Essays on multinational firm behaviour: Profit shifting, secrecy jurisdictions and stock value

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Contents

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Introduction

The multinational enterprise is on the rise. In the last 30 years the share of global corporate profits accruing to non-residents has more than tripled (Tørsløv *et al.*, 2018). The rising importance of multinational corporations in world commerce has engendered increasing concern with their implications for global tax policies. Multinational firms can take advantage of international differences in corporate tax systems to reduce their tax burden. Globalization and the rise of intangible capital have significantly increased their tax avoidance opportunities. This is supported by the ongoing tax competition - between 1985 and 2018, the global average statutory corporate tax rate has fallen by more than half, from 49% to 24% (Bunn, 2018). Importantly, in 2018 the United States cut its corporate tax rate from 35% to 21%. Also other countries have announced their willingness to cut tax rates.

There are two types of effects that arise due to the tax competition between countries worldwide - real effects and financial (profit shifting) effects. First, the real effects is that multinational firms have incentives to move their tangible capital, employment and economic activities from high-tax countries to low-tax countries. Second, the profit shifting effects is that multinational firms shift their paper profits to tax havens by manipulating transfer prices, using intra-group borrowing and locating intangibles or royalties in low-tax subsidiaries. Both types of effects contribute to lost corporate income tax revenue for governments.

Today's largest multinational firms are typically technology-intensive and do not tend to own much tangible capital, so they do not seem to move much tangible capital to low-tax countries. For instance, Google Alphabet made $19.2 billion revenue in Bermuda in 2016, where it has almost no workers or tangible assets, but where the corporate tax rate is zero percent. Hence, profit shifting seems to be a key driver of the decline in corporate income tax rates. It has been estimated that close to 40% of multinational profits were artificially shifted to tax havens in 2015 (Tørsløv *et al.*, 2018).

The economic literature on tax havens has mostly viewed them as places that offer opportunities for tax evasion and legal tax planning to individuals and businesses. However, tax havens also provide opportunities to evade national and international regulation and lower the costs of criminal activities. The veil of secrecy associated with tax haven subsidiaries may allow for a range of activities from direct expropriation through tunneling and outright theft to less extreme forms such as managerial slack (Bennedsen & Zeume, 2018; Schjelderup, 2016).

Accordingly, empirical evidence from stock market returns shows that stock prices

decline following the public revelation of firms engaging in tax sheltering activities, especially for firms in the retail sector, thereby pointing to a reputational interpretation of tax avoidance (Hanlon & Slemrod, 2009; Kim *et al.*, 2011). Consistent with this argument, Dyreng *et al.* (2016) find that firms' tax and disclosure strategies respond to public pressure, and a survey led by Graham *et al.* (2013) shows that a large majority of tax executives in their sample (69%) rank reputational concerns as an important factor deterring firms from avoiding taxes.

Moreover, reports on firms' tax avoidance strategies have triggered an intense public debate, which has brought the issue to the top of the international policy agenda. Both the OECD and the EU Commission are working on measures to fight tax avoidance and profit shifting by multinational firms. The taxation of multinational companies is a challenging and complex issue. Countries want to make sure that corporations bear a fair part of the overall tax burden, but they also want to attract investment and jobs. From a global perspective, firms should invest where the capital is most productive, not where taxes are lowest.

Hence, this thesis focuses on multinationals' profit shifting, with a particular attention to secrecy aspect of tax havens, stock market evaluation of firms' engagement in tax avoidance and international policies to limit profit shifting.

The first chapter is co-authored with Evelina Gavrilova-Zoutman. We examine investor reaction to news on firms' decisions to acquire affiliates located in known secrecy havens. We find that acquisitions of affiliates in secrecy havens affect share prices negatively, especially for firms with an existing network of secrecy haven affiliates. For an average S&P 500 firm, acquisition of a secrecy haven affiliate erases $685 million in its market capitalization. The market reaction to acquisitions of secrecy haven affiliates is particularly negative during the financial crisis years and for firms operating in the retail sector. Investors react less negatively to acquisitions of affiliates in secrecy havens if the acquirer firm or the target firm is well-governed. The market reaction is also less negative if the acquirer firm is more tax aggressive and if the secrecy haven has a low corporate tax rate, which indicates that investors consider the potential future tax savings as positive news. Investors react positively to enforcement of tax information exchange agreements, which increase transparency of the corporate structure to domestic authorities and investors. The findings suggest that investors are concerned about firms' secrecy, but also that potential future tax planning opportunities mitigate these concerns.

In the second chapter I study publication of the European Union (EU) tax haven blacklist on December 5, 2017 to examine whether and how the use of recognized tax

havens affects firm value. I find that the tax haven naming and shaming by the EU was associated with a negative stock price reaction of firms with tax haven subsidiaries. Overall, publication of the blacklist erased $56 billion in market capitalization among the implicated firms. The largest reaction was for those tax havens, for which it was not foreseeable that they would be included in the blacklist. Retail firms experienced a larger decrease in share price than firms in other industries, which is consistent with a potential consumer backlash. Also more tax aggressive firms faced more negative returns, which suggests that investors expect firms might be audited or fined for past or overly aggressive tax avoidance. The negative reaction was less pronounced in countries with low levels of investor protection and weakly-governed firms with substantial conflicts of interest between principals and shareholders. This is consistent with increased scrutiny and potential for countermeasures associated with the blacklist, which reduce opportunities for managerial wealth diversion. Importantly, firms with the blacklisted tax haven subsidiaries subsequently demonstrate reduced economic activity in their tax haven subsidiaries, reduce their tax haven exposure and become less tax aggressive.

Finally, the third chapter is co-authored with Guttorm Schjelderup. We study how a multinational firm's choice to centralize or decentralize its decision structure affects profit shifting incentives under a destination-based cash-flow tax (DBCFT) system. When decisions are centralized and the DBCFT is universally adopted, profit shifting incentives vanish. If a single country adopts the DBCFT and decisions are centralized, profits are shifted to the adopting country. When there are strategic reasons to decentralize decisions, we show that profit shifting incentives exist both under universal and unilateral adoption.

References

Bennedsen, Morten, & Zeume, Stefan. 2018. Corporate tax havens and transparency. *The Review of Financial Studies*, **31**(4), 1221–1264.

Bunn, Daniel. 2018. Corporate income tax rates around the world, 2018. *Tax Foundation*, Nov., 1–10.

Dyreng, S.D, Hoopes, J.L, & Wilde, J.H. 2016. Public pressure and corporate tax behavior. *Journal of Accounting Research*, **54**(1), 147–186.

Graham, John R, Hanlon, Michelle, Shevlin, Terry, & Shroff, Nemit. 2013. Incentives for tax planning and avoidance: Evidence from the field. *The Accounting Review*, **89**(3), 991–1023.

Hanlon, Michelle, & Slemrod, Joel. 2009. What does tax aggressiveness signal? Evidence from stock price reactions to news about tax shelter involvement. *Journal of Public Economics*, **93**(1), 126–141.

Kim, Jeong-Bon, Li, Yinghua, & Zhang, Liandong. 2011. Corporate tax avoidance and stock price crash risk: Firm-level analysis. *Journal of Financial Economics*, **100**(3), 639–662.

Schjelderup, Guttorm. 2016. Secrecy jurisdictions. *International Tax and Public Finance*, **23**(1), 168–189.

Tørsløv, Thomas R., Wier, Ludvig S., & Zucman, Gabriel. 2018. The missing profits of nations. *NBER Working Paper No. 24701.*

Chapter 1

Stairway to haven: Market attitudes towards secrecy shopping*

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Abstract

Tax aggressiveness is known to come with the cost of less transparency in the corporate structure. In this paper we study the reaction of the average investor to news on firms' decisions to acquire affiliates located in known secrecy havens. We find that such acquisitions decrease share prices by almost 1 percent. For an average S&P 500 firm, acquisition of a secrecy haven affiliate erases $685 million in its market capitalization. We find a stronger effect for firms with an already existing network of secrecy haven affiliates, suggesting that investors dislike the lack of transparency. When we take into account the corporate governance, we find that the negative effect of secrecy decreases, showing that good governance can compensate for the obfuscation due to extra secrecy. When we take into account tax aggressiveness we find that investors react less negatively to acquisitions of affiliates in secrecy havens with low statutory corporate tax rates. This suggests that investors view the potential future tax saving opportunities as positive news. Similarly, the market reaction is less negative for more tax aggressive parent firms, which are likely to acquire affiliates in secrecy havens as part of their tax saving strategies. The findings suggest that investors are concerned about firms' secrecy; however, potential future tax planning opportunities mitigate these concerns.

