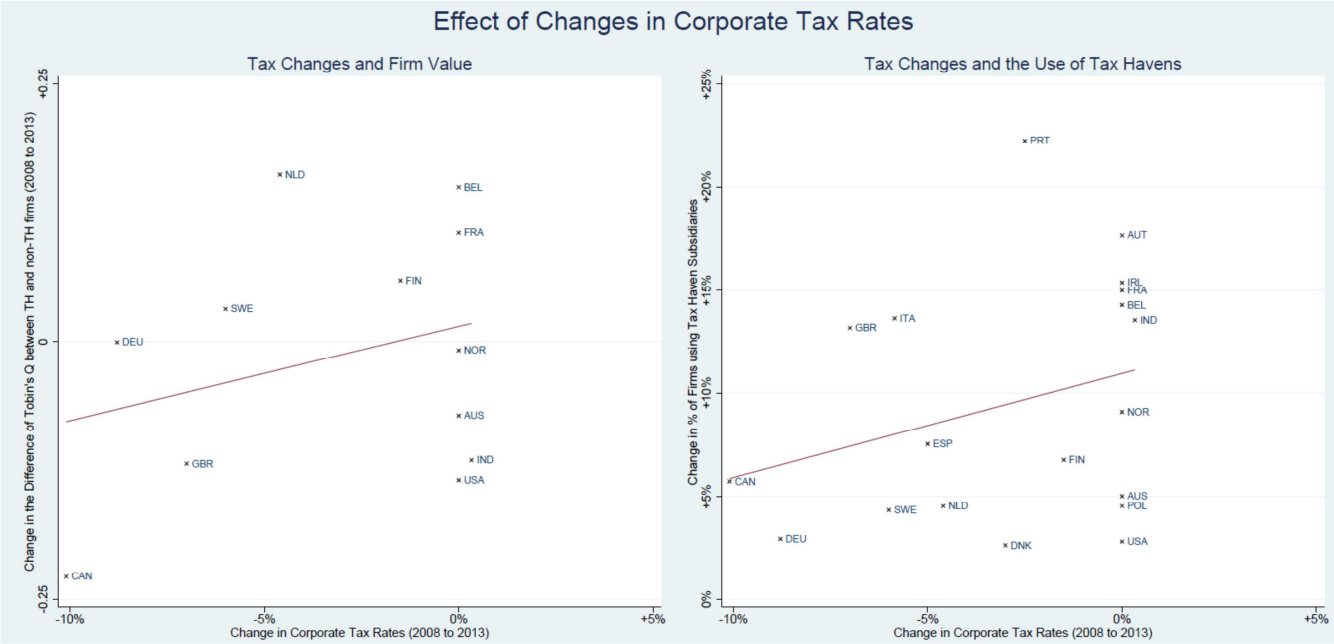
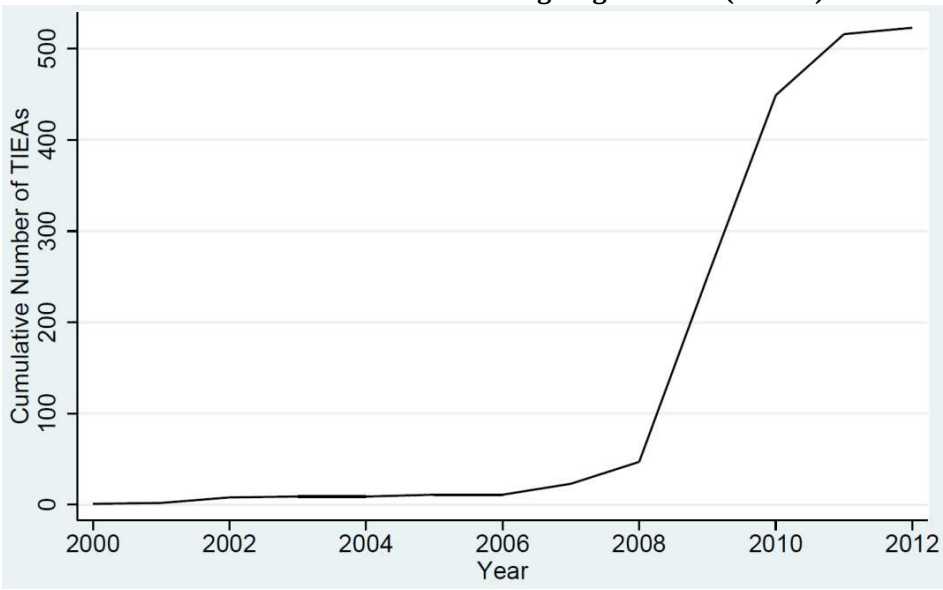


