

Corporate Tax Havens and Shareholder Value: Evidence from Tax Information Exchange Agreements

Morten Bennedsen[†]
INSEAD

Stefan Zeume[‡]
University of Michigan

First Draft: November 18, 2014

Abstract

Using a novel hand-collected dataset of 17,357 publicly listed firms from 55 countries and their international subsidiaries, we provide evidence that subsidiaries in tax havens are used for tax saving motives and for entrenchment motives. Consistent with the tax motive, we find that 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 subsidiary while firms with tax haven subsidiary are unaffected. To provide direct evidence for the entrenchment motive, we exploit the passage of Tax Information Exchange Agreements (TIEAs) between countries and tax havens as a shock to firms' transparency. The implementation of a TIEA increases average shareholder value by 2.5 percent, a result confirmed in event studies of daily abnormal returns around the passage of TIEAs. The main driver of our result is that treated firms reduce their complexity, measured by number of subsidiaries and number of hierarchical levels. However, even though tax agreements are endorsed by investors, we show that some affected firms engage in *haven hopping*: They move subsidiaries from tax havens that entered TIEAs to tax havens that did not.

Keywords: Tax havens, firm value, corporate governance, entrenchment

Preliminary. Please do not cite or circulate without permission. We have benefitted from comments offered by John Graham, Denis Gromb, Maria Guadalupe, Charlie Hadlock, and Urs Peyer. We thank the participants of brownbag seminars at INSEAD (Economics, Finance) and the University of Michigan (Finance).

[†] André and Rosalie Hoffmann Chaired Professor of Family Enterprise and Professor of Economics, INSEAD, morten.bennedsen@insead.edu

[‡] Assistant Professor, Department of Finance, University of Michigan, zeume@umich.edu

1. Introduction

A tax haven is a state or territory where 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. In 2007, the OECD estimated that between USD 5 trillion and USD 7 trillion were held offshore. The tax justice network estimates that between USD 21 trillion and USD 32 trillion were held offshore in 2012. The US organization *Citizens for Tax Justice* estimates that at least 362 out of the top 500 US firms are active in tax havens and that the thirty US companies with most offshore investment collectively book 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 that more than 374 large international companies had made private arrangements with the Luxembourgish tax authority to pay less than 1% in tax – the official Luxembourgish corporate tax rate is 29%. While this 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 first signing tax information exchange agreements with tax havens more than 15 years ago.¹

Given the large amount of tax shielding that takes place in international corporations and the enormous attention this topic has received in policy and media spheres, it is surprising how little is known about types of firms that use tax haven subsidiaries and their underlying motives. This paper fills this gap by providing evidence from a novel dataset covering 17,357 publicly listed firms from 55 countries and their circa 232,000 domestic and foreign subsidiaries.

The most obvious and cited motive for establishing subsidiaries in tax havens is to minimize overall tax payments. Multinational firms can reduce their tax bill by establishing subsidiaries in tax havens. Typically, firms pursue little operational activities in tax havens yet tax reductions can be obtained e.g. by transferring intangible assets such as patents, licenses, brands, or goodwill to tax havens. Operational subsidiaries in high tax environments as well as the parent firm are charged for using these assets, reducing firms' tax bill.

Besides this tax motive, companies may have an entrenchment motive for establishing subsidiaries in tax havens. Tax havens are typically not very transparent and it may be hard for

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).

shareholders to clearly monitor how a firm's assets are used in these territories. For instance, the controlling managers may have an interest in piling cash in tax havens to finance future activities beyond what shareholders find optimal. Hanlon, Lester and Verdi (2014) document that firms hold cash in tax havens and use it for inefficient acquisitions. Entrenchment can also involve resource transfers out of the corporation through third parties. These are often non-transparent for non-controlling owners. For example, Enron CFO Andrew Fastow created a staggering 892 offshore subsidiaries, 692 of these were created in the Cayman Islands alone. Not only did this network of subsidiaries allow Enron to avoid paying taxes but in the court cases after the Enron collapse it was also revealed that Fastow and his friends were able to transfer considerable resources to companies that they controlled outside Enron. Stealing and tunneling resources from shareholders to controlling managers is easier in environments that lack transparency and enforcement as shown in the context of Russia by Desai, Dyck and Zingales (2007) and Mironov (2013).

In this paper, we first provide descriptive evidence for the use of tax haven and then offer direct evidence for the tax motive and the entrenchment motive. In order to test for the tax motive, we use historical changes in corporate tax levels. We find that a 1 percentage point reduction in firms' home-country corporate tax rate is associated with a 1.2% increase in value of firms without tax haven subsidiaries while firms with tax haven subsidiaries are unaffected.

To provide direct evidence for the entrenchment motive, we exploit the passage of Tax Information Exchange Agreements (TIEAs) between countries and tax havens as a shock to firms' transparency. A TIEA is a bilateral agreement between countries to exchange information relevant in civil or criminal tax investigations against individuals or firms. Importantly, TIEAs do not directly affect tax rates or tax rules in either of the involved countries.

TIEAs provide a natural experiment to separate the tax motive from the entrenchment motive. As for the tax motive, TIEAs could leave firm value unaffected or lead to a decline in firm value: If firms indeed followed the tax rules in both countries, passage of a TIEA should have no effect on tax payments and shareholder value for firms with subsidiaries in a tax haven. If a TIEA increased a country's ability to judge whether within firm transfer pricing and other activities are consistent with national tax rules or not, the passage of a TIEA might increase the amount of taxes due at home, reducing shareholder value.

The entrenchment motive, however, suggests that the passage of TIEAs increases shareholder value: Suppose tax havens were used to shield assets from shareholders, such as through piling up free cash for later or inefficient use or tunneling assets out of the company through third party companies that are controlled by insiders of the multinational firm or their close friends or families. TIEAs make the actual transfers of cash and assets costlier to insiders and more transparent to headquarter country tax authorities during tax investigations. Thus, it becomes more difficult and costly for controlling owners and managers to use tax havens to hide or steal cash. If entrenchment is an important motive for the use of tax havens, shareholders should endorse TIEAs affecting firms headquartered in one signatory country and operating subsidiaries in the other signatory country (the tax haven).

TIEAs provide an ideal experimental setting not only because they enable us to separate the two main motives but also because they are bilateral, affecting some firms headquartered in a country but not others. More than 500 such agreements were passed at different points in time over the past 15 years, providing a lot of variation across time and countries. Above all, it is relatively easy to identify counterfactuals such as publicly traded companies that are headquartered in one signatory country but that do not have tax haven subsidiaries or that have subsidiaries in unaffected tax havens.²

Using annual data, we show that the implementation of a TIEA increases average shareholder value (measured by Tobin's Q) by 2.5 percent on average. We re-confirm this result using daily abnormal stock returns around the signing of TIEAs. This result provides strong evidence that the use of tax havens does come with costs to shareholders: Tax havens may be used for entrenchment and even stealing; shareholders reward increased transparency resulting from the passage of TIEAs.

One of the key drivers of our firm value result is the fact that treated firms reduce their complexity relative to control firms. Treated firms reduce the number of subsidiaries by 20% and reduce their average hierarchical depth, both of which are characteristics of firms that use tax havens.

² 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.

We also show that firms engage in *haven hopping*: They move their subsidiaries strategically from tax havens that entered TIEAs to tax havens that did not. Haven hopping is consistent with the entrenchment hypothesis but is hard to explain from the tax saving motive, given that shareholder value increases after the implementation of a TIEA. As a side effect, this may mean that TIEAs benefit the least compliant tax havens.

Our paper is related to a number of recent papers studying the use of tax haven subsidiaries by multinational corporations. These papers are largely country specific and provide somewhat mixed evidence. Desai, Foley and Hines (2006B) study US firms: large firms, more international firms, and firms with extensive intrafirm 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. Markle and Robinson (2012), studying 8,000 multinational firms from 28 countries, document that tax haven firms are larger, more R&D intensive firms. They also document a negative correlation between the tax rate in non-tax haven subsidiaries and the use of tax havens. In Germany, however, foreign income is tax exempt and consequently, manufacturing firms are more likely to use tax havens when facing high foreign corporate taxes (Gumpert, Hines and Schnitzer 2011). Last but not least, constrained firms are less likely to use tax haven subsidiaries (Dyreg and Markle 2013). We contribute to this literature by documenting causal evidence on the tax savings motive and the entrenchment motive, by collecting a larger dataset of 13,639 firms that covers 52 countries, and by exploiting various sources of data on transferrable assets to obtain more clarity on the link between transferrable assets and the use of tax havens. Also, our results are robust to various definitions of tax havens.

In terms of tax enforcement, the paper closest to ours is Desai, Dyck, Zingales (2007) who show that 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, Desai, Dyck and Zingales (2007) 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. Linking this finding to private benefits of control, the authors then document that tax enforcement actions aimed at extractive industries lead to a reduction in the control premium compared to the reduction in control premium experienced by firms in other industries. This confirms a notion made by Dyck and Zingales (2004): The premium paid in block sales is negatively related to the strength of tax enforcement.

These studies are supported by Mironov (2013): In Russia, tax enforcement correlates positively with operating performance. Mironov (2014) cleverly measures tax enforcement at regional level by standardizing the number of tax employees by the number of firms.

In the corporate finance literature, Heider and Ljungqvist (2012) document an asymmetric relation between changes in the tax rate and adjustment in leverage. Firms lever up subsequent to increases in the tax rate but do not lever down subsequent to tax reductions. The relation between tax sheltering and leverage has been studied by Graham and Tucker (2006) who, on a carefully collected sample of 44 tax sheltering cases, show that firms engaged in tax sheltering have lower leverage than matched firms at the time of detection and prior to detection of sheltering activity.

A large accounting literature has examined the link 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. These papers differ in that they look at firms' selected level of tax avoidance rather than tax enforcement.

Two challenges with studying tax regimes are measurement across countries and finding shocks that affect a subsample of firms. Dyck and Zingales (2004) resort to La Porta et al.'s (1996) tax compliance measure that is based on surveys published in the *Global Competitiveness Report* for 1996. Subsequent reports allow constructing a time series yet the resulting measure refers to all firms in a country, making it difficult to identify a suitable control group.

The rest of this paper is organized as follows: In Section 2, we discuss the definition of tax havens and describe our data. In Section 3, we provide descriptive statistics for the use of tax havens at country and industry level. In Section 4, we provide firm level evidence on the use of tax haven subsidiaries. In Section 5, we study changes in corporate tax rates as a shock to the value of having tax haven subsidiaries. Section 6 provides our most direct evidence for the entrenchment motive for use of tax havens: Studying TIEAs, we show that shareholders rewards firms when TIEAs are introduced. Section 7 concludes.

2. Country-level analysis

Tax haven subsidiaries come with costs and benefits: They can be used for to save taxes but their opaque nature allows for rent extraction by managers. In this section, we define and

describe tax havens and present country-level measures on the use of tax havens, tax savings, and the cost of rent extraction. We illustrate that firms' use of tax haven subsidiaries is associated with country level measures of benefits and costs of tax avoidance. We introduce our subsidiary data along the way.