JEL classification: G12, G32, H26

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... the letter that auditors Grant Thornton SpA used to confirm the existence of the fake Bonlat account was created using low-tech scissors to cut out a Bank of America logo.
Court documents say former Chief Financial Officer Fausto Tonna has admitted the logo was scanned into a computer and used to produce counterfeit letterhead. Company officials faxed it to the auditors, making billions appear where none existed.

David McHugh, The Seattle Times, 2004

1.1 Introduction

The common tenet among high-profile fraud cases like Enron, Parmalat and Olympus was the existence of a constellation of shell companies through which losses of the parent were hidden. The problem with a complex corporate structure is the lack of transparency, where, as shown in the above quote, one can make billions appear or disappear without a reasonable doubt or the raising of an eyebrow. Yet, the world has come a long way from these scandals and likely investors have learned to be cautious about complex corporate structures. One would expect that markets have become more efficient now that we know that in some countries one can hide funds, companies, crimes, corruption, and other secrets.

These countries are usually referred to as secrecy jurisdictions, tax and offshore havens. They provide low tax rates to foreign-owned companies. However, coincidentally, many of these jurisdictions also maintain a layer of secrecy - it is often impossible to determine who is the beneficial owner of a company(Schjelderup, 2016). For example, traditional tax havens like the Virgin Islands and the Bahamas offer both low taxes and secrecy. The lack of transparency can be used for nefarious purposes like hiding the dealings of a manager or the ultimate culprit for an environmental crime, but it can also be used to protect the trade secrets and to maintain a low overall tax rate. Previous literature has already established that tax aggressiveness and lack of transparency are intimately related (for e.g. Braun & Weichenrieder, 2015; Balakrishnan *et al.*, 2018).

On the one hand, we expect that markets are efficient and have discounted the low probability of detection that comes from secrecy. On the other hand, the Panama papers and their impact show that investors are not always aware of the extent of secrecy layers within a firm (O'Donovan *et al.*, 2019). Therefore, we want to determine whether the acquisition of an additional secrecy layer makes investors leery. In this paper we want to disentangle different motivations for secrecy from tax aggressiveness and their effect

on the stock price.

We hypothesize that acquisition of an affiliate in a haven[1] country will be seen differently than an acquisition in a non-haven country. We want to determine whether investors view these two types of countries as different and whether they deem that a haven acquisition reveals new information about the company. To test our hypotheses, we use firm-level historical ownership data from the Orbis Historical database from 2007 to 2014, merged with data on acquisition deals from the Zephyr database for the S&P 500 firms. We link the acquisition events to an event window of stock market prices and look at the share price reaction to acquiring an affiliate in a haven jurisdiction.

We find around 1 percent decrease in returns following acquisition deals in secrecy havens, as compared to acquisition deals in non-haven countries. In economic terms, acquisition of a secrecy haven affiliate reduces the market capitalization of an average S&P 500 firm by $685 million. Our results imply that increased secrecy does raise concerns among investors. The negative reaction increases with the proportion of secrecy haven affiliates the firm has, when the structure of a company is complex and non-transparent. Nevertheless, investors react less negatively to acquisitions of affiliates in secrecy havens if the parent firm or the target firm is well-governed. Higher governance minimizes agency problems on the side of the manager by increasing the probability of detection. Furthermore, our findings show that investors react less negatively to acquisitions of affiliates in secrecy havens with low corporate tax rates, suggesting that investors view the potential future tax saving opportunities as positive news. Similarly, the reaction is less negative for more tax aggressive parent firms, which potentially acquire secrecy haven affiliates to support and maintain their tax saving strategies. Finally, the negative market reaction is particularly strong during the financial crisis years.

Our findings, taken together with the previous literature, draw a complex relationship between transparency, tax aggressiveness and firm value.

On the one hand, stock prices decline when there are news about corporate tax aggressiveness (Hanlon & Slemrod, 2009; Johannesen & Larsen, 2016; Dyreng *et al.*, 2016; O'Donovan *et al.*, 2019). Part of the reaction seems to be due to consumer-taxpayer backlash, part due to expected future investigation by tax authorities and another part due to increased tax payments in the future.

On the other hand, the negative reaction to tax havens is already expected by managers (Graham *et al.*, 2014; Akamah *et al.*, 2018). For example, Akamah *et al.* (2018) suggest that managers try to avoid criticisms of shifting profits to low-tax countries

[1] We use haven as a catchall term for tax havens, secrecy jurisdictions and offshore service providers.

by concealing the name of the havens and aggregating the geographic disclosures to a greater extent.

Yet, the demand for disclosure on tax haven holdings is a direct demand for more transparency and less secrecy in the corporate structure. Most of the previous papers do not disentangle the effect of tax aggressiveness from the impact of secrecy provided by a haven. In an exception, O'Donovan *et al.* (2019) find a positive reaction to the Panama Papers' shining light on the current structure because the transparency is likely to decrease managerial diversion activities in the future. Similarly, Bennedsen & Zeume (2018) show that an increase in the transparency of corporate tax haven activities is associated with a 2.5% increase in the value of the affected firm. Our paper differs in that we examine the addition of a new affiliate, rather than the increase in available information to investors. Our findings are consistent with investors appreciating transparency and being apprehensive of the need to add a layer of secrecy to the current structure.

The paper proceeds as follows. In section 1.2 we develop our methodology and hypothesis. In section 1.3 we describe our data collection and provide descriptive statistics on acquisition deals. Section 1.4 discusses our results and section 1.5 concludes.

1.2 Methodology and hypothesis

We use an event study methodology to capture the current expectations of investors to news that a firm is acquiring an affiliate in a haven. We estimate a regression of the following type:

$$CAR_{di} = \alpha_{di} + \beta \times H(0/1)_{di} + \mathbf{X}_i\gamma + \varepsilon_{di}, \tag{1}$$

where CAR_{di} is the cumulative abnormal return of acquirer firm i for the completed acquisition deal d around the five day event window [-1;3] around the acquisition completion date (t=0). ε_{di} is a deal-specific error term. $H(0/1)$ denotes the country of the target of the acquisition. If the acquisition is in a haven country, then $H(0/1) = 1$ and the returns would be additionally influenced by the effect β. $\mathbf{X}_i$ contains industry fixed effects (NACE Rev. 2)[2] and the control variables - log(deal value), log(proportion of foreign affiliates) and cash deal dummy. (Log) deal value allows us to account for variation in the abnormal returns due to a difference between acquiring a small company versus a large company. (Log) proportion of foreign affiliates allows us to condition

[2]The results are unchanged if we use Fama French 49 industry classification instead. Other specifications are explored in the robustness tests.

on the complexity of the acquirer firm, and therefore capture with β the effect of the marginal acquisition. Finally, we also control for the type of financing of the deal, cash or not, as the liquidity can give an additional signal to investors about the acquirer and confound the estimation of the main effect.

We present results where we modify our modelling choices to determine the robustness of our findings. First, we implement the single factor market model to construct expected returns over the event window, according to MacKinlay (1997). In order to test the robustness of our results, we also calculate the abnormal returns according to the mean-adjusted model, market-adjusted model and capital asset pricing model. Methodology for these models is presented in Appendix A.1.1. Second, we vary the length of the event window, where in previous related literature three days have been used by Hanlon & Slemrod (2009), while the event window of five days has been used by O'Donovan *et al.* (2019). Previous event studies on mergers and acquisitions use event windows of various lengths. Third, we include in the appendix additional results for the rumour and announcement dates of an acquisition deal, whereas here we focus on deal completion events for reasons of brevity.

Our main hypothesis is that the market should react differently to acquisitions in a haven country with respect to a non-haven country. Therefore, we expect that

$$H_1 : \beta \neq 0.$$

Identification comes from distinguishing between haven and non-haven countries. Our main measure of haven countries is the Financial Secrecy Index, presented in the section 1.3.

Most papers in the previous literature lump together the *tax effect* and *secrecy effect*. Most haven countries provide both secrecy and tax services, therefore previous papers find that tax aggressiveness is related to a reduction in the transparency of the accounting information (Balakrishnan *et al.*, 2018; Chen *et al.*, 2018; Demere & Gramlich, 2018; Kim *et al.*, 2011; Schjelderup, 2016, with the exception of Durnev *et al.*, 2017; O'Donovan *et al.*, 2019). Given that the tax and secrecy effects are intertwined, it is difficult to distinguish between them in absence of exogenous variation that impacts differently the tax, secrecy and other aspects of haven countries. Therefore, as the first step we will estimate the overall effect β of an acquisition in a haven country.