Figure 3: Tax Information Exchange Agreements and treated firms over time
This figure shows the evolution of passed Tax Information Exchange Agreements (TIEAs) and treated firms over time. The graph on the left shows all TIEAs passed between two countries or non-sovereign nations (Source: OECD *Harmful Tax Practices*). The graph on the right shows the number of publicly listed firms directly affected by TIEAs at any point in time. A firm is directly affected (*treated*) if it is headquartered in a country that signs a TIEA and has a subsidiary in the other signatory country (a tax haven). Some firms are affected by more than one TIEA: they are counted as treated the moment they are affected for the first time.

Panel A: Cumulative number of Tax Information Exchange Agreements (TIEAs) over time



Panel B: Cumulative number of treated firms over time

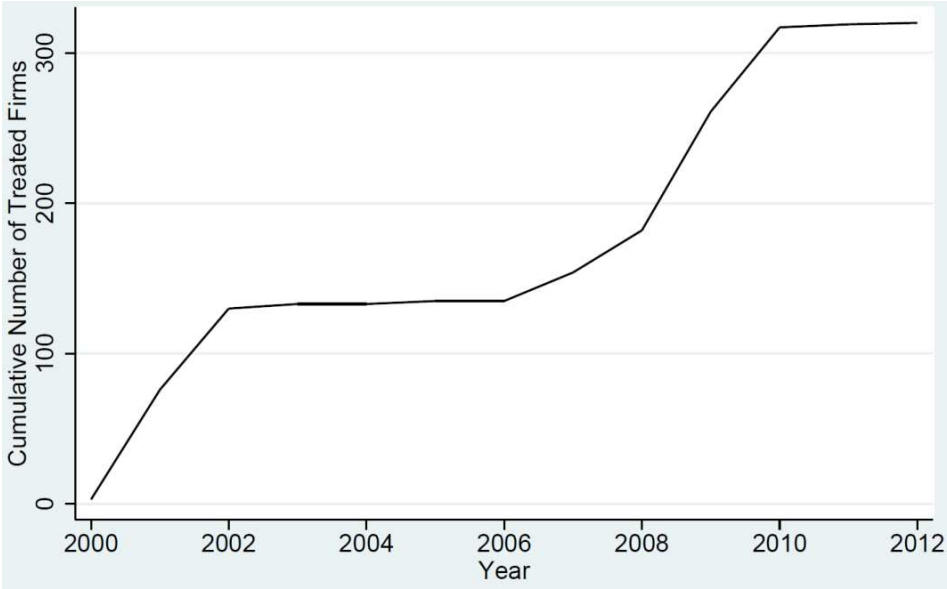
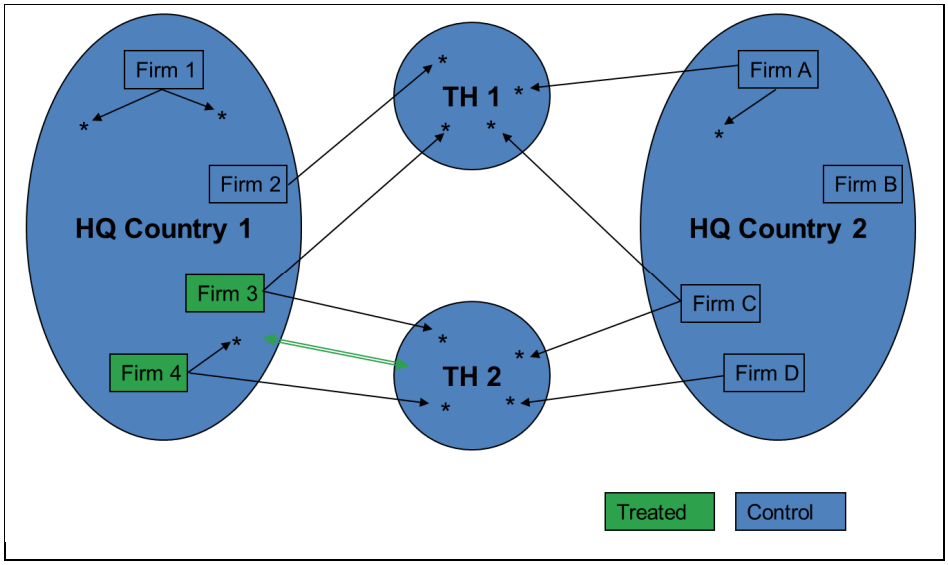