2.1 Tax haven lists

A typical definition of tax havens makes reference to sovereign and non-sovereign territories where certain taxes are low or zero; such territories allow firms to engage in tax avoidance (e.g. Dharmapala and Hines 1996). By that definition, many tax haven lists exist. It is not our intention to provide or suggest one universal list of tax havens. Much rather, most of our descriptive analysis focuses on the OECD Grey List (the most commonly cited list) though all results are robust to using other lists. Table 1 lists all territories that fall under the definition of either one of four tax haven lists or that entered Tax Information Exchange Agreements (TIEA) 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* in Table 1). Using the Grey List as of August 17, 2009, 34 territories are described as tax haven. 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 a tax haven 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, we use the original OECD Tax Haven list, which includes 42 territories (see *List 3* in Table 1). Fourth, Hines and Rice (1994) provide a more practical list based on true corporate tax rates rather than official corporate tax rates (see *List 4*). Luxembourg, for instance, has an official corporate tax rate of 29% and does therefore not fall 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 Luxembourgish tax authorities, making it effectively a tax haven. Fifth, as we use TIEAs for an experiment, we provide a list of all low-tax regimes that entered such agreements according to the OECD (see *TIEA* in Table 1; see *OECD Harmful Tax Practices*). 37 territories classified as tax havens under any of the five lists are sovereign; 12 are small non-sovereign territories.

In order to further illustrate how these tax havens are used by foreign firms, we hand-collect the number of foreign subsidiaries headquartered in each of the tax havens. Subsidiary data is obtained from Dun and Bradstreet's 2013/2014 *Who Owns Whom*; this data set lists public and private ultimate owner firms, subsidiaries held to 50% or more, and subsidiaries of subsidiaries, as well as subsidiaries' headquarter country.

One caveat of the subsidiary data is that it does not distinguish operational subsidiaries from tax vehicles. However, setting the number of foreign subsidiaries located in each tax haven in relation to size and area of the tax haven, and comparing these ratios to the USA, it becomes apparent that tax havens harbor relatively many foreign subsidiaries per capita and per square kilometer. In the USA, on average, one can find 1 foreign subsidiary per 307 km² and per 9,946 inhabitants. In the British Virgin Islands and the Cayman Islands, one foreign subsidiary comes with 19 and 50 inhabitants, respectively, and with less than 0.1 square kilometers of land.³

2.2 Subsidiary data and country-level characteristics

Firm-level subsidiary data is obtained from Dun and Bradstreet's 2013/2014 *Who Owns Whom* book series. For a list of publicly listed firms obtained from Datastream/Worldscope, we collect the subsidiaries held to 50% or more, subsidiaries of subsidiaries, as well as subsidiaries' headquarter location. Headquarter locations include sovereign countries and non-sovereign territories. For later analysis, we supplement this data with 2008/2009 and 1998/1999 data.

We obtain subsidiary information for 17,357 publicly listed firms from 55 countries. These firms have a total of 232,029 subsidiaries – partly at home, partly abroad. Table 2 provides summary statistics by country. Countries are sorted by percentage of publicly listed firms that

³ Some narrative examples taken from the data tell a similar story. For instance, there are 1,759 breweries in the US, roughly 1 per 180,000 inhabitants. There are 3 breweries in the Virgin Islands (UK), roughly 1 per 9,300 inhabitants. SAB Miller Plc (the multinational brewery) alone had 4 subsidiaries in the Virgin Islands in 2013/2014, some of them certainly not breweries.

have at least one subsidiary headquartered in a tax haven as defined by the OECD Grey List (*List 1*).

--- TABLE 2 ABOUT HERE ---

Besides Singapore – where 100% of sample firms are classified as Tax Haven Firm (because Singapore is a Tax Haven by the OECD ‘Grey List’) – tax havens are particularly wide-spread 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). While further analysis of summary statistics will be based on List 1, all results are robust to using other lists.

Table 2 also provides country-level variables for further analysis. *Log (GDP per capita)* is the natural logarithm of GDP per capita in USD in 2013 (Source: World Bank). Two direct measures of the benefits of saving taxes are the *Corporate Tax Rate* and the *Income Tax Rate*. 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 is an indirect measure of the benefits of saving taxes or a measure of potential entrenchment.

Entrenchment is hard to measure yet 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 (Source: Transparency International), an index that measures corruption levels on a scale from 1 (high corruption) to 10 (low corruption).

2.3 The use of tax havens and country characteristics

Figure 2 illustrates the correlations between the use of tax haven subsidiaries at the country level and country-level measures of tax savings and entrenchment. 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. The line is the line of best fit weighing each observation equally.

--- FIGURE 1 ABOUT HERE ---

First, while the relation between corporate tax rates of firms’ home country 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. This highlights the tax savings motive behind using tax havens. Second, the use of tax haven subsidiaries is more prevalent in countries with stronger property rights protection and lower corruption levels. It is presumably costlier to steal directly from shareholders in such countries through e.g. tunneling (such as in Desai, Dyck and Zingales 2007 or Mironov 2013). The opaque nature of tax haven subsidiaries facilitates stealing when stealing is costly at home. Third, tax haven firms are more wide-spread in countries with low levels of tax evasion. While the argument may be similar to the argument on property rights and corruption levels before, an alternative explanation is the nature of the tax evasion measure. Tax evasion is the outcome of a survey conducted among individuals in home countries; if tax evasion happens at home, it will be more strongly in individuals’ mind.

Overall, Figure 1 provides indication that there is a correlation between the use of tax havens and the tax savings as well as the entrenchment motive. However, one immediate concern is that tax rates and country-level governance could be correlated with economic development (and with each other). Indeed, Figure 1 shows that the use of tax havens is more prevalent in countries that are economically more advanced as measured by the natural log GDP per capita. We address this concern in Appendix 1 by running a logit regression where the dependent variable is the percentage of firms that use tax haven subsidiaries. Besides controlling for economic

development, we control for tax saving measures and entrenchment measures simultaneously. Supporting the previous notion, the use of tax havens is more pronounced in countries with higher tax rates, stronger protection of property rights, lower corruption levels, and lower tax evasion even after controlling for economic development. The entrenchment measures are robust to additionally controlling for tax rates.

A second immediate concern is that our results are driven by outliers – such as countries with few observations in our dataset. Panel B of Appendix 1 shows that all previous correlations are robust to weighing observations by the number of sample firms.

Overall, these country-level correlations are suggestive of the tax savings motive and the expropriation motive.

3. Firm-level analysis

In this section, we study the relation between the use of tax havens and firm characteristics. We describe firm level data, and provide a univariate and multivariate description of the data. The aim is to gain a better understanding of the data by examining correlations.

3.1 Variables

We enrich our subsidiary dataset described in the previous section by firm-level accounting data and data on trademarks and patents from Orbis/Osiris. Following Demsetz and Lehn (1985) and Morck, Shleifer and Vishny (1988), we use Tobin's Q as the main measure of firm value. We restrict the sample to those 10,527 publicly listed firms for which we can construct Tobin's Q. *Tobin's Q* is obtained from Osiris as $(\text{Enterprise Value} + \text{Total Liabilities}) / (\text{Total Shareholder Equity (Book Value)} + \text{Total Liabilities})$.

All control variables are constructed as described in Table 3 and winsorized at 1st and 99th percentile though our results are robust to other specifications. For the summary statistics presented in Table 3, all accounting measures are firstly constructed at the firm-year level and then summarized by firm over the period from 2004-2013 to obtain one observation per firm. Panel A splits firms into firms with and without tax haven subsidiary. While we use the definition of the OECD Grey List, our results are robust to using any other definition. 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 ---

3.2 Univariate split

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

Moreover, tax haven firms are 2.2%pts 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 subsidiary also face higher effective tax rates: Again, this does most likely not mean that tax haven subsidiaries increase effective tax rate; much 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 subsidiary hold less cash though this result is turned around in the multivariate setting. Moreover, tax haven firms pay higher dividends though this might be correlated with size, age, and leverage.

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 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.

3.3 Firm-level probit regressions

In order to more formally study the use of tax haven subsidiaries, we employ firm-level probit regressions with industry and country fixed effects and control for various firm characteristics in Panels C and D of Table 3. The dependent variable is an indicator variable equal to one if a firm has at least one subsidiary headquartered 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 in the univariate analysis. Controlling for all of these at once, the results for size, leverage, and being a dividend payer survive, 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 on 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. Appendix 2 further splits our sample into US and non-US firms: all previous results are by and large confirmed.

Overall, this section provides correlations between firm characteristics and the use of tax haven subsidiaries. While these correlations by and large hint at 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.

4. Tax Savings Motive: Evidence from changes in the corporate tax rate

So far, we have documented that the use of tax havens correlates with country-level tax savings and entrenchment measures. In this section, we exploit changes in corporate tax rates over the period 2008-2013 to provide causal evidence on the tax savings motive. During this

period, some countries reduced their maximum corporate tax bracket. All else equal, a reduction in corporate taxes increases firm value. However, we predict that firms that avoid home taxes through tax haven subsidiaries should be unaffected or less positively affected.

As a starting point, Figure 2 plots changes in the 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.⁴

--- 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 subsidiary and control firms matched by industry, headquarter country, the natural logarithm of assets, and the natural logarithm of firms' age (measured by years since foundation). All regressions control for the natural logarithm of assets, the natural logarithm of

⁴ We restrict our sample to countries in which we can track at least 5 firms with accounting data from 2008 to 2013.

assets squared, firm fixed effects, and time fixed effects. Standard errors are clustered at the country and year level (2-way clustering).⁵

--- 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.⁶ 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 subsidiary 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 subsidiary has increased over the five year period. Somewhat 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 5 year sample period in countries that reduce corporate tax rates.

In sum, this section shows that tax haven subsidiaries are used for tax saving motives.

5. Entrenchment Motive: Evidence from Tax Information Exchange Agreements (TIEAs)

So far, we have documented that the use of tax havens correlates with country-level tax savings and entrenchment measures and that tax havens create firm value through tax savings. In this section, we provide causal evidence that tax havens come with entrenchment and can

⁵ Our results are robust to other specifications, such as omitting controls from the matched regressions and clustering along other dimensions.

⁶ The sample of tax changes is a sample abundant of tax reductions. 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 contains by and large tax reductions, we chose to interpret the coefficients in that way. All results are robust to removing countries that did not change their corporate tax rate.

therefore be costly to shareholders. For identification, we study the passage of Tax Information Exchange Agreements (TIEAs) as a shock to corporate and individual activity in tax havens.

5.1 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. Importantly for the study of firms, 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. TIEAs increase the amount of information that can be used to discover and prosecute for tax evasion and very aggressive tax avoidance. Ultimately, they improve tax authorities' ability to enforce tax laws – with civil and criminal consequences for firms and individuals – more effectively.⁷

Since 2000, over 500 *Tax Information Exchange Agreements* have been signed (see left Panel 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 (through a few agreements that affected many firms), as well as through agreements signed after 2008. This time series variation in the passage of agreements is important for our identification strategy.

--- FIGURE 3 ABOUT HERE ---

At least on third of of TIEAs agreements have been signed between two tax havens or between tax havens and economically small (and non-sovereign) territories (such as between the Faroe Islands and Greenland) or between tax havens. Being interested in implications of tax enforcement for publicly listed firms, these agreements are outside the scope of this paper. On another critical note, some countries are not among the signatory countries, e.g. Brazil and Russia or Luxembourg and Switzerland. 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 achieved through outright theft (see Mironov 2013). Thus, a TIEA signed by Russia unlikely affects firms.

⁷ See e.g. oecd.org/tax/exchange-of-tax-information/taxinformationexchangeagreementstieas.htm and hmrc.gov.uk/taxtreaties/tiea.htm for more information and a list of all treaties.

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 non-tax haven signatories (Panel A) and Tax Haven signatories. The table lists all 362 such agreements – some sample firms may be affected by more than one of these agreements but we focus on the first treatment.

5.2 Empirical 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

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

where i denotes firms, t denotes time, y_{it} is the dependent variable of interest (e.g. Tobin's Q or daily stock returns), 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 tax 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. It is helpful that treatment is staggered over time (see Figure 3): Alternative events affecting treated firms at the same time can be ruled out more easily.