O'Donovan *et al.* (2019) find evidence that publication of the Panama Papers led to a decrease in the market value of 400 big firms, which were exposed to using offshore vehicles to finance corruption and aggressively avoid taxes. Therefore, consistent with previous literature, we expect that $\beta < 0$.

However, haven countries are special because they offer a variety of services. Among them a low *tax* rate for foreign-owned companies, *secrecy* on the ownership of companies and different law *regulations* than the origin countries of multinational companies. A firm could acquire affiliates in such havens for a variety of reasons, among which lowering their overall tax bill through transfer pricing, strategically hiding ownership for insider trading schemes or to benefit of more lax regulations. In this paper we focus on the first two reasons: taxes and secrecy. Therefore, it is likely that

$$\beta = \beta^T + \beta^S + \beta^\epsilon,$$

where β^T is the tax effect of potentially lowering the overall tax bill and β^S is the secrecy effect of obtaining a veil of secrecy between activities of the parent and the affiliate. β^ϵ captures the residual effect of the acquisition deal and it includes the impact of different law regulations, competition and restructuring concerns. In order to determine, which effect and investor concern has the strongest impact on β, we expand the main specification 1 in several directions.

Secrecy effect. There are different motivations to obtain a haven affiliate for the purpose of adding a layer of secrecy to the corporate structure.

Secrecy can be used to a variety of goals, from defending trade secrets such as particular supply chains to hiding losses and covering managerial fraud. From the perspective of the investor, secrecy can be both good and bad, and therefore β^S does not have a clear-cut effect. In either case, the veil of secrecy lowers the probability of detection. The more complex a corporate structure becomes, the more difficult it is to follow any money trail.

First, we focus on determining the impact of lowering the probability of detection by adding a secrecy layer to an already complex corporate structure. We hypothesize that the increased secrecy due to yet another secrecy haven acquisition should be especially important for firms that already have an established network of haven jurisdictions. Investors are likely to react negatively to increased opacity of the corporate structure if they are concerned about the possibility of fraud arising from many secretive jurisdictions. Hence, we modify specification 1 and add an interaction term to control for the existing secrecy haven exposure of the firm.

We measure the exposure in three ways. First, we divide the number of haven affiliates by the number of total affiliates of the firm for each deal d and we transform this variable into a dummy which equals 1 if the firm has an above-median proportion of affiliates in secrecy havens, and it equals 0 otherwise. Second, we calculate the average secrecy score of all affiliates of the firm and we create a dummy which equals 1 if the

firm has an above-median average secrecy score, and it equals 0 otherwise. Third, we use the raw value of the FSI for the target country. The interaction term allows us to compare firms with a large exposure to secrecy havens to those with a small exposure. If there is indeed an investor concern due to opacity we expect that the coefficient of the interaction $\beta^{S1} < 0$.

One way to distinguish between positive and negative reasons for secrecy is to take into account the corporate governance. Companies with a larger share of institutional ownership would be less likely to engage in nefarious offshore activities, due to the extra attention of shareholders (Rohrer, 2017; Santana & Rezende, 2016; Li *et al.*, 2017; Kim *et al.*, 2011). On the flip side, companies could use havens in order to hide activity under the influence of bad governance (Hebous & Lipatov, 2014). Therefore, we distinguish between good and bad secrecy by interacting the haven indicator variable with the fraction of institutional ownership of the acquirer company. If a company has a good corporate governance, then the acquisition of another secrecy affiliate should not raise investor concerns.

Similarly, acquisitions of target companies that are located in more corrupt countries are likely to rise more corporate governance concerns than acquisitions in less corrupt countries. We control for this by interacting the haven indicator variable with an indicator variable for the target firm being located in one of the most perceptively corrupt tercile of countries, according to Transparency International, 2016. If the secrecy haven is also located in a corrupt country, then the acquisition of such an affiliate is likely to amplify investor concerns.

Tax effect. The purpose of acquiring an affiliate in a tax haven is straightforward in lowering the overall tax bill for the company. On the one hand, firms can use new affiliates in order to avoid paying taxes, which would lead to an increase in after-tax profits. This could be considered good news, implying that the *tax effect* $H_2 : \beta^T > 0$. However, Hasan *et al.* (2014) suggests that loan-giving banks could perceive tax avoidance activities as risky, earning a negative tax effect in expectation of future fines.

We try to discern the importance of the tax effect by adding an interaction term to specification 1, where we interact the acquisition indicator with the statutory tax rate of the target country. The resulting coefficient β^{T1} of the interaction would reveal the additional influence of tax concerns for investors. Similarly, we create tax bins for the target country's statutory corporate tax rate and create interaction terms with the acquisition indicator in order to see which tax bins contribute towards the market reaction. Finally, we examine whether the investor reaction differs for more tax aggressive firms by interacting the acquisition indicator with a variable for acquirer firm's tax ag-

gressiveness. Tax aggressive firms are more likely to acquire affiliates in secrecy havens as part of their tax saving strategies, instead of secrecy shopping.

1.3 Data and descriptive statistics

1.3.1 Data

To measure the impact of secrecy haven affiliate acquisitions on firm value, we obtain daily data on closing prices (adjusted for dividends and splits) on S&P 500 companies from *Yahoo! Finance* from 2007 to 2014. To control for exposure of the S&P 500 firms to specific havens over time, we obtain historical ownership data on these firms from Orbis Historical database, provided by Bureau van Dijk. We merge these data with data on acquisitions from the Zephyr database, provided by Bureau van Dijk. We obtain data on rumour, announcement and completion dates of deals between parent firms and target firms, where the acquirer firm is the S&P 500 company.

It is important to note that our variables are constructed, based on publicly available information on firms' corporate structures. Companies disclose ownership data themselves, either when they disclose their shareholders or list their subsidiaries. Laws and regulations regarding disclosure of ownership data vary widely between countries. The same is true for common company practices that often go beyond the legal requirements. It is possible that not all haven subsidiaries are observed , which can induce a bias on our findings on the importance of secrecy.

In order to distinguish between countries that can be considered (tax or secrecy) havens and non-havens, we use the Financial Secrecy Index (FSI) developed by the Tax Justice Network (2015). The FSI ranks jurisdictions according to their secrecy and the scale of their offshore financial activities.[3] We extract the secrecy score for each country and use a rating of higher than 60 as a cut-off to define a secrecy haven.[4] Table A.2 shows the target firm countries in our sample and their secrecy scores, according to the FSI.

Further, in order to identify tax havens, we obtain the worldwide statutory corporate tax rates from the corporate tax rates table provided by KPMG (n.d.). For the purpose of the analysis, we then split the tax rate into four equally-sized bins. Tax bin 1 covers tax rates from 0 to 10%, tax bin 2 covers tax rates from 10% to 20%, tax bin 3 from

[3]The FSI is a ranking of jurisdictions based on combining a qualitative measure (a secrecy score, based on 20 secrecy indicators) with a quantitative measure (the global weighting to give a sense of how large the offshore financial centre is). Full details of the methodology are available on Tax Justice Network (2018).

[4]We use other secrecy score thresholds in robustness tests.

20% to 30% and tax bin 4 covers the residual of all other tax rates from 30% to 55%.

1.3.2 Descriptive statistics

In Table 1 we present summary statistics, distinguishing between acquisitions of affiliates in haven countries and non-haven countries. The table is defined over the acquisition deals as the unit of observation. In the last two columns we present the p-values of a t-test for difference in means between the two types of deals overall and on a matched sub-sample. We provide a complete list with variable definitions and source in Table A.1.

In panel A of Table 1, we focus on deal characteristics. We observe that even though deals in non-haven countries are for larger amounts of money than haven deals, they are not significantly different from one another. However, acquisitions of non-haven affiliates involve a larger fraction of cash financing. Non-haven acquisitions also take longer amount of time from rumour to completion, since deals in haven countries are more likely to be completed in one day. This reveals that haven deals are more likely to be suddenly announced, so that rumour, announcement and completion of the acquisition are all coded to have occurred on the same day. In our analysis we focus on the study of the event of completion of acquisition deals and we consider the rumours and announcements in the appendix.