Figure 4: Illustration of the identification strategy

This figure illustrates the identification strategy. Firms 1 through to 4 are headquartered in Headquarter Country 1. Firms A through to D are headquartered in Headquarter Country 2. Asterisks denote subsidiaries, some of which are in tax havens, and arrows denote parent firms of these subsidiaries. In Panel A, at time *t*, HQ Country 1 and Tax Haven 2 enter a Tax Information Exchange Agreement (TIEA) and Firms 3 and 4 become treated while all remaining firms in both countries act as control firms. In Panel B, at some later point in time *t+s*, HQ Country 2 and Tax Haven 1 also enter a TIEA, which means that (besides Firms 3 and 4) Firms A and C become treated while Firms 1, 2, B, and D are control firms. In robustness tests, one treated firm is matched to one control firm that is headquartered in the same country, operates in the same industry, and is similar in age and size.

Panel A: At time *t*, Headquarter Country 1 and Tax Haven 2 enter a TIEA



Panel B: At time *t+s*, Headquarter Country 2 and Tax Haven 1 also enter a TIEA

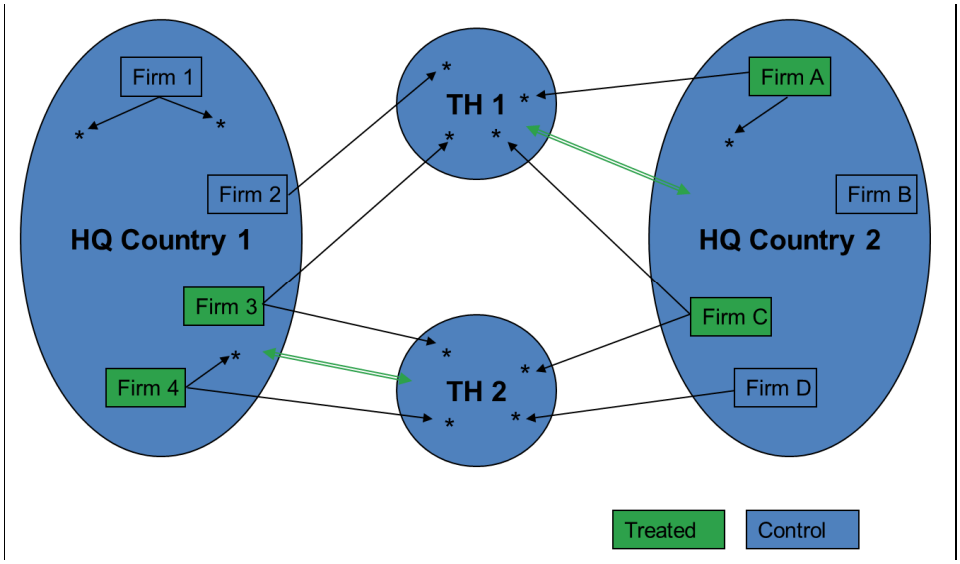


Figure 5: Firm value around the passage of Tax Information Exchange Agreements (TIEAs)

This figure shows the evolution of firm value of treated firms relative to control firms around the passage of Tax Information Exchange Agreements (TIEAs). The *x*-axis denotes years around the passage of TIEAs. The *y*-axis shows the interaction between year-to-event dummies and an indicator variable that equals one if a firm is directly affected by a TIEA. Interaction terms are obtained from an OLS regression on a sample of treated and control firms with the natural logarithm of Tobin's Q on the left-hand side and controls for size and size squared as well as year and industry fixed effects on the right. Control firms are matched to treated firms 5 years before treatment by headquarter country and industry, as well as by the natural logarithm of assets and the natural logarithm of assets squared.