In a variation of (1) above, y_{it} denotes daily returns or abnormal returns and $TREATED_{it}$ denotes days around the signing to TIEAs. Besides raw daily returns, we also use excess returns obtained by subtracting daily market returns from daily stock returns and abnormal returns obtained from estimating a 1-factor CAPM model with a rolling [-292;-40] event window.

5.3 Firm Value

In Table 5 Panel A, we study the effect of Tax Information Exchange Agreements (TIEAs) on firm value using OLS regressions for a panel of firms from 1995 to 2013 following Equation (1) above. The left-hand side variable is the natural logarithm of Tobin's. 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. 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). Some firms are affected by more than one TIEA: They are counted as treated the moment they are affected for the first time. Column (1) uses the full sample of firms. In columns (2) and (3), one non-treated (control) firm is matched to each treated firms 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. Firms are matched by country, industry, natural logarithm of assets, and natural logarithm of age. Standard errors are clustered at the country and year level (2-way clustering) though results are robust to alternative specifications.

--- TABLE 5 ABOUT HERE ---

In line with the expropriation motive, the passage of TIEAs does indeed lead to an increase in firm value. In the full sample, the average treated firm sees an increase in Tobin's Q by 2.5%. While this may seem a lot at first sight, recall that Desai, Dyck and Zingales (2007) find an effect of roughly 20% for 5 tax enforcement announcements in Russia. The effect is still significant and similar in magnitude for samples of 1 control firm (2.6%) and 10 control firms (2.3%). Moreover, the effect is not present in control firms.

In order to alleviate the concern that we are merely capturing a time trend, Figure 4 plots the evolution of firm value of treated 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 1 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 as in described in (1). Indeed, the increase in firm value occurs abruptly between year -1 and year +1 around the treatment date.

--- FIGURE 4 ABOUT HERE ---

One concern up to now may be that Tobin's Q also responds to changes in e.g. accounting practices associated with the passage of TIEAs and that Tobin's Q is measured annually,

allowing for a longer time period for related events to lead to similar results. Figure 5 plots returns of treated firms 100 days around the signing of a TIEA. While it is impossible to nail down precisely the first mentioning of these agreements by the press, anecdotal evidence suggests that these agreements are not discussed in public long before they are signed. In fact, they sometimes become public knowledge only days after being passed. As these agreements are passed at different precise dates in time between 2001 and 2012, using raw returns is less subject to other events (such as a positive market return around the passage) driving the result. Returns are cumulative daily raw returns standardized to equal zero a day before the signature date. Indeed, Figure 5 confirms that TIEAs do have a positive effect on affected firms' value: The result on Tobin's Q is not entirely driven by changes in accounting treatment or by other events that occur within the same year.

--- FIGURE 5 ABOUT HERE ---

The magnitudes in Figure 5 have to be interpreted with caution. Raw returns also reflect risk and indeed, tax haven firms tend to have a higher beta. In order to control for risk, we use daily excess returns (over and above daily market returns) and abnormal returns (alphas) for event windows around the passage of TIEAs in Equation (1) (see Table 5 Panel B). We confirm our previous results: Firms affected by TIEAs have positive daily returns around the signature date. The magnitude of the effect is reduced when controlling for risk and is similar to the magnitude reported for Tobin's Q.

Overall, this sub-section provides evidence that tax haven subsidiaries may be used for entrenchment: The passage of TIEAs makes private rent extraction more expensive hence increases shareholder value.

5.4 Drivers of Firm Value

Next, we establish channels through which the passage of TIEAs increases firm value.

First, operating tax haven subsidiaries comes with complexity which may be discounted by shareholders. Indeed, Table 6 shows that firms with tax haven subsidiary have significantly more subsidiaries and have a significantly more complex subsidiary structure as measured by the number of hierarchical levels (Panel A). This still holds true after controlling for country and

industry fixed effects as well as size, return on assets, effective tax rate, leverage, cash holdings, and being a dividend payer (Panel B): Firms with tax haven subsidiary have more subsidiaries and more layers.

--- Table 6 ABOUT HERE ---

One way through which the passage of TIEAs affects shareholders might be a reduction in complexity. Thus, as tax haven subsidiaries are no longer used to extract rents, subsidiaries of tax haven subsidiaries may be closed and particularly deep structures might be simplified. Therefore, we study changes in measures of complexity in Panel C. We calculate the difference in various measures of complexity from 2008 to 2013 and explain that difference by firm characteristics, country fixed effects, industry fixed effects, and treatment. We compare affected firms to all non-affected firms, to 1 matched firm, and to up to 10 matched firms, respectively. As we require a balanced panel of firms with accounting data both in 2008 and 2013, our sample drops to 2,488 firms (and significantly fewer in the matched samples). Furthermore, as some of our changes are indicator variables, we lose some observations where there is no country- or industry-level variation. Last but not least, while we can observe the number of subsidiaries in 2008, we obtain hierarchical information for only a subset of sample firms.

In line with the prediction that complexity of treated firms declines, we find that firms affected by TIEAs do indeed reduce the number of subsidiaries and their depth relative to unaffected firms. Relative to control firms, the number of subsidiaries of treated firms grows 20% more slowly. This is particularly relevant for smaller tax haven firms as reflected in the results for dummies of having more than 1, 3, 5, and 10 subsidiaries. Moreover, the average number of layers goes down among treated firms. While matching treated firms to same-country same-industry firms with similar size and age further reduces our sample, the results are by and large confirmed for matched samples. Thus, part of the effect of TIEAs on firm value is driven by a reduction in tax haven firms' complexity.

Next, if tax haven subsidiaries are at least partly used to extract rents from shareholders, the passage of TIEAs might lead to the closure of such subsidiaries. However, one alternative response to TIEAs is to engage into *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. Panel B follows firms through the second wave from 2008 to 2013.

--- Table 7 ABOUT HERE ---

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.

Most importantly, one third of firms that have a subsidiary in an affected haven at the beginning of the sample period close that subsidiary and move exclusively to non-affected tax havens, while only one in ten firms with tax haven subsidiary moves into affected tax havens. This indicates that some firms strategically avoid tax havens entering TIEAs; it might suggest that we underestimate the true effect of TIEAs on firm value as some firms circumvent TIEAs.

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 that do open tax haven subsidiaries, most open such subsidiaries in unaffected tax havens. Again this may suggest strategic haven hopping though some of the very strong effect during the early sample period may stem from the fact that not too many tax havens signed TIEAs.

Last but not least, we attempt to analyze components of Tobin's Q that may drive our firm value results. Specifically, Table 8 follows the methodology outlined in Equation (1) but tests for the effect of TIEAs on ROE, profit margin, Gross Margin, effective tax rate, beta, and leverage. Treated firms experience an insignificant reduction in ROE and profit margin yet relative to control firms, they are insignificantly less negatively affected. However, it seems that this is driven more by a reduction in control firms' profitability than by treated firms. Treated firms do experience an increase in their gross margin yet this effect becomes insignificant when matching treated firms to similar firms. Moreover, this effect does not filter through to the profit margin, suggesting that the expense structure (other than cost of goods sold) may change.

--- Table 8 ABOUT HERE ---

Tobin's Q might increase due to a reduction in effective tax rates; however, TIEAs are meant to detect tax evasion or aggressive tax avoidance and might be used to reassess the home tax base, which would suggest an increase in effective tax rates. However, studying the effect of TIEAs on effective tax rates does not deliver any significant results.

Part of the reduction in complexity may be reflected in a reduction of investors' discount rate. While proxies are hard to obtain, one component is firms' exposure to market movement, measured by beta. Beta of treated firms goes down relative to control firms though insignificantly so. Finally, if tax haven operations were a substitute tax savings mechanism to leverage, firms might respond to TIEAs by leveraging up. However, this does not seem to be the case, potentially because some tax haven firms move into other tax havens and because tax haven firms might have achieved their debt capacity already. Taken together, the evidence in Table 8 suggests that all of the components of Tobin's Q contribute to the result.

5.5 Cross-sectional results

Last but not least, we are interested in establishing which types of firms benefit more from the passage of TIEAs. In Table 9, we re-run our main specification and interact the treatment dummy with a range of cross sectional firm characteristics.

--- Table 9 ABOUT HERE ---

First, we find that more profitable firms are among the benefactors of TIEAs. Second, we find that firms with higher beta – i.e. riskier firms – benefit more from the passage of TIEAs. This goes in line with the notion that more opaque tax haven firms are even more positively affected. Third, we find that firms with higher effective tax rate are more positively affected. Potentially, the high costs of taxes at home motivate particularly aggressive rent extraction through tax havens. Fourth, highly levered firms benefit less. One potential channel is monitoring: If higher leverage is associated with better monitoring through banks then entrenchment is less pronounced in such firms even before the passage of TIEAs; the additional impact of TIEAs on entrenchment is likely smaller. Fifth, dividend paying firms benefit more. Sixth, firms with higher cash flow growth benefit more. This makes sense when we think of fast-growing firms as

firms in which corporate governance does not catch up with growth so that entrenchment is easier prior to the passage of TIEAs. Last but not least, innovative firms – firms with (more) patents and (more) trademarks – are more positively affected. From anecdotal evidence, these firms engage into more opaque techniques to shift revenues, techniques such as Irish sandwiches. Such firms benefit from the fact that shifting revenues (such as royalties) from patents and trademarks does not require shifting physical goods to and from tax havens.

In sum, this section shows that tax haven firms come at the cost of entrenchment. TIEAs increase transparency and render tax enforcement more effective which reduces entrenchment, with positive impact on firm value. Part of the firm value effect is driven by firms becoming less opaque. We also document that firms that are likely to be less strongly monitored e.g. by creditors and firms that are likely to engage into more aggressive tax avoidance – such as innovative firms with intangible assets – are more positively affected by TIEAs.

6. Conclusion

Corporations use tax havens to reduce corporate taxes and to shield, potentially extract, cash from shareholders. Consistent with the tax motive, 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 subsidiary while firms with tax haven subsidiary are unaffected. In order to provide direct evidence for an entrenchment motive, we exploit the passage of Tax Information Exchange Agreements (TIEAs) between countries and tax havens as a shock to firms' transparency. The implementation of a TIEA increases average shareholder value by 2.5% using annual data. This positive effect is confirmed when studying daily returns around the passage of TIEAs and is by and large explained by firms becoming less complex. Even though tax agreements are endorsed by firms' investors, many firms engage in *haven hopping*: They strategically move their subsidiaries from tax havens that have entered TIEAs to tax havens that did not. This suggests that the OECD-led crackdown on tax havens may benefit some of the less compliant tax havens.

Besides global evidence on this entrenchment motive, the hand-collected dataset on firms' subsidiary structure provides novel insights into the use of tax haven subsidiaries with respect to country and firm-level characteristics.