In panel B of Table 1 we focus on the acquirer side of the deal. Acquirers in haven deals are likely to be larger firms, with larger market capitalization. These firms have also on average significantly more affiliates, which tend to be foreign and based in havens. For most of these firms the acquisition deal is the addition of an extra haven affiliate, given a large existing multinational structure with other haven affiliates. There is no significant difference in the firm-level governance or tax aggressiveness between firms engaging in the two types of deals.

In Panel C we examine target firm characteristics. Acquired firms in havens have lower statutory corporate tax rates. Haven affiliates are located in countries with substantially higher corruption and a higher GDP per capita than non-haven affiliates.

Finally, in Figure 1 we investigate how the number of completed acquisition deals has changed over years. The S&P 500 firms tend to complete many more acquisitions of affiliates in non-haven countries than secrecy haven countries. During the financial crisis years, the number of acquisitions of affiliates in non-haven countries decreased sharply, while it did not substantially change for acquisitions of affiliates in secrecy haven countries. While the acquisitions of affiliates in non-havens reached the pre-crisis level in 2014, the number of acquisitions of affiliates in secrecy havens started to decline

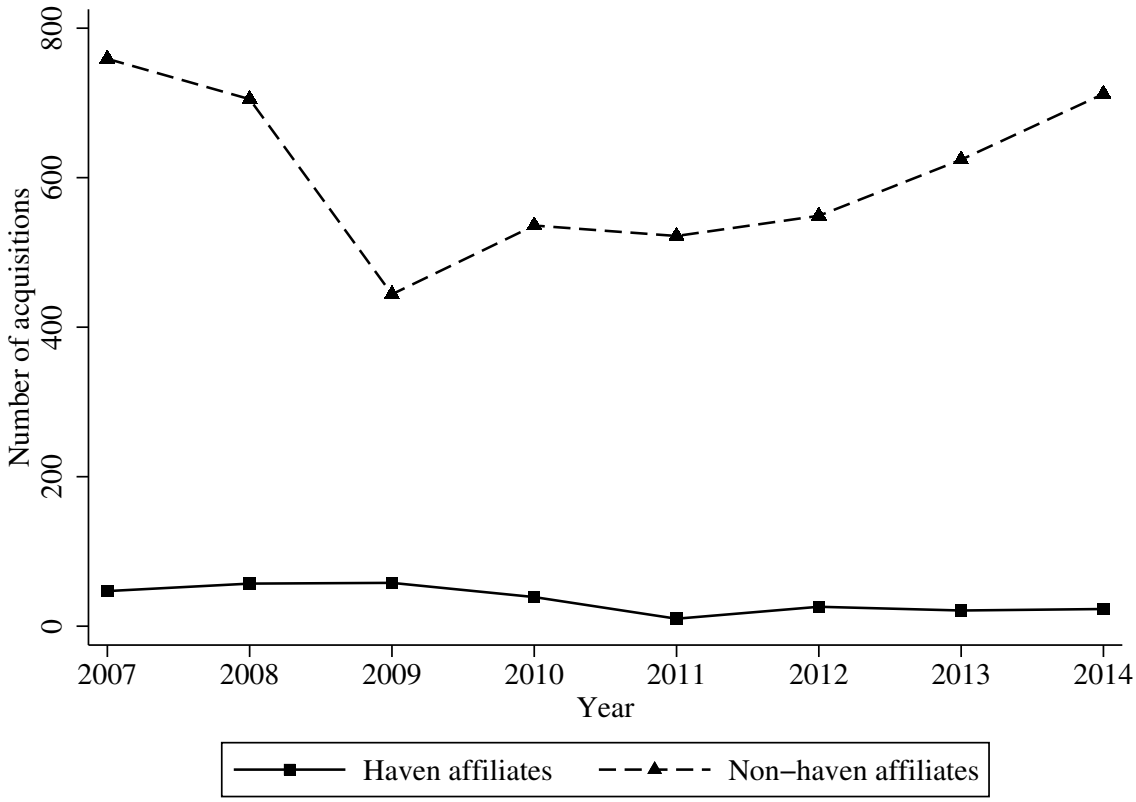
Table 1: Descriptive statistics

	Acquisitions of non-havens		Acquisitions of havens		Difference full	Difference matched
	Mean	SD	Mean	SD	P-value	P-value
Panel A: Deal characteristics						
Deal value (m USD)	1 333.66	6 482.48	643.45	4 100.48	0.10	1
Cash financing (0/1)	0.46	0.50	0.28	0.45	0	0
Deal length (number of days)	72.46	174.24	36.77	97.61	0	0.20
Deal rumoured (0/1)	1	0	1	0		
Deal announced (0/1)	0.92	0.27	0.94	0.24	0.33	0.15
Deal completed (0/1)	0.80	0.40	0.83	0.37	0.11	0.89
Panel B: Acquirer characteristics						
Market capitalization (bln USD)	66.16	75.75	81.08	63.67	0	0
Number of affiliates	600.58	690.72	1 067.71	838.30	0	0
Proportion of foreign affiliates	0.62	0.24	0.67	0.16	0	0.01
Proportion of secrecy havens	0.08	0.05	0.10	0.04	0	0.05
Proportion of secrecy havens (0/1)	0.54	0.007	0.76	0.03	0	0
Average secrecy score	51.94	4.41	51.99	3.21	0.84	0.96
Average secrecy score (0/1)	0.53	0.01	0.56	0.03	0.23	1
Has existing secrecy havens (0/1)	0.93	0.25	0.99	0.11	0	0.02
Foreign institutional ownership (total)	0.05	0.15	0.04	0.15	0.10	0.53
Tax aggressiveness	0.004	0.001	0.004	0.003	0.96	0.06
Panel C: Target characteristics						
Tax rate	0.35	0.06	0.17	0.14	0	0
Secrecy score	53.54	8.88	68.73	4.44	0	0
Financial Secrecy Index value	0.70	0.007	0.80	0.03	0	0.45
Corruption (0/1)	0.01	0.10	0.03	0.17	0	0.09
GDP per capita (th USD)	40.63	12.81	42.28	48.83	0.08	0.85

Notes: This table shows the descriptive statistics on acquisition deals, distinguishing between acquisitions of affiliates in non-havens and havens. The table is defined over the acquisition deals as the unit of observation. In total, there are 4 754 non-haven acquisition deals and 281 haven acquisition deals. *Mean* is the average value of the observations. *SD* is the standard deviation of the observations. *P-value* shows whether the difference in means between the two groups is significant, either for the full sample (*Difference full*) or for the matched sample (*Difference matched*). We match the acquisition deals by nearest neighbour by deal value. *(0/1)* implies that the variable is a dummy variable. Table A.1 provides detailed variable definitions.

after 2009.

Figure 1: Number of completed acquisition deals over time

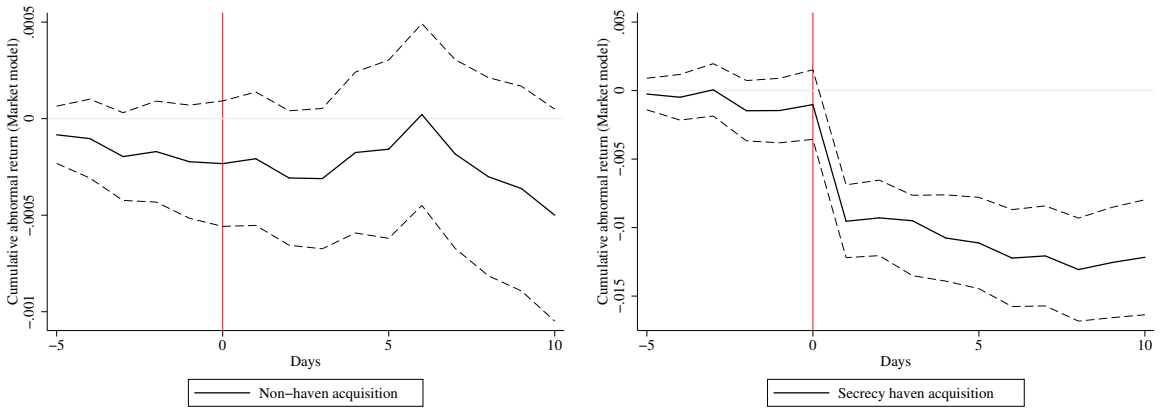


1.4 Results

1.4.1 Pre-event trends and preliminary results

In Figure 2 we show the cumulative abnormal returns, calculated according to the market model, around acquisitions of non-haven and haven affiliates. Non-haven acquisitions do not affect share prices significantly, so the cumulative abnormal returns are approximately zero and insignificant both before and after completion of non-haven acquisitions. Market reaction is significantly negative for haven acquisitions, so the cumulative abnormal returns become negative and statistically significant right after the acquisition. The cumulative effect is approximately 1% reduction in firm's stock price after acquisition of a secrecy haven. Overall, the figure shows that the methodology effectively accounts for the influence of variables on the pre-trends.