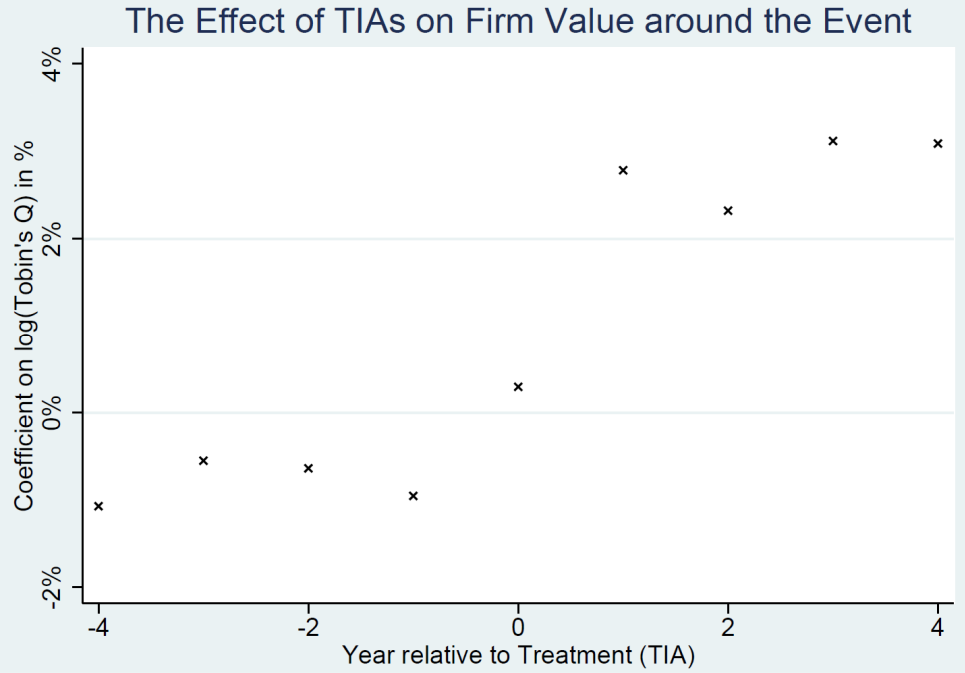
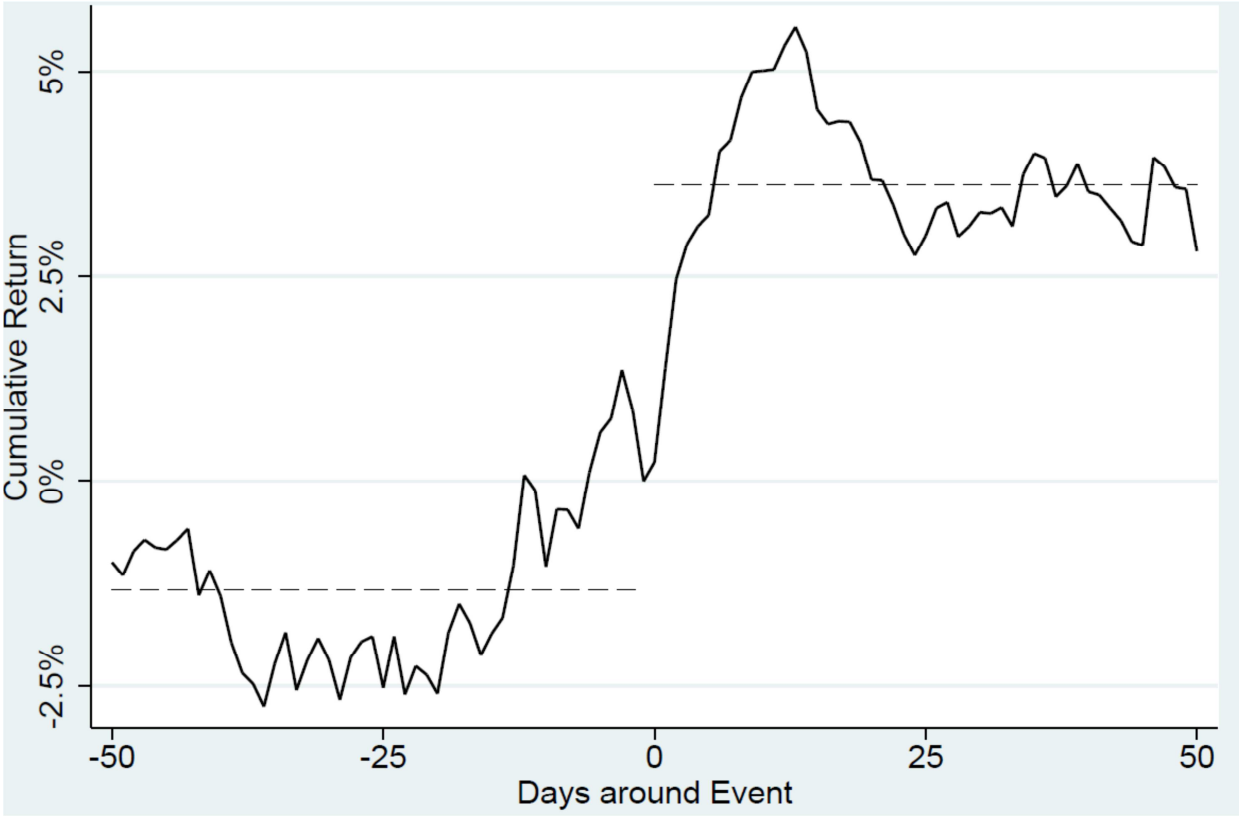