References:

- Bertrand, Marianne and Sendhil Mullainathan, 2003, "Enjoying the Quiet Life? Corporate Governance and Managerial Preferences.", *Journal of Political Economy*, 111(5), 1043-1075.
- Bilicka, Katarzyna and Clemens Fuest, 2014, 'With which countries do tax havens share information?'. *Int Tax Public Finance*, 21: 175-197.
- Blouin, Jennifer, John E. Core, and Wayne Guay, 2010, 'Have the tax benefits of debt been overestimated?'. *Journal of Financial Economics*, 98(2), 195-213.
- Braun, Julia and Alfons Weichenrieder, 2014, 'Does exchange of tax information between tax authorities influence foreign direct investment into tax havens?', Working Paper.
- Demsetz, Harold and Kenneth Lehn, 1985, "The Structure of Corporate Ownership: Causes and Consequences, *Journal of Political Economy*, 93(6), 1155-1177.
- Desai, Mihir A. and Dhammika Dharmapala, 2005, "Corporate Tax Avoidance and Firm Value", *American Law & Economics Association Annual Meetings*, Paper 27.
- Desai, Mihir A., Alexander Dyck and Luigi Zingales, 2005, "Theft and Taxes", *NBER Working Paper*, Paper No. 10978.
- Desai, Mihir A., Alexander Dyck and Luigi Zingales, 2007, "Theft and Taxes", *Journal of Financial Economics*, 84, 591-623.
- Desai, Mihir A., C. Fritz Foley, and James R. Hines Jr., 2004, 'Economic Effects of Regional Tax Havens', NBER Working Paper #10806.
- Desai, Mihir A., C. Fritz Foley, and James R. Hines Jr., 2006A, 'Do tax havens divert economic activity?', *Economic Letters*, 90: 216-224.
- Desai, Mihir A., C. Fritz Foley, and James R. Hines Jr., 2006B, 'The demand for tax haven operations', *Journal of Public Economics*, 90: 513-531.
- Dharmapala, Dhammika, 2008, 'What problems and opportunities are created by tax havens?', *Oxford Review of Economic Policy*, 24(4): 661-679.
- Dharmapala, Dhammika und Hines Jr., James R. (2006) Which Countries Become Tax Havens?
- Dyck, Alexander and Luigi Zingales, 2004, "Private Benefits of Control: An International Comparison", *The Journal of Finance*, Vol. LIX(2), 537-600.
- Dyreg, Scott D. and Kevin S. Markle, 2013, 'The effect of financial constraints on tax-motivated income shifting by U.S. Multinationals, Working Paper.

Graham, John R. and Alan L. Tucker, 2006, "Tax Shelters and Corporate Debt Policy", *Journal of Financial Economics*, 81, 563-594.

Gumpert, Anna, James R. Hines Jr., and Monika Schnitzer, 2011, *The use of tax havens in exemption regimes*, NBER Working Paper #17644.

Hanlon, Michelle, Rebecca Lester, and Rodrigo S. Verdi, 2014, "The Effect of Repatriation Tax Costs on U.S. Multinational Investment", SSRN Working Paper.

Heider, Florian and Alexander Ljungqvist, 2012, "As Certain as Debt and Taxes: Estimating the Tax Sensitivity of Leverage from Exogenous State Tax Changes", *Working Paper*.

Hines, James R. Jr. and Rice, "Fiscal Paradise: Foreign Tax Havens and American Business", NBER Working Paper No. 3477.

Johannesen, Niels and Gabriel Zucman, 2014, 'The end of bank secrecy? An evaluation of the G20 tax crackdown', *American Economic Journal: Economic Policy*, 6(1): 65-91.

La Porta, Rafael, Florencio Lopez-de-Silanes, Andrei Shleifer, and Robert W. Vishny, 1996, "Trust in Large Organizations", *NBER Working Paper 5864*.

Markle, Kevin and Leslie Robinson, 2012, 'Tax haven use across international tax regimes'. Working Paper.

Mironov, Maxim. 2013, "Taxes, Theft, and Firm Performance", *The Journal of Finance*, Vol. 68(4), 1441-1472.

Morck, Randall, Andrei Shleifer and Robert W. Vishny, 1988, "Management Ownership and Corporate Performance: An Empirical Analysis", *Journal of Financial Economics*, 20(1), 293-315.

Slemrod, Joel and John D. Wilson, 2006, 'Tax Competition with parasitic tax havens', NBER Working Paper #12225.

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. *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 the population divided by area (km²). *#Foreign Subs* is the number of subsidiaries of public and private firms headquartered in the respective territory in 2013 but ultimately owned by a foreign parent firm (Dun & Bradstreet's *Who Owns Whom 2013/2014*). Subsidiaries are defined as companies owned by at least 50%. *Pop/ForSub* and *km²/ForSub* denote the population and square kilometers per foreign subsidiary, respectively.

Country Name	Region	List 1	List 2	List 3	List 4	TIEA	Sovereign	Pop (000s)	Area (km ²)	Pop Dens (ppl/km ²)	#Foreign Subs	Pop/ForSub	km ² /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
ChannellIslands	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)		57%	70%	57%	84%	81%		1,790	20,145	1,278	44,907	5,567	19
Non-Sovereign(mean/sum)		75%	67%	75%	92%	100%		106	234	2,134	8,013	671	2
For Comparison													
USA	NorthAm.	0	0	0	0	0	0	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 industry affiliation in Datastream/Worldscope could be matched to Dun & Bradstreet's *Who Owns Whom 2013/2014*. Countries are sorted by the % of public firms that have at least one subsidiary headquartered in a tax haven. Tax havens are countries or non-sovereign nations that appear on the OECD 'Grey List' as of August 17, 2009 (this percentage is 100% for Singapore as Singapore is a Tax Haven by that list). # *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 rate bracket and *Income Tax Rate* is the maximum income tax bracket in 2013, listed by Wikipedia and 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).

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%	10.85	19.0%	20.0%	5.05	4.50	9.20
Switzerland	148	6,106	39.86%	45.95%	45.95%	50.00%	29.73%	11.28	25.0%	13.2%	4.49	4.50	9.00
Norway	120	2,623	22.50%	25.00%	25.00%	26.67%	3.33%	11.51	28.0%	47.8%	3.96	5.00	7.90
Qatar	9	36	22.22%	22.22%	22.22%	22.22%	22.22%	11.45	10.0%	0.0%		2.30	6.50
Malaysia	664	4,345	21.84%	24.85%	24.85%	24.85%	2.11%	9.25	25.0%	26.0%	4.34	2.40	5.10
Netherlands	76	3,201	19.74%	30.26%	30.26%	36.84%	22.37%	8.43	25.0%	52.0%	3.40	5.00	8.90
Kuwait	17	143	17.65%	17.65%	17.65%	17.65%	11.76%	10.94	10.0%	0.0%		2.50	4.30
Japan	2,382	32,983	17.46%	25.90%	25.94%	26.15%	2.81%	10.75	38.0%	50.0%	4.41	3.40	7.30
Chile	35	188	17.14%	20.00%	20.00%	14.29%	17.14%	9.65	20.0%	40.0%	4.20	3.70	6.90
Portugal	18	724	16.67%	22.22%	22.22%	33.33%	27.78%	9.91	25.0%	54.0%	2.18	3.80	6.10
France	367	12,482	16.35%	20.16%	21.25%	27.79%	17.71%	10.59	33.3%	45.0%	3.86	3.60	6.90
Denmark	77	1,414	15.58%	20.78%	20.78%	25.97%	7.79%	10.94	25.0%	51.7%	3.70	5.50	9.30
Finland	92	2,437	15.22%	21.74%	21.74%	27.17%	5.43%	10.73	20.0%	51.0%	3.53	6.00	9.00
Austria	47	2,324	14.89%	23.40%	23.40%	27.66%	10.64%	10.75	25.0%	50.0%	3.60	5.00	8.10
Saudi Arabia	27	96	14.81%	14.81%	18.52%	14.81%	14.81%	10.13	20.0%			2.00	3.50
Bangladesh	7	9	14.29%	28.57%	28.57%	28.57%	0.00%	6.62		25.0%		1.60	2.10
Spain	93	3,038	13.98%	15.05%	17.20%	23.66%	15.05%	10.25	30.0%	52.0%	1.91	3.90	6.50
UK	1,162	33,021	13.60%	18.59%	18.76%	26.33%	10.50%	8.27	24.0%	45.0%	4.67	4.30	7.70
India	983	4,136	12.82%	15.46%	16.38%	15.97%	3.15%	7.32	30.0%	33.0%	2.16	2.30	3.40
Germany	471	12,137	11.68%	15.50%	15.50%	18.26%	6.58%	10.66	29.8%	45.0%	3.41	4.80	7.90
Philippines	87	773	11.49%	14.94%	14.94%	14.94%	10.34%	7.86	30.0%	32.0%	1.83	2.00	2.30

USA	3,572	54,577	11.42%	15.37%	15.57%	18.03%	8.62%	10.85	39.0%	55.9%	4.47	4.40	7.30
Venezuela	9	45	11.11%	11.11%	11.11%	11.11%	11.11%	9.45	34.0%	34.0%	1.56	1.40	1.90
Pakistan	18	30	11.11%	16.67%	16.67%	16.67%	5.56%	7.14	35.0%	35.0%		1.60	2.50
Colombia	9	22	11.11%	11.11%	11.11%	11.11%	11.11%	8.96	33.0%	33.0%	2.11	2.80	3.80
Hong Kong	347	2,105	10.66%	100.00%	100.00%	100.00%	9.51%	10.51	16.5%	15.0%	4.56	4.00	8.10
Belgium	77	1,536	10.39%	14.29%	14.29%	32.47%	25.97%	10.68	34.0%	55.0%	2.27	3.80	7.30
Indonesia	124	528	9.68%	12.90%	12.90%	12.90%	0.81%	8.18	25.0%	30.0%	2.53	1.80	2.60
Australia	1,217	11,124	8.79%	10.85%	10.85%	11.67%	1.31%	11.12	30.0%	45.0%	4.58	4.70	8.70
Italy	126	3,013	8.73%	11.11%	11.11%	26.19%	19.84%	10.43	31.4%	43.0%	1.77	2.40	4.80
Mexico	12	319	8.33%	8.33%	8.33%	8.33%	16.67%	9.19	30.0%	30.0%	2.46	2.00	3.60
Sweden	286	7,020	7.69%	14.34%	14.69%	16.08%	5.94%	8.61	22.0%	57.0%	3.39	5.10	9.30
Korea	759	3,486	7.38%	14.23%	14.23%	14.76%	1.05%	7.72	22.0%	41.8%	3.29	2.60	5.60
New Zealand	68	396	7.35%	8.82%	8.82%	8.82%	0.00%	10.56	28.0%	33.0%	5.00	5.50	9.30
Thailand	260	1,141	7.31%	8.85%	8.85%	8.85%	0.38%	6.31	20.0%	35.0%	3.41	1.50	3.50
Egypt	16	32	6.25%	6.25%	6.25%	6.25%	6.25%	8.09	20.0%	20.0%	3.57	1.70	2.80
Brazil	33	300	6.06%	6.06%	6.06%	12.12%	12.12%	7.03	34.0%	27.5%	2.14	2.30	3.50
Ireland	37	786	5.41%	8.11%	8.11%	100.00%	8.11%	10.74	25.0%	41.0%	3.55	3.40	7.70
Israel	205	1,464	5.37%	7.32%	7.32%	9.27%	3.41%	10.39	26.5%	52.0%	3.69	3.20	6.00
Vietnam	21	48	4.76%	4.76%	4.76%	4.76%	0.00%	7.47	25.0%	35.0%		2.10	2.70
Canada	776	3,980	4.12%	7.22%	7.22%	9.28%	4.90%	10.84	31.0%	50.0%	3.77	4.80	8.70
South Africa	256	2,252	3.13%	5.08%	5.47%	7.03%	2.34%	8.90	28.0%	40.0%	2.40	2.30	4.90
Turkey	69	373	1.45%	1.45%	1.45%	2.90%	1.45%	9.27	20.0%	35.0%	2.07	2.50	4.60
China	1,100	6,106	1.18%	12.00%	12.00%	12.09%	0.27%	8.71	25.0%	45.0%	2.51	2.00	3.60
Poland	380	1,839	0.53%	0.79%	0.79%	1.84%	0.79%	7.15	19.0%	32.0%	2.19	2.30	4.60
Argentina	23	105	0.00%	0.00%	0.00%	0.00%	0.00%	9.36	35.0%	35.0%	2.41	2.50	2.90
Czech Rep.	14	63	0.00%	0.00%	0.00%	0.00%	0.00%	7.53	19.0%	15.0%	2.54	2.50	5.20
Greece	99	1,004	0.00%	16.16%	16.16%	19.19%	5.05%	10.02	33.0%	42.0%	2.36	2.20	4.70
Hungary	15	215	0.00%	6.67%	6.67%	6.67%	0.00%	7.14	19.0%	16.0%	1.97	3.00	5.10
Kazakhstan	1	2	0.00%	0.00%	0.00%	0.00%	0.00%	9.40	17.5%	10.0%		1.50	2.20
Nigeria	10	15	0.00%	0.00%	0.00%	0.00%	0.00%	7.35	30.0%	24.0%		1.30	2.70
Peru	1	3	0.00%	0.00%	0.00%	0.00%	0.00%	8.82	30.0%	30.0%	2.66	2.50	3.60
Russia	103	900	0.00%	1.94%	1.94%	1.94%	0.00%	9.55	20.0%	13.0%	1.43	1.90	2.10
Ukraine	32	101	0.00%	0.00%	0.00%	0.00%	0.00%	8.26	25.0%	15.0%		1.60	2.50
Sum / Mean	17,357	232,029	11.47%	16.39%	16.55%	20.25%	7.56%	9.33	25.93%	34.96%	3.14	3.10	5.49