Figure 2: Market reaction to completion of acquisitions: Cumulative abnormal returns (Market model)



Notes: The graphs show the cumulative abnormal returns, calculated according to the market model, around completion of acquisition of affiliate in either a non-haven country or a secrecy haven country. The dashed lines represent the 95% confidence intervals for significance limits.

1.4.2 Main results

In Table 2 we present the main results. In columns 1 and 2 we show the average cumulative abnormal returns for acquisitions in non-haven countries and haven countries. We find that the returns from haven acquisitions seem to be always lower than the returns in non-haven acquisitions. In column 3 we test the hypothesis of a difference between haven and non-haven acquisitions, according to different expected return models. The market model is the baseline model in our study. We find that firms that acquire affiliates in havens have negative cumulative abnormal returns during the event window that are 0.92% lower than those of firms that acquire affiliates in non-havens. The results are robust to using different expected return models, ranging from 0.9 to 1.2 percent decrease in returns associated with haven acquisitions, as compared to non-haven acquisitions. Matching the acquisition deals by deal value decreases this differential to 0.54% for the baseline model. In economic terms, an acquisition of a secrecy haven affiliate reduces the market capitalization of an average S&P 500 firm by $685 million.

1.4.3 Secrecy effect

In Table 3 we present our main results on the secrecy effect. In column 1 we show the baseline estimate, corresponding to column 3 in Table 2. In order to gauge the relative importance of the secrecy effect, we estimate an interacted model in columns 2, 3 and 4. In column 2 we find that if the firm has an above-median exposure to secrecy havens, its cumulative abnormal returns decrease by 1.3% on average, following

Table 2: Cumulative returns of firms after haven and non-haven acquisitions

	(1)	(2)	(3)	(4)
	Non-haven acquisitions	Haven acquisitions	Full sample	Matched sample
	Mean	Mean	Difference	Difference
CRR	0.0021***	-0.0071*	-0.0092***	-0.0049**
Market model				
CAR	-0.0003	-0.0095***	-0.0092***	-0.0054**
Market-adjusted model				
CAR	0.0016**	-0.0084**	-0.0101***	-0.0063**
Mean-adjusted model				
CAR	0.0016**	-0.0073**	-0.0089***	-0.0046**
Capital asset pricing model				
CAR	0.0053***	-0.0066**	-0.0119***	-0.0107**

Notes: This table provides cumulative returns of the S&P 500 firms around completion of their acquisition deals, distinguishing between non-haven and haven acquisitions. Returns are cumulated over days around the acquisition, the event window is [-1;3] with respect to this date. The table distinguishes between cumulative returns in the full sample and matched sample, where acquisition deals are matched by closest neighbour by deal value. Significance of the cumulative abnormal returns is tested via an unadjusted t-statistic, using the sample standard deviation and robust standard errors. *CRR* is the cumulative raw return, obtained by summing up daily raw returns during the event period. *CAR* is the cumulative abnormal return, obtained according to several models to estimate expected returns. Methodology of these expected return models is explained in Appendix A.1.1. There are 4 754 completed acquisitions of non-haven affiliates and 281 acquisitions of haven affiliates. *, **, and *** denote significance at the 10%, 5%, and 1% levels.

an acquisition of a secrecy haven, as compared to firms with a below-median exposure to secrecy havens. Similarly, in column 3 we show that if the firm has an above-median average secrecy score, its cumulative abnormal returns decrease by 2% on average, following an acquisition of a secrecy haven, as compared to firms with a below-median average secrecy score. In column 4 we show that the larger the Financial Secrecy Index value of the acquired secrecy haven affiliate, the worse the market reaction. The results support our hypothesis that a complex corporate structure, consisting of many secrecy jurisdictions, creates the perception of obfuscation and the news on firm's decision to acquire additional secrecy haven affiliates are perceived more negatively for firms with a large existing network of secrecy jurisdictions.

Table 3: Market reaction to haven acquisitions. Secrecy effect I

	(1)	(2)	(3)	(4)
Haven affiliate acquisition	-0.00920***	-0.00037	0.00090	-0.00621*
	(0.00323)	(0.00408)	(0.00506)	(0.00320)
Haven affiliate acquisition · Proportion of secrecy havens		-0.01294**		
		(0.00631)		
Proportion of secrecy havens		0.00535***		
		(0.00171)		
Haven affiliate acquisition · Average secrecy score			-0.02019**	
			(0.00901)	
Average secrecy score			-0.00070	
			(0.00165)	
Haven affiliate acquisition · Affiliate's financial secrecy index value				-0.01289**
				(0.00584)
Affiliate's financial secrecy index value				0.00071
				(0.00159)
Interaction effect		-0.00692	-0.00893	-0.0165
R^2	0.020	0.022	0.023	0.021
Observations	5 035	5 035	5 035	5 035

Notes: The table shows the market reaction of S&P 500 firms around completion of their acquisition deals. The dependent variable is *Cumulative abnormal return*. Returns are cumulated over days around the acquisition, the event window is [-1;3] with respect to this date. All specifications include industry fixed effects (NACE Rev. 2) and control variables. Standard errors are clustered at the industry level and reported in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% levels.

In Table 4 we further examine how the cumulative abnormal returns after acquisitions of affiliates in havens are different for firms that already have an existing network of affiliates in secrecy havens and firms that do not. We hypothesize that investors should react negatively to both a firm's acquisition of its first secrecy haven affiliate and also to a firm's acquisition of a successive secrecy haven affiliate. Acquisition of the first secrecy haven affiliate might signal to investors that the firm wants to engage in secrecy planning, while acquisition of a successive haven affiliate might signal to investors the increased potential for expropriation and fraud. Existence of a complex corporate ownership structure makes it more difficult for authorities and analysts to determine and examine cash flows between the different structures. As the level of complexity increases, the likelihood of detection of potential fraud decreases and investors should become more cautious.

Therefore, we separate companies into two groups - companies with no pre-existing affiliates in havens and companies with pre-existing affiliates in havens. We implement our baseline regression analysis, controlling for firm's existing network of affiliates in secrecy havens. The results are displayed in Table 4 and must be interpreted with respect to the omitted category (firms that acquire non-haven affiliates and do not have any existing affiliates in secrecy havens). Column 1 shows the baseline specification (column 1 of Table 3) for ease of comparison. Consistent with our hypothesis, we show in column 2 that the main result is driven by companies which acquire their first secrecy haven affiliate, as well as firms that acquire yet another secrecy haven affiliate and are already exposed to havens. The results show that investors care about more opaque corporate structures and react negatively to evidence that the management is engaging in secrecy shopping activities. This signals the existence of potential expropriation activities behind the veil of secrecy.

Overall, the market reacts negatively to acquisitions of affiliates in secrecy havens, as compared to acquisitions of affiliates in other countries. The secrecy effect is even more negative if the firm is already exposed to secrecy to a large extent. The market seems to be penalizing the firm for opacity and lack of transparency. The more secrecy havens the firm has, the more it lacks transparency, so investors react negatively to yet another acquisition of an affiliate in a secrecy haven country.

Further, we examine whether the results differ for better governed parent firms, since, if the firm is well-governed and faces stronger regulations, it is less likely to acquire affiliates only for secrecy purposes. Well-governed firms are more likely to engage in value-enhancing activities and less likely to acquire affiliates in secrecy havens for the sole purpose of secrecy. We use the foreign institutional ownership (fraction of foreign

total investment) in order to define well-governed firms, in line with previous literature on corporate governance (Rao, 2018). In column 3 we find that better governed firms face less negative investor reaction to acquisitions of affiliates in secrecy havens.

Similarly, we examine whether investors react differently to acquisitions of affiliates in secrecy havens with relatively worse country-level governance in column 4. If the affiliate is located in a poorly-governed country, it is more likely that its secrecy could be used for expropriation purposes. We use the corruption index by the Transparency International as a measure to define poorly-governed affiliates. We find that the market reaction to secrecy haven acquisitions is more negative, the worse governed the acquired affiliate.[5]

The findings support our hypothesis that investors dislike the firm-wide opacity and secrecy that increases after acquisitions of affiliates in secrecy havens. If the acquisition deal characteristics suggest that the affiliate was not acquired solely for secrecy purposes, investors react less negatively to such acquisitions and the negative secrecy effect is mitigated.