Figure 6: Daily returns of affected firms around the passage of Tax Information Exchange Agreements (TIEAs)

This figure plots cumulative returns of firms affected by Tax Information Exchange Agreements (TIEAs) over the 100 days surrounding the signing of a TIEA. A firm is directly affected (*treated*) if it is headquartered in a country that signs a TIEA and has a subsidiary in the other signatory country (a tax haven). Some firms are affected by more than one TIEA: they are counted as treated the moment they are affected for the first time. Event dates are spread over 10 years (2002 to 2011). Returns are obtained from Datastream/Worldscope and cumulated; cumulative returns are standardized to equal zero a day before the signature date.



Online Appendix for 'Corporate Tax Havens and Shareholder Value'.

Online Appendix 1: Country-level regressions with log(GDP pc) control

This table presents the results of country-level logit models. The dependent variable *%TH Firms* denotes the % of publicly listed firms that have at least one subsidiary headquartered in a tax haven where tax havens are countries or non-sovereign nations that appear on the OECD Grey List (as of August 17, 2009). Sample countries are those listed in Table 2, with the exception of countries that are a tax haven by any of the different tax haven definitions given in Table 1. Panel A reports results for equally weighted observations; Panel B reports results for value weighted observations where weights are determined by the % of public firms in the overall sample. All regressions control for log(GDP per capita). *Log (GDP per capita)* is the natural logarithm of GDP per capita in USD in 2013 (Source: World Bank). *Corporate Tax Rate* is the maximum corporate tax rate bracket, and *Income Tax Rate* is the maximum income tax bracket in 2013, obtained through various sources (largely government agencies and audit firms). *Total Tax* is *Corporate Tax Rate + (1 - Corporate Tax)*Income Tax*. *Tax Evasion* is obtained from the Global Competitiveness Report conducted by the World Economic Forum: Countries' tax evasion is rated on a scale from 1 (strongly disagree) to 7 (strongly agree) to the statement "Tax evasion is minimal.". *ICRG (Property Rights Protection)* captures political, economic, and financial risk in 2013 and is obtained from the International Country Risk Guide; the measure ranges from 1 to 6 and increases in protection. *Corruption Level* is based on Transparency International's Corruption Perception Index as of 2013 (Source: Transparency International), an index that measures corruption levels on a scale from 1 (high corruption) to 10 (low corruption). All continuous variables are winsorized at 1% and 99% levels. T-statistics for tests of significance based on robust standard errors are reported below coefficients. ***, **, and * indicate significance at the 1%, 5%, and 10% levels.