Table 3: Firm Level Summary Statistics

This table presents firm-level summary statistics and characteristics of firms with tax haven subsidiary 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 haven countries; see Table 1), and the difference in means with significance at 1%, 5% and 10% denoted by ***, **, and *, respectively. *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 in the same way but restricted to firms with non-missing total assets and non-missing data required to construct Tobin’s Q. Means of accounting variables are constructed from one observation per firm; firm-level observations are obtained from data going back up to 10 years. *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 Payout / Div Payer* is the dividends per share over earnings per share conditional on paying a dividend. *Dividend Payout* is constructed similarly but assumes 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. *ln(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 contain 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. T-statistics for tests of significance based on robust standard errors are reported below coefficients. ***, ** and * indicate significance at the 1%, 5% and 10% level.

Variable	Panel A: All Sample Firms						Panel B: Firms with ≥ 1 Foreign Subsidiary					
	#Firms	Mean	Does firm have TH Sub?			Difference	#Firms	Mean	Does firm have TH Sub?			Difference
			yes	no					Yes	No		
TH Subsidiary (Dummy)	17,357	13.25%					7,578	40.25%				
TH Subsidiary w/Acc Info	10,527	17.23%					5,281	31.85%				
Tobin's Q	10,527	1.63	1.48	1.67	(0.18)	***	5,281	1.63	1.49	1.70	(0.21)	***
Sales Growth	9,736	11.9%	8.8%	12.6%	-3.8%	***	5,019	11.0%	8.8%	12.1%	-3.2%	***
ROA(%)	9,232	4.3%	5.3%	4.1%	1.3%	***	4,801	4.8%	5.5%	4.5%	0.9%	***
Cash Flows over Sales	9,464	8.9%	10.8%	8.4%	2.3%	***	4,931	8.4%	10.8%	7.2%	3.6%	***
Profit Margin	9,977	4.7%	6.6%	4.2%	2.4%	***	5,130	4.7%	6.6%	3.8%	2.9%	***
Gross Margin	9,874	42.2%	41.7%	42.3%	-0.6%		5,089	42.5%	41.9%	42.8%	-0.9%	
Effective Tax Rate	8,061	21.4%	23.0%	21.0%	2.0%	***	4,053	23.2%	23.6%	23.0%	0.6%	
Leverage	9,950	47.3%	49.2%	46.9%	2.2%	***	5,087	48.5%	49.6%	48.1%	1.5%	**
Cash over Total Assets	10,322	17.3%	15.7%	17.7%	-1.9%	***	5,199	16.8%	15.3%	17.5%	-2.2%	***
Dividend Payout Div Payer	6,046	22.1%	25.7%	21.3%	4.4%	***	2,781	24.0%	26.0%	23.0%	3.0%	**
Dividend Payout	10,527	12.7%	15.1%	12.2%	2.9%	***	5,281	12.6%	14.5%	11.8%	2.7%	***
Intangible Assets	9,901	10.9%	13.0%	10.5%	2.6%	***	5,046	13.8%	13.8%	13.8%	0.0%	
R&D	10,527	1.5%	1.7%	1.5%	0.3%	**	5,281	2.1%	1.9%	2.2%	-0.4%	**
#Trademarks	10,527	6.9	13.9	5.5	8.4	***	5,281	11.5	15.0	9.9	5.1	***
ID Trademark	10,527	39.9%	52.3%	37.3%	15.0%	***	5,281	56.3%	56.0%	56.5%	-0.5%	
#Patents	10,527	64.0	170.1	41.9	128.2	***	5,281	114.4	183.4	82.1	101.3	***
ID Patent	10,527	40.9%	49.9%	39.1%	10.8%	***	5,281	53.9%	53.4%	54.0%	-0.6%	
ln(Assets)	10,527	11.9	13.1	11.7	1.4	***	5,281	12.6	13.3	12.2	1.0	***
Age	10,527	33.6	41.6	32.0	9.7	***	5,281	38.5	43.5	36.2	7.3	***
Mean Foreign Tax							5,215	26.5%	24.2%	27.5%	-3.3%	***
Dif (Foreign-Home Tax)							5,214	-4.8%	-6.4%	-4.0%	-2.4%	***

Panel C: All firms

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	TH Sub (Dummy)	TH Sub (Dummy)	TH Sub (Dummy)	TH Sub (Dummy)	TH Sub (Dummy)	TH Sub (Dummy)	TH Sub (Dummy)	TH Sub (Dummy)	TH Sub (Dummy)
Log (Assets)	0.269*** (20.40)						0.269*** (16.37)		0.234*** (12.43)
Return on Assets		1.103*** (6.41)					0.129 (0.48)		-0.147 (-0.44)
Effective tax rate			0.712*** (5.18)				0.148 (0.85)		0.159 (0.76)
Leverage				0.417*** (6.10)			0.314*** (2.72)		0.206 (1.43)
Cash / Total Assets					-0.979*** (-7.36)		0.426** (2.26)		0.237 (0.97)
Dividend Payer (Dummy)						0.768*** (16.00)	0.255*** (3.99)		0.325*** (4.10)
Foreign – Home Tax								-7.354*** (-17.19)	-8.984*** (-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)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	TH Sub (Dummy)	TH Sub (Dummy)	TH Sub (Dummy)	TH Sub (Dummy)	TH Sub (Dummy)	TH Sub (Dummy)	TH Sub (Dummy)	TH Sub (Dummy)
Intangible Assets	0.691*** (4.66)							
R&D/Assets		2.427*** (3.96)						
Trademark (Dummy)			0.366*** (7.48)				0.294*** (5.78)	
Ln(#Trademarks)				0.133*** (8.00)				0.107*** (6.13)
Patent (Dummy)					0.361*** (6.91)		0.272*** (4.99)	
Ln(#Patents)						0.083*** (6.97)		0.061*** (4.88)
Log (Assets)	0.262*** (15.80)	0.266*** (16.15)	0.250*** (15.10)	0.250*** (15.03)	0.251*** (15.12)	0.254*** (15.25)	0.241*** (14.40)	0.242*** (14.53)
Return on Assets	0.108 (0.40)	0.218 (0.79)	0.120 (0.45)	0.117 (0.44)	0.166 (0.61)	0.146 (0.54)	0.150 (0.55)	0.133 (0.49)
Effective tax rate	0.168 (0.96)	0.179 (1.03)	0.178 (1.02)	0.162 (0.93)	0.140 (0.80)	0.183 (1.05)	0.166 (0.95)	0.184 (1.05)
Leverage	0.319*** (2.73)	0.331*** (2.86)	0.368*** (3.15)	0.381*** (3.27)	0.336*** (2.90)	0.345*** (2.97)	0.373*** (3.20)	0.390*** (3.34)
Cash / Total Assets	0.516*** (2.69)	0.226 (1.13)	0.353* (1.85)	0.323* (1.69)	0.356* (1.86)	0.312 (1.62)	0.314 (1.63)	0.258 (1.33)
Dividend Payer (Dummy)	0.263*** (4.08)	0.275*** (4.27)	0.246*** (3.83)	0.261*** (4.02)	0.252*** (3.95)	0.238*** (3.72)	0.246*** (3.83)	0.247*** (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 (Enterprise Value+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' *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'). 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' age (measured by years since foundation). All regressions control for the natural logarithm of assets, the natural logarithm of assets squared, firm fixed effects, and time fixed effects. 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% level.

	(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 (-1.52)	-0.872 (-1.55)	-0.871** (-2.31)	-1.217*** (-3.14)
Change in Tax Rate		0.696* (1.79)		1.027** (2.68)
* Tax Haven Subsidiary				
Ln(Assets)	0.071** (2.15)	0.071** (2.15)	0.211*** (8.74)	0.211*** (8.68)
Ln(Assets) sqr	-0.004*** (-3.11)	-0.004*** (-3.12)	-0.009*** (-5.23)	-0.009*** (-5.22)
Firm FE	Y	Y	Y	Y
Time FE	Y	Y	Y	Y
N	37414	37414	5587	5587
r2_a	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. In Panel A, the left-hand side variable is the natural logarithm of Tobin's Q, calculated as (Enterprise Value+Total Liabilities)/(Total Shareholder Equity (Book Value) + Total Liabilities). 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. 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). Some firms are affected by more than one TIEA: They are counted as treated the moment they are affected for the first time. Column (1) uses the full sample of firms. In columns (2) and (3), one non-treated (control) firm is matched to each treated firms 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. 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)), excess return calculated as stock returns minus market return (Columns (5)-(8)), 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 (9)-(12)). *Treated* is a Dummy equal to 1 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*). T-statistics for tests of significance of coefficients based on robust standard errors clustered at the firm level are reported below coefficients. ***, ** and * indicate significance at the 1%, 5% and 10% level.

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*** (3.22)	0.020** (2.78)	0.026** (2.68)	0.021** (2.32)	0.023*** (2.87)
Control after			-0.009 (-0.77)		-0.005 (-0.42)
Ln(Assets)	0.098*** (3.82)	0.045 (1.30)	0.047 (1.33)	0.127*** (10.57)	0.128*** (10.53)
Ln(Assets) Sqr	-0.003*** (-4.12)	-0.002* (-1.93)	-0.002* (-1.95)	-0.006*** (-9.81)	-0.006*** (-9.89)
Ln(Age)	-0.103 (-1.32)	0.020 (0.31)	0.019 (0.30)	-0.006 (-0.10)	-0.007 (-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
Treated=Control			0.091		0.071

Panel B: Daily Stock Returns

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Raw	Raw	Raw	Raw	Excess	Excess	Excess	Excess	Alpha	Alpha	Alpha	Alpha
Treatment period	[-15;15]	[-10;10]	[-5;5]	[0;0]	[-15;15]	[-10;10]	[-5;5]	[0;0]	[-15;15]	[-10;10]	[-5;5]	[0;0]
Treated	0.202*** (4.06)	0.246*** (3.73)	0.266*** (2.99)		0.084* (1.88)	0.132** (2.25)	0.169** (2.25)	0.161 (0.60)	0.088** (2.04)	0.140** (2.53)	0.180*** (2.68)	0.149 (0.55)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Month FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	20732415	20732415	20732415	20732415	20732415	20732415	20732415	20732415	20311441	20311441	20311441	20311441
Adj. R2	0.001	0.001	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Economic Effect	6.26%	5.17%	2.93%		2.60%	2.77%	1.86%	1.61%	2.73%	2.94%	1.98%	1.49%

Table 6: Tax Information Exchange Agreements and Firm Complexity

This table investigates differences between firm structure of tax haven and non-tax haven firms (Panels A and B) and tax haven firms' response to the passage of Tax Information Exchange Agreements (TIEAs). The first measure of complexity is $\ln(\text{Number of Subsidiaries})$, the number of subsidiaries and subsidiaries of subsidiaries owned to 50% or more. Subsidiary data is obtained from Dun & Bradstreet's *Who Owns Whom 2013/2014* (Panels A-C) and complemented by *Who Owns Whom 2008/2009* (Panel C). % ≥ 2 layers, % ≥ 3 layers, and % ≥ 4 layers are Dummy variables that takes a value of 1 if a firm has at least 2 (3, 4) hierarchical layers. A firm with at least one subsidiary that owns a subsidiary in turn is a firm with at least 2 layers (% ≥ 2 layers=1) by that definition. % >1 Subsidiary is a dummy equal to one if a firm has strictly more than 1 subsidiaries. Panel A follows Table 4 in splitting the sample into firms with and firms without tax haven subsidiary. Panel B follows Table 5 in providing results of a probit regression where the dependent variable equals 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 5 are included. Panel C studies the change in complexity measures from 2008 to 2013 for treated firms compared to (i) all firms, (ii) the first-best match with replacement, and (iii) up to 10 matches with replacement. 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. Column (i) is estimated using OLS; Columns (ii)-(xi) using probit regressions. Controls include changes in firm size, changes in firm size squared, and country fixed effects.