1.4.4 Tax effect

In Table 5 we examine whether investors react differently to acquisitions of affiliates in havens in high- or low-taxed jurisdictions. In column 1 we show the baseline results. In column 2 we interact the haven acquisition indicator with the target country's statutory corporate tax rate. The results are barely significant and show that, the higher the tax rate of the acquired haven affiliate, the more negative the market reaction to the acquisition. In column 3, we aggregate the tax rates into 4 bins and show that the results in column 2 are driven by the positive investor reaction to acquisitions of low-taxed secrecy havens with statutory corporate tax rates below 20%, as compared to high-taxed secrecy haven acquisitions.[6] The omitted category is tax bin 4 or affiliates located in countries with tax rates higher than 30%. The results imply that investors react more positively to secrecy haven acquisitions in low-taxed jurisdictions, as compared to secrecy haven acquisitions in high-taxed jurisdictions. The findings suggest that there exists a positive tax effect due to potential future tax planning opportunities when acquiring secrecy haven affiliates in low-taxed jurisdictions.

Further, we examine whether the results differ for more tax aggressive firms, since such firms are more likely to acquire affiliates in secrecy havens as part of their tax

[5]The results are robust to using other country-level governance measures instead, such as minority shareholders risk, rule of law, property rights risk and country risk.

[6]Tax bin 1 covers tax rates from 0 to 10%, tax bin 2 covers tax rates from 10% to 20%, tax bin 3 from 20% to 30% and tax bin 4 from 30% to 55%.

Table 4: Market reaction to haven acquisitions: Secrecy effect II

	(1)	(2)	(3)	(4)
Haven affiliate acquisition	-0.00920***		-0.00963***	-0.00875***
	(0.00323)		(0.00317)	(0.00381)
Non-haven affiliate acquisition · Has existing secrecy havens		-0.00147		
		(0.00321)		
Haven affiliate acquisition · Does not have existing secrecy havens		-0.02203***		
		(0.00734)		
Haven affiliate acquisition · Has existing secrecy havens		-0.01051***		
		(0.00395)		
Haven affiliate acquisition · Parent foreign institutional ownership			0.01791*	
			(0.01037)	
Parent foreign institutional ownership			-0.00398	
			(0.00407)	
Haven affiliate acquisition · Target corruption				-0.01896***
				(0.00354)
Target corruption				-0.0156*
				(0.00739)
Interaction effect			-0.00912	-0.00878
R^2	0.020	0.020	0.020	0.025
Observations	5 035	5 035	5 035	5 035

Notes: This table examines the existing network of firms' secrecy haven affiliates and governance while determining firms' cumulative abnormal returns around completion of their acquisition deals. The dependent variable is *Cumulative abnormal return*. Returns are cumulated over days around the acquisition, the event window is [-1;3] with respect to this date. Column 1 shows the baseline specification (column 1 of Table 3) for ease of comparison. Table A.1 provides detailed variable definitions. All specifications include industry fixed effects and control variables. Standard errors are clustered at the industry level and reported in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% levels.

saving strategies. As column 4 shows, investor reaction to acquisitions of affiliates in secrecy havens is less negative, the more tax aggressive the parent firm is. Secrecy haven acquisitions by tax aggressive firms signal to investors that they are carried out in order to maintain firm's low effective tax rate, instead of secrecy shopping.

The findings suggest that investors are concerned about firms' secrecy; however, potential future tax planning opportunities mitigate these concerns. The market reacts negatively to evidence that the acquisition was done mainly for secrecy purposes and without the intention to use the acquired affiliate in a secrecy haven for tax avoidance purposes. If the acquisition deal characteristics suggest that the main purpose of the acquisition deal was tax savings, the investors react positively to such haven acquisitions. Then the negative secrecy effect is mitigated by the positive tax planning effect.

1.4.5 Extensions and robustness

In order to test whether the stock market reaction changes in different time periods, we implement year-by-year analysis and depict results graphically in Figure 3. The figure shows that the most negative reaction to acquisitions of affiliates in secrecy havens was in years 2007 until 2009, and it started to become more neutral after that. The reaction worsened again after 2011. The years 2007 until 2009 were characterized by the financial crisis and the following global economic downturn. It is likely that due to the economic distress, acquisitions of affiliates in secrecy havens were perceived as more risky, especially due to the diminished transparency they contributed to. Further, the negative reaction in 2012 and 2013 might be related to the United States debt-ceiling crisis, which led to downgraded US Global Credit Rating and an overall negative outlook on the country's credit. Also this might make investors more cautious regarding acquisitions of affiliates in secrecy havens. Moreover, the years after 2010 characterized the rise of "tax shaming", which could have influenced investors' responses to secrecy haven shopping.[7]

Further, in Table A.3 we show robustness tests of the main specification. The main

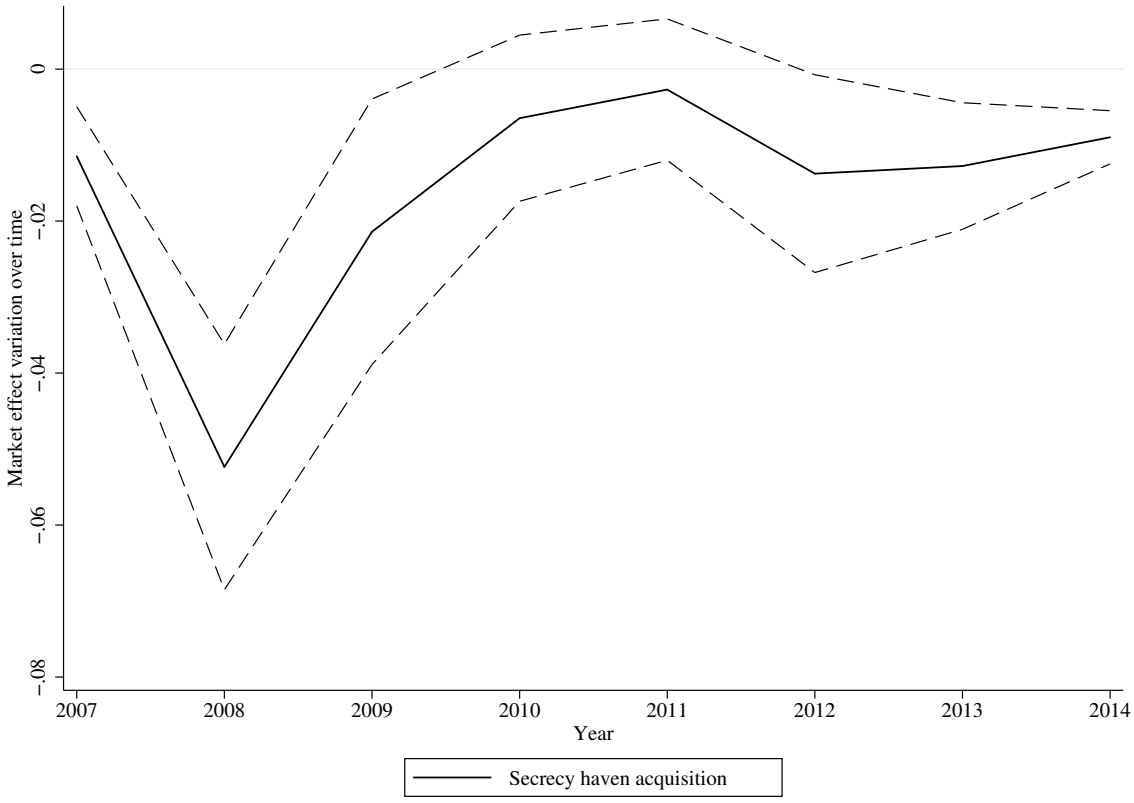
[7]In 2010, tax avoidance became a hot-button issue in the United Kingdom. An organisation, UK Uncut, began to encourage people to protest at local high-street shops that were thought to be avoiding tax, such as Vodafone, Topshop and the Arcadia Group (The Guardian, 2010). Further, a review in 2011 by Citizens for Tax Justice and the Institute on Taxation and Economic Policy of companies in the Fortune 500 profitable every year from 2008 through 2010 stated that these companies paid an average tax rate of 18.5% and that 30 of these companies actually had a negative income tax due (CNN, 2011). Moreover, in 2010, the United States implemented the Foreign Account Tax Compliance Act, which required financial firms around the world to report accounts held by US citizens to the Internal Revenue Service. This meant that the US received tax and asset information for American assets and income abroad, but did not share information about what happened in the United States with other countries. Hence, the US effectively became a secrecy jurisdiction itself.