Panel A: Equally weighted

	(1) %TH Firms	(2) %TH Firms	(3) %TH Firms	(4) %TH Firms	(5) %TH Firms	(6) %TH Firms	(7) %TH Firms	(8) %TH Firms	(9) %TH Firms	(10) %TH Firms
Log (GDP pc)	0.516	0.799*	0.002	0.489	-0.419	-0.746	-1.033	-1.123	-1.191	-1.680
	(1.36)	(1.76)	(0.00)	(0.84)	(-0.53)	(-1.22)	(-1.43)	(-1.19)	(-1.46)	(-1.57)
Corp Tax		8.078								
		(0.89)								
Income Tax			14.484***					12.673***	13.288***	13.864**
			(3.11)					(3.18)	(2.62)	(2.34)
Total Tax				13.281***						
				(2.91)						
Tax Evasion					1.480***			1.512***		
					(2.76)			(2.96)		
ICRG						1.504***			1.352**	
						(2.89)			(2.07)	
Corruption							0.822***			0.816**
							(3.13)			(2.21)
Constant	-3.613	-8.573	-3.042	-9.926	2.019	4.940	7.924	4.709	5.632	10.040
	(-0.96)	(-1.53)	(-0.53)	(-1.49)	(0.29)	(0.94)	(1.25)	(0.53)	(0.74)	(1.03)
Observations	49	48	48	47	40	49	47	40	48	46
Pseudo R2	0.025	0.066	0.345	0.307	0.176	0.199	0.218	0.388	0.412	0.430

Panel B: Value weighted

	(1) %TH Firms	(2) %TH Firms	(3) %TH Firms	(4) %TH Firms	(5) %TH Firms	(6) %TH Firms	(7) %TH Firms	(8) %TH Firms	(9) %TH Firms	(10) %TH Firms
Log (GDP pc)	0.719	0.558	0.392	0.376	-1.481**	-1.996*	-2.807***	-2.203***	-2.807*	-4.662***
	(1.50)	(1.14)	(0.68)	(0.62)	(-2.33)	(-1.68)	(-2.64)	(-3.44)	(-1.69)	(-2.99)
Corp Tax		10.972								
		(0.88)								
Income Tax			16.952**					11.521*	13.485	8.455
			(2.35)					(1.93)	(1.39)	(0.58)
Total Tax				17.245**						
				(2.17)						
Tax Evasion					3.036***			2.552***		
					(3.50)			(6.05)		
ICRG						3.544***			3.383**	
						(2.84)			(2.42)	
Corruption							1.885***			2.334***
							(5.15)			(3.80)
Constant	-3.308	-4.779	-5.851	-8.924	10.409*	14.503	22.400**	14.649***	18.660	35.881***
	(-0.69)	(-0.89)	(-0.92)	(-1.09)	(1.85)	(1.40)	(2.43)	(2.64)	(1.17)	(2.63)
Observations	49	48	48	47	40	49	47	40	48	46
Pseudo R2	0.030	0.067	0.313	0.295	0.473	0.374	0.498	0.559	0.493	0.557

Online Appendix 2: What explains the use of TH among US and non-US firms?

This table follows Table 3 (Panel C and D) in establishing firm characteristics that correlate with the use of tax haven subsidiaries among US firms (Panel A) and non-US firms (Panel B).