Panel A: Are firms with tax haven subsidiary more complex?

Variable	All Sample Firms						Firms with ≥ 1 Foreign Subsidiary					
	#Firms	Mean	Does firm have TH Sub?			#Firms	Mean	Does firm have TH Sub?				
			yes	no	Difference			Yes	No	Difference		
Number Subsidiaries	10,527	16.44	47.91	9.89	38.02	***	5,281	27.3	51.2	16.2	35.0	***
% >1 Subsidiary	10,527	78.4%	95.8%	74.8%	21.0%	***	5,281	90.9%	96.6%	88.2%	8.4%	***
% >3 Subsidiary	10,527	56.5%	86.8%	50.2%	36.6%	***	5,281	75.9%	89.1%	69.7%	19.3%	***
% >5 Subsidiary	10,527	44.0%	78.9%	36.8%	42.1%	***	5,281	64.6%	81.7%	56.5%	25.2%	***
% >10 Subsidiary	10,527	28.9%	63.6%	21.7%	41.9%	***	5,281	46.7%	67.2%	37.1%	30.1%	***
% >20 Subsidiary	10,527	17.0%	47.2%	10.7%	36.5%	***	5,281	29.8%	50.5%	20.1%	30.4%	***
Mean Depth	10,527	1.31	1.72	1.23	0.49	***	5,281	1.51	1.76	1.39	0.37	***
Median Depth	10,527	1.25	1.58	1.18	0.40	***	5,281	1.41	1.62	1.31	0.30	***
% ≥ 2 layers	10,527	44.3%	78.4%	37.2%	41.2%	***	5,281	65.2%	81.5%	57.6%	23.8%	***
% ≥ 3 layers	10,527	20.8%	49.2%	14.9%	34.3%	***	5,281	35.7%	52.4%	27.9%	24.6%	***
% ≥ 4 layers	10,527	10.9%	31.6%	6.6%	25.0%	***	5,281	19.9%	34.1%	13.3%	20.7%	***

Panel B: Is complexity correlated with having a tax haven subsidiary and other firm characteristics?

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
	Ln(#Subs)	>1 Sub (Dummy)	>3 Subs (Dummy)	>5Subs (Dummy)	>10Subs (Dummy)	>20Subs (Dummy)	Ln(Mean Depth)	Ln(Median Depth)	≥2Layers (Dummy)	≥3Layers (Dummy)	≥4Layers (Dummy)
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 Firm Complexity

(i) Treated Firms versus all other firms

	(1) Ln(#Subs) OLS	(2) >1 Sub Probit	(3) >3 Subs Probit	(4) >5Subs Probit	(5) >10Subs Probit	(6) >20Subs Probit	(7) Mean Depth OLS	(8) Median Depth OLS	(9) ≥2Layers Probit	(10) ≥3Layers Probit	(11) ≥4Layers Probit
Treated	-0.205** (-2.36)	-0.910*** (-3.61)	-0.972*** (-3.34)	-0.674*** (-3.47)	-0.787*** (-4.08)	-0.142 (-0.85)	-0.075* (-1.73)	-0.043 (-0.58)	-0.653** (-2.43)	-0.432** (-2.02)	-0.171 (-0.76)
Firm controls	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Country FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
N	2488	2441	2487	2449	2480	2487	1138	1138	1137	1137	1137
Adjusted R2	0.039	0.096	0.106	0.095	0.096	0.089	0.060	0.006	0.037	0.073	0.082

(ii) 1 Treated Firm and 1 Control firm (matched by country, industry, size)

	(1) Ln(#Subs) OLS	(2) >1 Sub Probit	(3) >3 Subs Probit	(4) >5Subs Probit	(5) >10Subs Probit	(6) >20Subs Probit	(7) Mean Depth OLS	(8) Median Depth OLS	(9) ≥2Layers Probit	(10) ≥3Layers Probit	(11) ≥4Layers Probit
Treated	-0.076 (-0.59)	-1.085*** (-3.63)	-0.635* (-1.70)	-0.237 (-0.63)	-0.593 (-1.24)	0.320 (0.83)	-0.075* (-1.72)	-0.078 (-1.62)	-0.848** (-1.98)	-0.899*** (-2.95)	-0.708** (-2.13)
Firm controls	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Country FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
N	256	207	160	158	169	222	148	148	148	148	148
Adjusted R2	0.052	0.201	0.216	0.237	0.304	0.159	0.008	0.009	0.160	0.159	0.082

(iii) 1 Treated Firm and 10 Control firms (matched by country, industry, size)

	(1) Ln(#Subs) OLS	(5) >1 Sub Probit	(7) >3 Subs Probit	(9) >5Subs Probit	(10) >10Subs Probit	(11) >20Subs Probit	(7) Mean Depth OLS	(8) Median Depth OLS	(2) ≥2Layers Probit	(3) ≥3Layers Probit	(4) ≥4Layers Probit
Treated	0.004 (0.04)	-0.965*** (-3.72)	-0.693* (-1.88)	-0.386* (-1.71)	-0.696*** (-3.05)	-0.005 (-0.03)	-0.075* (-1.92)	-0.066* (-1.70)	-0.550** (-2.04)	-0.454** (-2.01)	-0.123 (-0.50)
Firm controls	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Country FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
N	680	588	555	572	601	641	429	429	429	429	429
Adjusted R2	0.032	0.092	0.163	0.137	0.151	0.118	0.020	0.009	0.042	0.058	0.064

Table 7: Tax Information Exchange Agreements and Haven Hopping

This conversion matrix investigates whether firms move their subsidiaries out of tax havens that entered Tax Information Exchange Agreements (TIEAs) between 1998 and 2008 (Panel A) and between 2008 and 2013 (Panel B), respectively. The sample is a balanced Panel of firms with subsidiary data for 1998 and 2008, as well as 2008 and 2013, respectively. In 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. Panel B shows the same for firms in 2008 and 2013. Panel A ignores firms affected by TIEAs after 2008; Panel B ignores firms affected by TIEAs prior to 2008.

Panel A: Haven Hopping between 1998 and 2008

		2008			
1998		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%]

Panel B: Haven Hopping between 2008 and 2013

		2013			
2008		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%]

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 *ROE(%)* (Profit & Loss before Tax / Total Equity in %), *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 %), and *Beta* (estimated in a 1-factor model of monthly excess stock returns on the headquarter country's main market index' excess return over 24 months). 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*. 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% level.

Dependent Variable	ROE(%)		Profit Margin (%)		Gross Margin (%)		Effective Tax Rate		Beta		Leverage	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(7)	(8)
	ALL	Match 1	ALL	Match 1	ALL	Match 1	ALL	Match 1	ALL	Match 1	ALL	Match 1
Treated after	-0.300 (-0.23)	0.963 (1.20)	-0.827 (-1.41)	-0.185 (-0.37)	0.672* (1.86)	0.767 (0.92)	-0.006 (-0.41)	-0.001 (-0.04)	0.003 (0.05)	-0.042 (-1.20)	0.002 (0.08)	-0.001 (-0.18)
Control after		-1.646* (-1.95)		-1.061 (-1.68)		-0.346 (-0.48)		0.004 (0.29)		0.003 (0.08)		0.005 (0.74)
Controls	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Time FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
N	77899	4605	71810	4664	72119	4649	80226	4732	38940	2193	83512	4884
Adjusted R2	0.492	0.454	0.484	0.464	0.843	0.883	0.309	0.357	0.339	0.379	0.678	0.788
Treated=Control		0.070		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 4 but the treatment dummy is additionally interacted with firm characteristics. These interaction terms are generally continuous but dummies to indicate dividend payers (Panel B Columns (5) and (6)), firms with at least one patent (Panel C Columns (3) and (4)), and firms with at least one trademark (Panel C Columns (7) and (8)). Interaction terms are constructed as described in Table 3.

Panel A

Interaction with...	Gross Margin		Profit Margin		EBIT		Beta	
	Continuous		Continuous		Continuous		Continuous	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	ALL	Match 1	ALL	Match 1	ALL	Match 1	ALL	Match 1
Treated after	-0.019 (-0.66)	-0.017 (-0.65)	-0.017 (-0.84)	-0.019 (-0.88)	-0.024 (-1.13)	-0.029 (-1.49)	-0.036*** (-3.23)	-0.032** (-2.61)
Treated after * Interaction	0.001** (2.16)	0.001* (1.98)	0.004** (2.29)	0.004** (2.40)	0.004*** (3.17)	0.004*** (3.44)	0.051*** (5.50)	0.049*** (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	72119	4649	71810	4664	72564	4690	45029	2502
Adjusted R2	0.714	0.774	0.734	0.775	0.733	0.775	0.740	0.794

Panel B

Interaction with...	Effective Tax Rate		Leverage		Dividend Payer		Cash Flow Growth	
	Continuous		Continuous		Dummy		Continuous	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	ALL	Match 1	ALL	Match 1	ALL	Match 1	ALL	Match 1
Treated after	0.005 (0.39)	0.000 (0.01)	0.243*** (2.90)	0.241*** (3.74)	-0.018 (-1.40)	-0.024 (-1.27)	0.031*** (3.42)	0.030*** (3.18)
Treated after * Interaction	0.152*** (3.29)	0.144*** (2.98)	-0.364** (-2.42)	-0.370*** (-3.35)	0.061*** (3.85)	0.061*** (3.34)	0.039*** (3.98)	0.046*** (5.55)
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	80226	4732	83512	4884	81406	4766	69156	4316
Adjusted R2	0.715	0.777	0.716	0.777	0.714	0.776	0.731	0.789

Panel C

Interaction with...	Ln(Patents) Continuous		Patent Dummy		Ln(Trademarks) Continuous		Trademark Dummy	
	(1) ALL	(2) Match 1	(3) ALL	(4) Match 1	(5) ALL	(6) Match 1	(7) ALL	(8) Match 1
Treated after	-0.013 (-0.54)	-0.017 (-0.76)	-0.024 (-1.20)	-0.016 (-0.79)	0.001 (0.03)	-0.001 (-0.09)	-0.017 (-1.10)	-0.015 (-0.84)
Treated after * Interaction	0.011*** (2.85)	0.010*** (3.48)	0.065*** (2.90)	0.050** (2.43)	0.008** (2.29)	0.007*** (3.01)	0.045*** (2.87)	0.043** (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

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). T-statistics for tests of significance based on robust standard errors are reported below coefficients. ***, ** and * indicate significance at the 1%, 5% and 10% level.