Table 5: Market reaction to haven acquisitions: Tax effect

	(1)	(2)	(3)	(4)
Haven affiliate acquisition	-0.00920***	-0.00072	-0.02546***	-0.00721
	(0.00323)	(0.00761)	(0.00972)	(0.00970)
Haven affiliate acquisition · Tax rate		-0.06780*		
		(0.03857)		
Tax rate		-0.01047		
		(0.01434)		
Haven affiliate acquisition · Tax bin 1			0.03337***	
			(0.01294)	
Haven affiliate acquisition · Tax bin 2			0.01333***	
			(0.00420)	
Haven affiliate acquisition · Tax bin 3			0.00250	
			(0.01545)	
Tax bin 1			-0.00029	
			(0.00643)	
Tax bin 2			0.00069	
			(0.00603)	
Tax bin 3			0.00442	
			(0.00285)	
Haven affiliate acquisition · Tax aggressiveness				0.10269**
				(0.04014)
Tax aggressiveness				-0.00220
				(0.00866)
Interaction effect		-0.02232		-0.00926
R^2	0.020	0.023	0.025	0.021
Observations	5 035	5 035	5 035	5 035

Notes: This table examines the target firms' tax rate and parent firm's tax aggressiveness while determining parent firms' cumulative abnormal returns around completion of their acquisition deals. The dependent variable is *Cumulative abnormal return*. Returns are cumulated over days around the acquisition, the event window is [-1;3] with respect to this date. Column 1 shows the baseline specification (column 1 of Table 3) for ease of comparison. Table A.1 provides detailed variable definitions. All specifications include industry fixed effects and control variables. Standard errors are clustered at the industry level and reported in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% levels.

Figure 3: Market reaction to completion of acquisitions of affiliates in secrecy havens: Year-by-year analysis



Notes: The graph shows year-by-year analysis of market reaction of S&P 500 firms around completion of acquisition deals of secrecy haven affiliates. The graph depicts coefficients and 95% confidence intervals from regression of firms' cumulative abnormal returns on secrecy haven affiliate acquisition event per each year, controlling for deal and firm characteristics and industry fixed effects.

effect remains virtually the same if we drop the industry fixed effects and the control variables or if we account for year specific fixed effects. In column 4 we use the Fama French 49 industry classification, instead of NACE Rev. 2 codes, and the results remain the same. In column 5 and 6 we move the FSI score threshold to 50 and 70 respectively. With the lower threshold more countries are classified as havens, which leads to a natural decrease in the estimated coefficient. When we use a more stringent threshold the coefficient increases to a 2 percent effect. This is in line with our findings about the secrecy effect. We do not find a differential effect on firm value for acquisitions of affiliates in countries with higher economic development, productivity and standard of living, suggesting that our country-level governance measure (corruption) does not merely reflect economic development.

Furthermore, in Table A.4 we show robustness tests of the chosen event period and

event dates (rumour and announcement). In column 2, we consider a three day event window around the completion date of the deal, while in columns 3 and 4 we consider the five day even window around rumour and announcement dates of the deal. The estimated effect of secrecy haven acquisitions remains largely unchanged across the specifications. The estimated coefficient of interest is smaller for the three day event window, as compared to the five day event window. Furthermore, haven acquisition deal announcement is associated with a slightly larger negative market reaction than deal completion or rumour. On average, our results are robust to alternative specifications.

1.5 Conclusion

In this paper we present evidence that stock market investors are concerned when multinational companies acquire affiliates in secrecy jurisdictions. In economic terms, acquisition of a secrecy haven affiliate reduces market capitalization of an average S&P 500 firm by $685 million. The negative reaction increases with the proportion of secrecy haven affiliates the firm has, as well as the average secrecy score of the firm. The more secrecy havens the firm has, the harder it becomes to detect managerial fraud; hence, the negative market reaction is especially large when the firm is already very secretive. Also, the larger the financial secrecy index value of the acquired secrecy haven affiliate (the more secretive the acquired affiliate), the worse the reaction.

The main result is driven by companies which acquire their first secrecy haven affiliate, as well as firms that acquire yet another secrecy haven affiliate and are already exposed to havens. The results show that investors care about more opaque corporate structures and react negatively to evidence that the management is engaging in secrecy shopping activities. This signals the existence of potential shareholder expropriation activities behind the veil of secrecy. Further, investors react less negatively to acquisitions of affiliates in secrecy havens if the parent firm is well-governed and if the secrecy haven is located in a better-governed country with low corruption. Higher governance minimizes agency problems on the side of the manager by increasing the probability of detection.

Further, investors react less negatively to acquisitions of affiliates in secrecy havens with low statutory corporate tax rates, suggesting that they view the potential future tax saving opportunities as positive news. Similarly, the market reaction is less negative for more tax aggressive parent firms, which are likely to acquire affiliates in secrecy havens as part of their tax saving strategies. The findings suggest that investors are concerned about firms' secrecy; however, potential future tax planning opportunities mitigate these concerns.

We also find that the negative market reaction is particularly strong during the financial crisis years. Acquisitions of affiliates in secrecy havens are perceived as more risky during times of economic distress, especially due to the diminished transparency they contribute to.

The findings support our hypothesis that investors dislike the firm-wide opacity and secrecy that increases after acquisitions of affiliates in secrecy havens. If the acquisition deal characteristics suggest that the affiliate was not acquired for solely secrecy purposes, investors react less negatively to such acquisitions. The negative secrecy effect of haven acquisitions is then mitigated by good governance and potential future tax savings via the positive tax effect.

References

Akamah, Herita, Hope, Ole-Kristian, & Thomas, Wayne B. 2018. Tax havens and disclosure aggregation. *Journal of International Business Studies*, **49**(1), 49–69.

Balakrishnan, Karthik, Blouin, Jennifer, & Guay, Wayne. 2018. Tax aggressiveness and corporate transparency. *The Accounting Review*.

Bennedsen, Morten, & Zeume, Stefan. 2018. Corporate tax havens and transparency. *The Review of Financial Studies*, **31**(4), 1221–1264.

Braun, Julia, & Weichenrieder, Alfons J. 2015. Does exchange of information between tax authorities influence multinationals' use of tax havens? *ZEW - Centre for European Economic Research Discussion Paper*, **15**(015).

Brown, S.J., & Warner, J.B. 1980. Measuring security price performance. *Journal of Financial Economics*, **8**.

Brown, S.J., & Warner, J.B. 1985. Using daily stock returns: The case of event studies. *Journal of Financial Economics*, **14**, 3–31.

Chen, Ciao-Wei, Hepfer, Bradford F., Quinn, Phillip J., & Wilson, Ryan J. 2018. The effect of tax-motivated income shifting on information asymmetry. *Review of Accounting Studies*.

CNN. 2011 (Nov.). *Many companies pay no income taxes, study finds*. Online; accessed 16 April 2019.

Demere, Paul, & Gramlich, Jeffrey. 2018. The value of international income shifting to U.S. multinational firms: Evidence from a new income shifting identification strategy. *SSRN Electronic Journal*, Jan.

Durnev, Artem, Li, Tiemei, & Magnan, Michel. 2017. Beyond tax avoidance: Offshore firms institutional environment and financial reporting quality. *Journal of Business Finance & Accounting*, **44**(5-6), 646–696.

Dyreng, Scott D, Hoopes, Jeffrey L, & Wilde, Jaron H. 2016. Public pressure and corporate tax behavior. *Journal of Accounting Research*.

Graham, John R., Hanlon, Michelle, Shevlin, Terry, & Shroff, Nemit. 2014. Incentives for tax planning and avoidance: Evidence from the field. *The Accounting Review*, **89**(3), 991–1023.

Hanlon, Michelle, & Slemrod, Joel. 2009. What does tax aggressiveness signal? Evidence from stock price reactions to news about tax shelter involvement. *Journal of Public Economics*, **93**(1), 126–141.

Hasan, Iftekhar, Hoi, Chun Keung Stan, Wu, Qiang, & Zhang, Hao. 2014. Beauty is in the eye of the beholder: The effect of corporate tax avoidance on the cost of bank loans. *Journal of Financial Economics*, **113**(1), 109–130.

Hebous, Shafik, & Lipatov, Vilen. 2014. A journey from a corruption port to a tax haven. *Journal of Comparative Economics*, **42**, 739–754.