Panel A: Only US firms

	(1) TH Sub (Dummy)	(2) TH Sub (Dummy)	(3) TH Sub (Dummy)	(4) TH Sub (Dummy)	(5) TH Sub (Dummy)	(6) TH Sub (Dummy)
Log (Assets)	0.248***	0.192***	0.240***	0.248***	0.238***	0.237***
	(7.84)	(5.92)	(7.47)	(7.81)	(7.56)	(7.43)
Return on Assets	0.484	0.490	0.461	0.583	0.479	0.471
	(1.02)	(0.80)	(0.95)	(1.20)	(0.99)	(0.98)
Effective tax rate	-0.227	-0.561	-0.192	-0.160	-0.210	-0.196
	(-0.63)	(-1.24)	(-0.52)	(-0.44)	(-0.57)	(-0.54)
Leverage	0.566**	0.409	0.561**	0.568**	0.585**	0.582**
	(2.46)	(1.55)	(2.41)	(2.46)	(2.50)	(2.49)
Cash / Total Assets	0.170	-0.493	0.354	-0.023	-0.014	-0.058
	(0.52)	(-1.22)	(1.04)	(-0.07)	(-0.04)	(-0.17)
Dividend Payer (Dummy)	0.449***	0.404***	0.466***	0.457***	0.408***	0.407***
	(3.53)	(2.68)	(3.61)	(3.58)	(3.19)	(3.13)
Foreign-Home Tax		-10.073***				
		(-5.16)				
Intangible Assets			0.520**			
			(1.98)			
R&D/Assets				1.376		
				(1.44)		
Trademark (Dummy)					0.098	
					(0.84)	
Ln(#Trademarks)						0.009
						(0.30)
Patent (Dummy)					0.460***	
					(3.87)	
Ln(#Patents)						0.086***
						(3.38)
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1249	780	1220	1249	1249	1249
Pseudo R2	0.213	0.207	0.215	0.214	0.227	0.223

Panel B: Only non-US firms

	(1) TH Sub (Dummy)	(2) TH Sub (Dummy)	(3) TH Sub (Dummy)	(4) TH Sub (Dummy)	(5) TH Sub (Dummy)	(6) TH Sub (Dummy)
Log (Assets)	0.285***	0.267***	0.278***	0.282***	0.251***	0.244***
	(14.83)	(11.20)	(14.37)	(14.65)	(12.80)	(12.42)
Return on Assets	-0.049	-0.459	-0.070	-0.015	-0.086	-0.144
	(-0.15)	(-1.10)	(-0.21)	(-0.04)	(-0.26)	(-0.44)
Effective tax rate	0.206	0.397*	0.230	0.204	0.251	0.276
	(1.03)	(1.65)	(1.14)	(1.02)	(1.25)	(1.37)
Leverage	0.239*	0.094	0.250*	0.257*	0.312**	0.332**
	(1.80)	(0.54)	(1.86)	(1.93)	(2.32)	(2.47)
Cash / Total Assets	0.329	0.585*	0.375	0.220	0.249	0.183
	(1.38)	(1.79)	(1.55)	(0.90)	(1.02)	(0.75)
Dividend Payer (Dummy)	0.193**	0.203**	0.200***	0.207***	0.188**	0.186**
	(2.52)	(2.07)	(2.60)	(2.70)	(2.43)	(2.39)
Foreign-Home Tax		-8.903***				
		(-13.42)				
Intangible Assets			0.722***			
			(3.87)			
R&D/Assets				2.851***		
				(3.29)		
Trademark (Dummy)					0.379***	
					(6.64)	
Ln(#Trademarks)						0.190***
						(8.41)
Patent (Dummy)					0.201***	
					(3.18)	
Ln(#Patents)						0.036**
						(2.51)
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	5709	2783	5608	5709	5709	5709
Pseudo R2	0.225	0.256	0.227	0.227	0.239	0.246

Online Appendix 3: Tax Information Exchange Agreements passed by non-tax haven countries

This table lists Tax Information Exchange Agreements (TIEAs) involving exactly one tax haven country (or non-sovereign nation) and one non-tax haven country (Source: OECD *Harmful Tax Practices*) and affecting at least one sample firm. Listed are non-tax haven signatories (Panel A) and tax haven signatories. This table lists all 362 such agreements; some sample firms may be affected by more than one of these agreements.