Panel A: Equally weighted

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	%TH Firms	%TH Firms	%TH Firms	%TH Firms	%TH Firms	%TH Firms	%TH Firms	%TH Firms	%TH Firms	%TH Firms
Log (GDP pc)	0.350 (1.63)	0.368 (1.58)	-0.007 (-0.02)	0.087 (0.29)	0.219 (0.64)	-0.160 (-0.38)	-0.139 (-0.32)	-0.461 (-1.48)	-0.399 (-1.02)	-0.432 (-1.12)
Corp Tax		4.061 (0.49)								
Income Tax			14.370*** (3.07)							
Total Tax				12.885*** (3.21)				13.901*** (3.07)	12.599*** (2.74)	13.678*** (2.69)
Tax Evasion					1.391*** (2.87)			1.542*** (3.45)		
ICRG						1.212** (1.98)			1.109** (2.03)	
Corruption							0.603** (2.06)			0.593** (2.35)
Constant	-1.639 (-0.84)	-2.906 (-1.07)	-2.948 (-0.92)	-5.735* (-1.85)	-3.830 (-1.22)	-0.206 (-0.08)	0.054 (0.02)	-5.272* (-1.78)	-4.132 (-1.06)	-4.185 (-1.01)
Observations	49	48	48	47	42	49	49	42	47	47
Pseudo R2	0.038	0.055	0.348	0.298	0.180	0.164	0.172	0.350	0.366	0.384

Panel B: Value weighted

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	%TH Firms	%TH Firms	%TH Firms	%TH Firms	%TH Firms	%TH Firms	%TH Firms	%TH Firms	%TH Firms	%TH Firms
Log (GDP pc)	0.234 (0.99)	-0.230 (-0.51)	-0.028 (-0.07)	-0.161 (-0.50)	-0.736 (-1.58)	-1.972* (-1.81)	-1.854** (-2.04)	-1.268*** (-3.34)	-2.251 (-1.50)	-2.424 (-1.47)
Corp Tax		16.025 (0.93)								
Income Tax			15,360** (2.47)							
Total Tax				16.092** (2.50)				15.264*** (2.61)	12.480* (1.86)	13.620*** (2.75)
Tax Evasion					3.144*** (3.18)			2.581*** (4.93)		
ICRG						5.360** (2.30)			4.522 (1.53)	
Corruption							1.900*** (4.30)			1.758** (2.04)
Constant	1.771 (0.86)	1.618 (0.74)	-1.387 (-0.33)	-3.237 (-0.73)	2.347 (0.51)	8.808 (1.42)	12.015* (1.77)	0.124 (0.03)	6.615 (0.68)	10.293 (0.82)
Observations	49	48	48	47	42	49	49	42	47	47
Pseudo R2	0.012	0.061	0.328	0.302	0.458	0.434	0.462	0.565	0.540	0.543

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

Panel A: Only US Firms

	(1)	(2)	(3)	(4)	(5)	(6)
	TH Sub (Dummy)	TH Sub (Dummy)	TH Sub (Dummy)	TH Sub (Dummy)	TH Sub (Dummy)	TH Sub (Dummy)
Log (Assets)	0.248*** (7.84)	0.192*** (5.92)	0.240*** (7.47)	0.248*** (7.81)	0.238*** (7.56)	0.237*** (7.43)
Return on Assets	0.484 (1.02)	0.490 (0.80)	0.461 (0.95)	0.583 (1.20)	0.479 (0.99)	0.471 (0.98)
Effective tax rate	-0.227 (-0.63)	-0.561 (-1.24)	-0.192 (-0.52)	-0.160 (-0.44)	-0.210 (-0.57)	-0.196 (-0.54)
Leverage	0.566** (2.46)	0.409 (1.55)	0.561** (2.41)	0.568** (2.46)	0.585** (2.50)	0.582** (2.49)
Cash / Total Assets	0.170 (0.52)	-0.493 (-1.22)	0.354 (1.04)	-0.023 (-0.07)	-0.014 (-0.04)	-0.058 (-0.17)
Dividend Payer (Dummy)	0.449*** (3.53)	0.404*** (2.68)	0.466*** (3.61)	0.457*** (3.58)	0.408*** (3.19)	0.407*** (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)	(2)	(3)	(4)	(5)	(6)
	TH Sub (Dummy)	TH Sub (Dummy)	TH Sub (Dummy)	TH Sub (Dummy)	TH Sub (Dummy)	TH Sub (Dummy)
Log (Assets)	0.285*** (14.83)	0.267*** (11.20)	0.278*** (14.37)	0.282*** (14.65)	0.251*** (12.80)	0.244*** (12.42)
Return on Assets	-0.049 (-0.15)	-0.459 (-1.10)	-0.070 (-0.21)	-0.015 (-0.04)	-0.086 (-0.26)	-0.144 (-0.44)
Effective tax rate	0.206 (1.03)	0.397* (1.65)	0.230 (1.14)	0.204 (1.02)	0.251 (1.25)	0.276 (1.37)
Leverage	0.239* (1.80)	0.094 (0.54)	0.250* (1.86)	0.257* (1.93)	0.312** (2.32)	0.332** (2.47)
Cash / Total Assets	0.329 (1.38)	0.585* (1.79)	0.375 (1.55)	0.220 (0.90)	0.249 (1.02)	0.183 (0.75)
Dividend Payer (Dummy)	0.193** (2.52)	0.203** (2.07)	0.200*** (2.60)	0.207*** (2.70)	0.188** (2.43)	0.186** (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

Appendix 3: Tax Information Exchange Agreements passed by Non-Tax Haven Countries

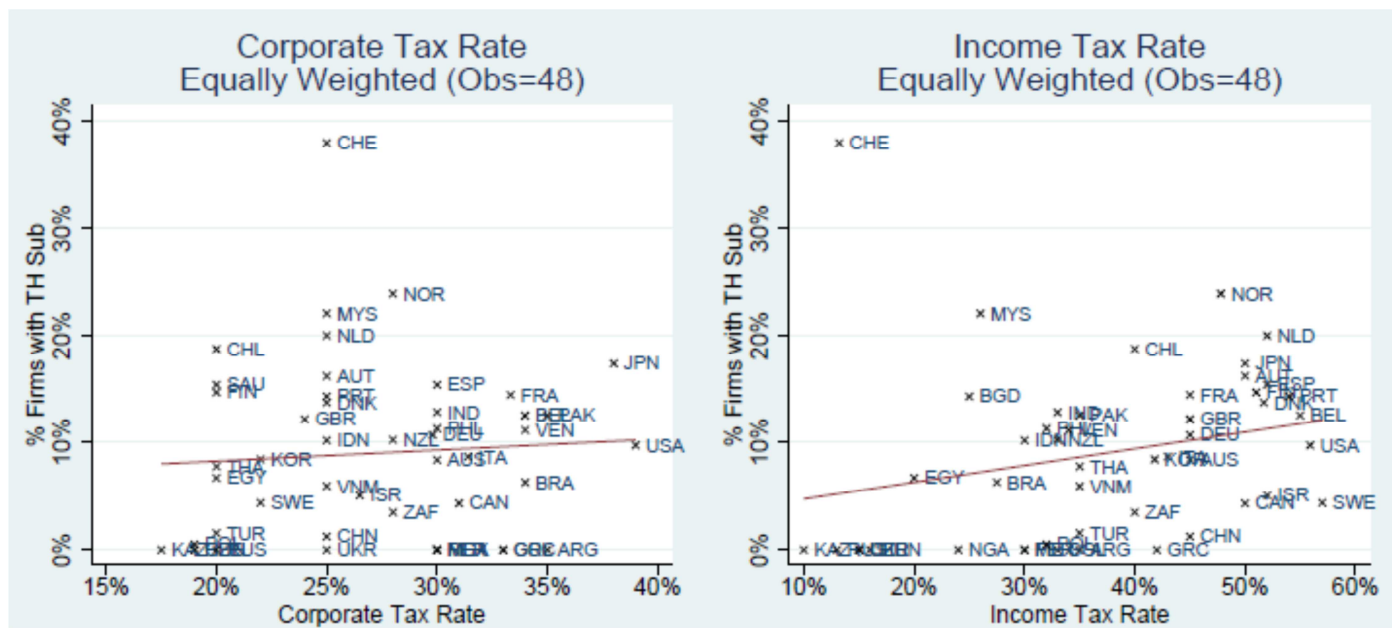
This table lists Tax Information Exchange Agreements (TIEAs) involving exactly one tax haven country (or non-sovereign nation) and one non-tax haven country (Source: OECD *Harmful Tax Practices*) and affecting at least one sample firm. Listed are non-tax haven signatories (Panel A) and Tax Haven signatories. 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

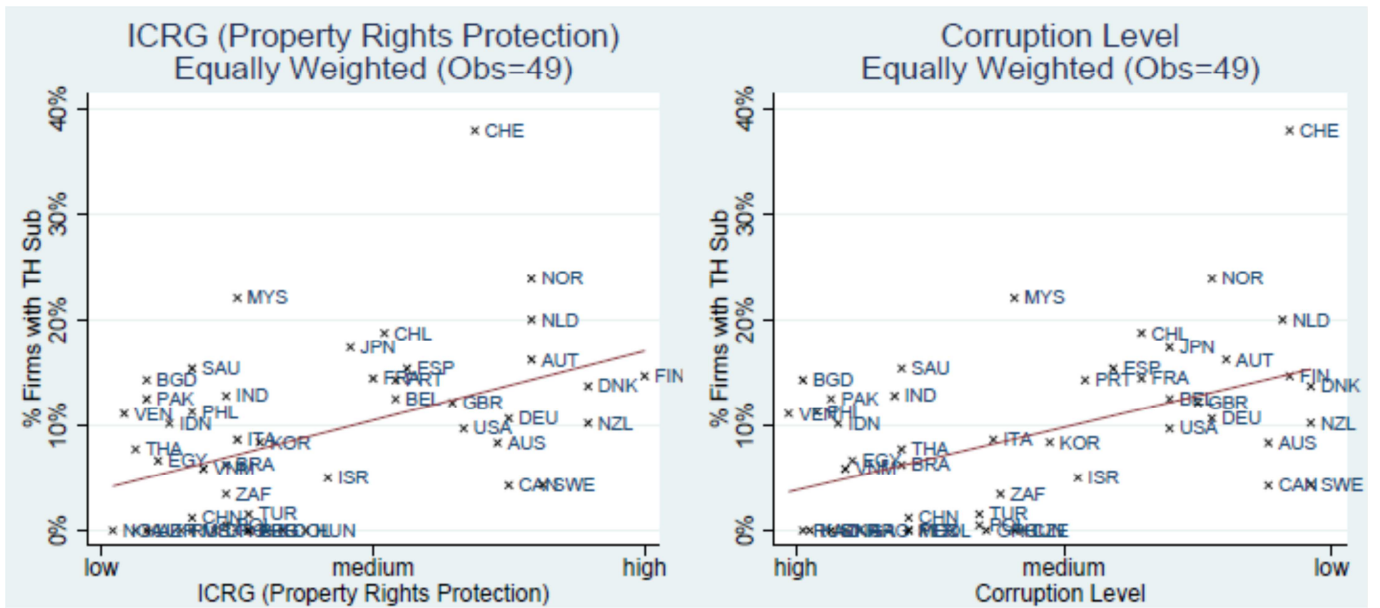
Figure 1: The use of tax haven subsidiaries and country characteristics

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)