Panel A: Non-tax havens			**Panel B: Tax havens**		
ISO	Country	**# TIEA Partners Coded**	ISO	Country	**# TIEA Partners Coded**
ARG	Argentina	2	ABW	Aruba	8
AUS	Australia	29	AIA	Anguilla	11
AUT	Austria	4	AND	Andorra	12
BEL	Belgium	12	ANT	Netherlands Antilles	7
CAN	Canada	7	ATG	Antigua	11
CZE	Czech Rep	5	BHR	Bahrain	5
DEU	Germany	13	BHS	The Bahamas	14
DNK	Denmark	38	BLZ	Belize	11
ESP	Spain	4	BMU	Bermuda	16
FIN	Finland	36	BRB	Barbados	1
FRA	France	20	COK	Cook Islands	11
GBR	UK	18	CRI	Costa Rica	7
IND	India	2	CYM	Cayman Islands	18
IRL	Ireland	15	DMA	Dominica	11
ISL	Iceland	37	GGY	Guernsey	12
JPN	Japan	3	GIB	Gibraltar	16
MEX	Mexico	3	GRD	Grenada	9
NLD	Netherlands	12	GTM	Guatemala	4
NOR	Norway	34	IMN	Isle of Man	11
NZL	New Zealand	15	JEY	Jersey	12
PRT	Portugal	14	KNA	St. Kitts & Nevis	21
SVN	Slovenia	1	LBR	Liberia	8
SWE	Sweden	34	LCA	St. Lucia	13
USA	United States	4	LIE	Liechtenstein	12
			MAC	Macao	6
			MCO	Monaco	9
			MHL	Marshall Islands	7
			MSR	Monserrat	7
			MUS	Mauritius	5
			PAN	Panama	1
			SMR	San Marino	12
			SYC	The Seychelles	5
			TCA	Turks & Caicos	12
			URY	Uruguay	5
			VCT	St. Vincent & Grenadines	5
			VGB	British Virgin Islands	13
			VUT	Vanuatu	6
			WSM	Samoa	8
	All non-TH Partners	**362**		**All TH Partners**	**362**

Online Appendix 4: The passage of Tax Information Exchange Agreements (TIEAs) and economic ties

This table presents the results of logit models explaining the passage of Tax Information Exchange Agreements (TIEAs) between pairs of tax haven territories and non-tax haven countries. The left-hand-side variable is a dummy variable equal to one if a pair has passed a TIEA by the end of 2013. Pairs are constructed from countries used in our sample (Table 1) and tax havens that occur on our tax haven list (Table 2). The key right-hand-side control is the economic link between respective pairs. In columns (1), (3), and (5), economic ties are measured by the sum of the number of subsidiaries of public and private firms from country 1 in country 2 and the number of subsidiaries of public and private firms from country 2 in country 1. In columns (2), (4), and (6), economic ties are measured by the maximum of the number of subsidiaries of public and private firms from country 1 in country 2 and the number of subsidiaries of public and private firms from country 2 in country 1. Columns (7) to (8) repeat the analysis using the number of subsidiaries of publicly listed firms. The right-hand side includes fixed effects for non-tax haven countries (Columns (1) and (2)), tax haven territories (Columns (3) and (4)), and both (Columns (5)-(8)). All continuous variables are winsorized at 1% and 99% levels. T-statistics for tests of significance based on robust standard errors clustered at the non-tax haven country level are reported below coefficients. ***, **, and * indicate significance at the 1%, 5%, and 10% levels.

	(1) TIEA (Dummy)	**(2) TIEA (Dummy)**	**(3) TIEA (Dummy)**	**(4) TIEA (Dummy)**	**(5) TIEA (Dummy)**	**(6) TIEA (Dummy)**	**(7) TIEA (Dummy)**	**(8) TIEA (Dummy)**
Log(Number Subsidiaries)	-0.009		0.010		0.018			
	(-0.56)		(0.81)		(1.54)			
Log(Max Number Subsidiaries)		-0.009		0.009		0.018		
		(-0.55)		(0.74)		(1.43)		
Log(#Subs of Public Firms)							0.029	
							(1.51)	
Log(Max #Subs of Public Firms)								0.029
								(1.45)
Non-Tax Haven FE	Yes	Yes	No	No	Yes	Yes	Yes	Yes
Tax Haven FE	No	No	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1147	1147	1147	1147	1147	1147	1147	1147
Pseudo R2	0.234	0.234	0.104	0.104	0.350	0.349	0.350	0.350