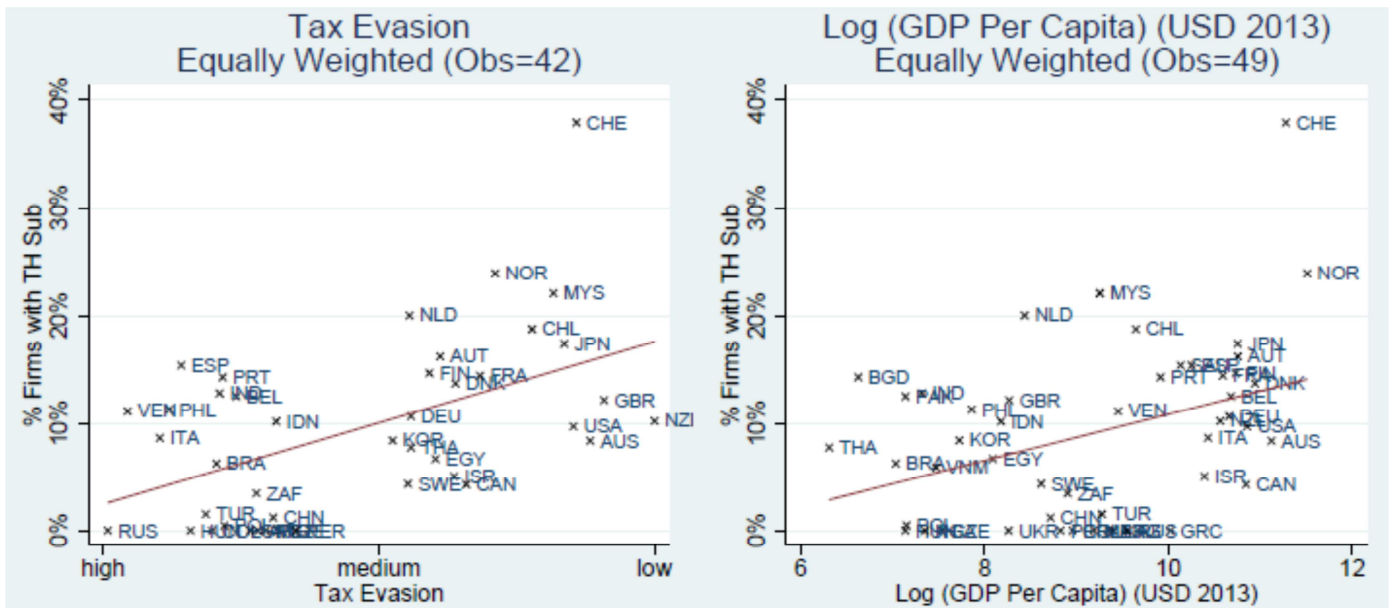


Figure 2: Value and use of tax haven subsidiaries around changes in corporate tax rates

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 subsidiary 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.

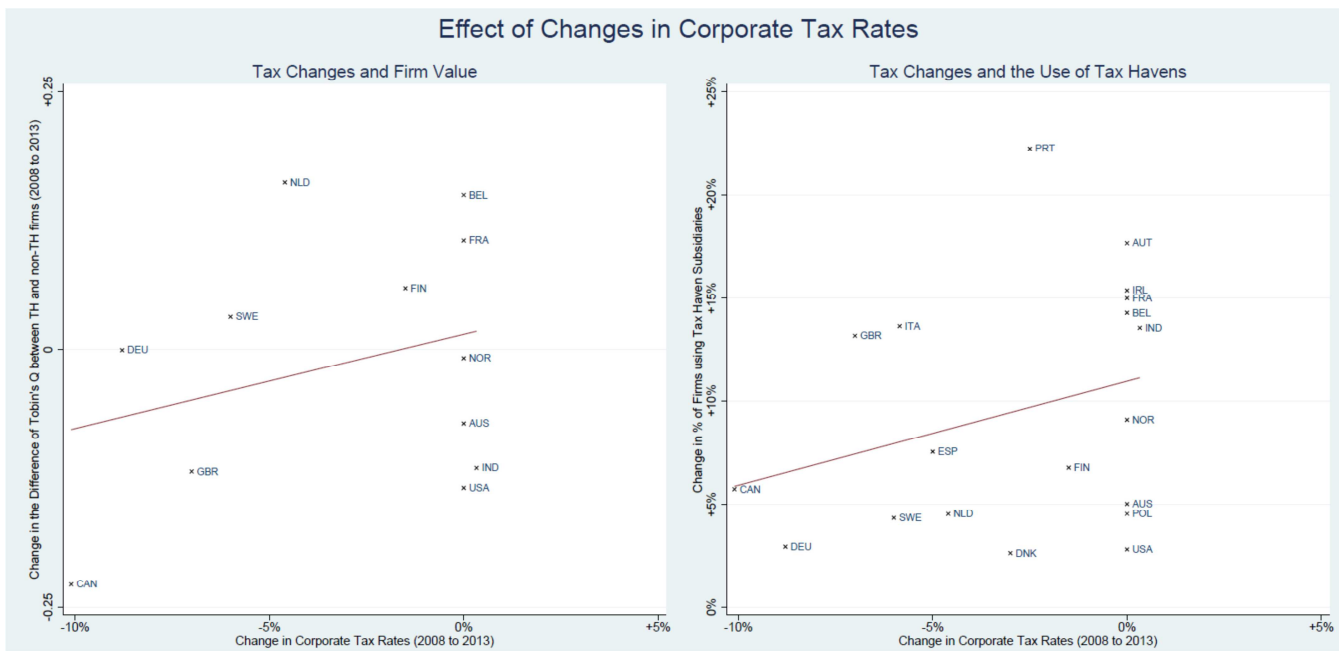
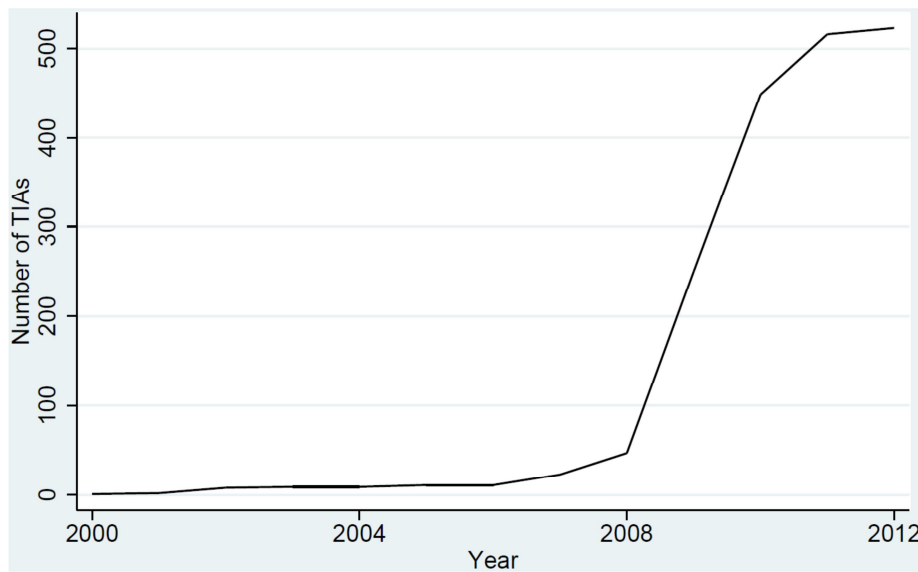


Figure 3: Tax Information Exchange Agreements and Treated Firms over time

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: Number of Tax Information Exchange Agreements (TIEA) over Time



Panel B: Number of Treated Firms over Time

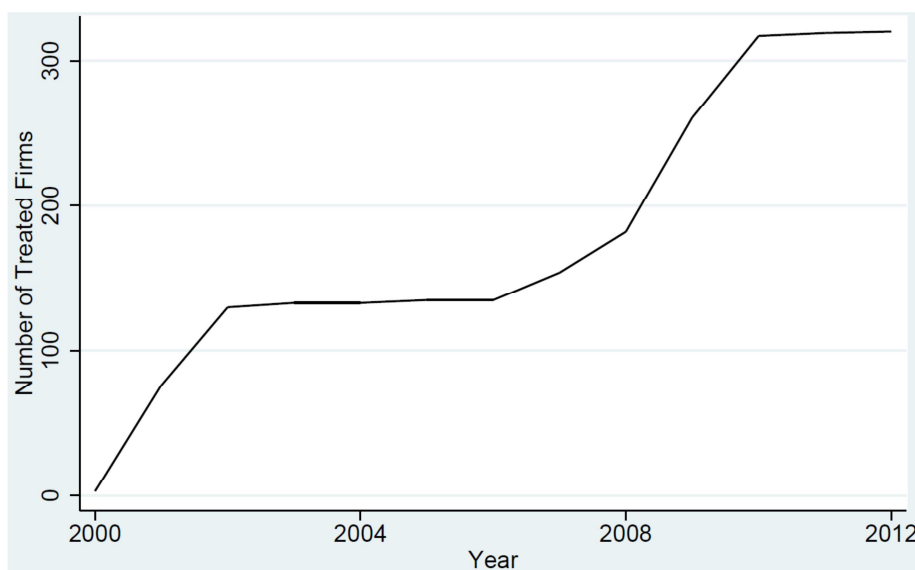


Figure 4: Firm Value around the Passage of Tax Information Exchange Agreements (TIEAs)

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 1 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, industry, as well as the natural logarithm of assets and the natural logarithm of assets squared.

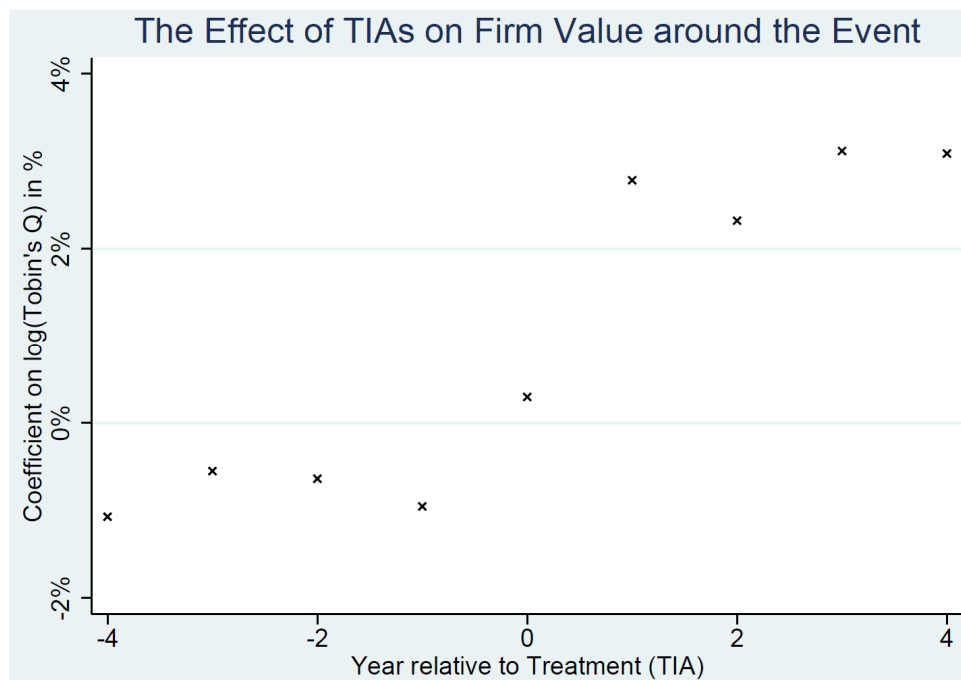


Figure 5: Daily returns of affected firms around the passage of Tax Information Exchange Agreements (TIEAs)

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.