Johannesen, Niels, & Larsen, Dan Thor. 2016. The power of financial transparency: An event study of country-by-country reporting standards. *Economics Letters*, **145**, 120–122.

Kim, J., Li, Y., & Zhang, L. 2011. Corporate tax avoidance and stock price crash risk: Firm-level analysis. *Journal of Financial Economics*, **100**(3), 639–662.

KPMG. *Corporate tax rates table.*

Li, Q., Maydew, E.L., Willis, R.H., & Xu, L. 2017. Taxes and director independence: Evidence from board reforms worldwide. *Vanderbilt Owen Graduate School of Management Research Paper No. 2860362.*

MacKinlay, Craig A. 1997. Event studies in economics and finance. *Journal of Economic Literature*, **35**(Mar.), 13–39.

O'Donovan, James, Wagner, Hannes F., & Zeume, Stefan. 2019. The value of offshore secrets: Evidence from the Panama Papers. *The Review of Financial Studies*, Feb.

Rao, Sandeep. 2018. Effect of foreign institutional investors on corporate board attributes: A literature review. *Journal of Finance and Marketing*, **2**(2), 24–30.

Rohrer, Maximilian. 2017. Challenging management in public. *Available at SSRN 3073015.*

Santana, Silvio, & Rezende, Amaury Jose. 2016. Corporate tax avoidance and firm value: Evidence from Brazil. *SSRN Electronic Journal*, **13**(30).

Schjelderup, Guttorm. 2016. Secrecy jurisdictions. *International Tax and Public Finance*, **23**(1), 168–189.

Tax Justice Network. 2015. *Financial Secrecy Index.* Online; accessed 29 November 2016.

Tax Justice Network. 2018. *Financial Secrecy Index 2018: Methodology.* Online; accessed 16 April 2019.

The Guardian. 2010 (Dec.). *UK Uncut protesters spied upon by undercover police.* Online; accessed 16 April 2019.

Transparency International. 2016. *Corruption Perceptions Index.* Online; accessed 17 January 2018.

A.1 Appendix

A.1.1 Expected return models

Abnormal returns are the crucial measure to assess the impact of an event. The general idea of this measure is to isolate the effect of the event from other general market movements. The abnormal return of firm i and event date t is defined as the difference between the realized return and the expected return given absence of the event:

$$AbnormalReturn_{it} = ActualReturn_{it} - ExpectedReturn_{it}. \tag{2}$$

The time period over which parameters are estimated is denoted as the estimation window. A number of different empirical models have been employed in the literature to estimate abnormal performance around the event. They include the market model, market-adjusted model, mean-adjusted model and capital asset pricing model. In the following, we describe these normal return models.

Market-adjusted (market return) model

The expected return is the market return at the same period of time, assuming that all stocks, on average, generate the same rate of return. Expected returns are constant across securities but not across time. A separate estimation window is not necessary.

$$ExpectedReturn_{it} = MarketReturn_{mt} \tag{3}$$

Mean-adjusted (constant mean return) model

The expected asset returns differ by company, but are constant over time. The expected returns are equal to the arithmetic mean of estimation window returns. Even though the constant mean return model is simple and restrictive, its results do not systematically deviate from results based on more sophisticated models (Brown & Warner, 1980, 1985).

$$ExpectedReturn_{it} = AverageReturn_{i} \tag{4}$$

Capital asset pricing model (CAPM)

Using the CAPM, the expected return is the outcome of the risk-free rate return plus market risk premium. β of the model measures the risk of the stock, assuming that an investor requires higher return to compensate for higher risk. Parameters are estimated based on the estimation window.

$$ExpectedReturn_{it} = RiskFreeRate_{ft} + \hat{\beta}_i(MarketReturn_{mt} - RiskFreeRate_{ft}) \tag{5}$$

Table A.1: Data appendix

Variable	Description	Source
Deal characteristics		
Deal value	The consideration paid for the actual stake acquired (th USD).	Zephyr
Cash financing	A dummy variable equal to one if the deal was financed by cash.	Zephyr
Deal length	Number of days from deal rumour to deal completion.	Zephyr
Rumour date	The date on which the deal was first mentioned, as far as Zephyr researchers can ascertain. The report may be in the press, in a company press release or elsewhere. The rumour is an unconfirmed report. If the first mention of the deal is when it is officially announced, then that date is entered as announced with the same date for both the rumour date and announced date.	Zephyr
Announced date	The date when details of the deal have been provided, when a formal offer has been made or when one of the companies involved in the deal has confirmed that the deal is to go ahead.	Zephyr
Completion date	The date when the deal has been announced as completed or in certain circumstances has received all approvals to go ahead.	Zephyr
Secrecy haven variables		
Secrecy score	Measurement of financial secrecy in each jurisdiction. We use a threshold of secrecy score of over 60 to define a secrecy haven (SH).	Tax Justice Network
Financial Secrecy Index value	The Financial Secrecy Index (FSI) is a ranking of jurisdictions based on combining a qualitative measure (a secrecy score, based on 20 secrecy indicators) with a quantitative measure (the global weighting to give a sense of how large the offshore financial centre is). The secrecy score and the weighting are arithmetically combined with a special formula - the cube of a jurisdiction's secrecy score is multiplied by the cube root of its global scale weight - to create the final score, which is then used for the FSI ranking.	Tax Justice Network
Haven affiliate acquisition	A dummy variable equal to one if the firm acquires an affiliate located in a secrecy haven country.	Orbis
Non-haven affiliate acquisition	A dummy variable equal to one if the firm acquires an affiliate located in a non-haven country.	Orbis
Proportion of SHs	A dummy variable equal to one if the firm has an above-median exposure to SHs, measured as the number of SH affiliates the firm has, relative to all firm's affiliates.	Orbis
Average secrecy score	A dummy variable equal to one if the firm has an above-median average secrecy score, measured by averaging the secrecy scores of all firm's affiliates.	Orbis
Has existing SHs	A dummy variable equal to one if the firm has existing affiliates in SH countries.	Orbis
Does not have existing SHs	A dummy variable equal to one if the firm does not have existing affiliates in SH countries.	Orbis
Measure of firm value		
Cumulative raw returns [a;b]	Cumulative daily stock returns in % from closing on day a-1 to closing on day b relative to the event date.	Datastream, Orbis

Continued on next page

Table A.1: Data appendix

Variable	Description	Source
Cumulative abnormal returns [a;b]	Cumulative daily abnormal stock returns in % from closing on day a-1 to closing on day b relative to the event date. Daily abnormal returns (alphas) are obtained from parameters of a one-factor model estimated over the year ending one month before the earliest acquisition date of each acquirer firm. The factor is the excess return on the market of the local index in US dollars over and above the US risk-free rate.	Datastream, Orbis
Tax measures		
Tax rate	Statutory corporate tax rate of the firm.	KPMG
Tax bin	A dummy variable equal to one if the firm belongs to a specific tax bin. Tax bin 1 involves tax rates from 0% to 10%. Tax bin 2 involves tax rates from 10% to 20%. Tax bin 3 involves tax rates from 20% to 30%. Tax bin 4 involves tax rates from 30% to 55%.	KPMG
Tax aggressiveness (unadjusted)	The statutory tax rate at the country level less firm's effective tax rate.	KPMG, Orbis
Effective tax rate	Taxation over earnings before interest and tax (EBIT), observations with negative EBIT are denoted as missing.	Orbis
Tax aggressiveness	The residual of a regression of firm's *Tax aggressiveness (unadjusted)* on return on assets, controlling for industry fixed effects.	KPMG, Orbis
Firm-level measures		
Number of subsidiaries	Number of domestic and foreign subsidiaries.	Orbis
Number of foreign subsidiaries	Number of foreign subsidiaries outside of the parent's headquarter country.	Orbis
Proportion of foreign subsidiaries	Fraction of firm's subsidiaries headquartered outside of its parent's headquarter country.	Orbis
Market capitalization	The market value of firm's outstanding shares (m USD).	Orbis
Foreign institutional ownership	Fraction of shares held by foreign owners in the firm, calculated in terms of total ownership.	Orbis
Country-level measures		
Corruption	A dummy variable that is equal to one if the firm is located in one of the most perceptively corrupt tercile of countries.	Orbis, Transparency International
GDP per capita	Country-level GDP per capita. We use the natural logarithm.	Orbis

Table A.2: Financial Secrecy Index: Secrecy haven classification

Secrecy score	Country	Secrecy haven	Secrecy score	Country	Secrecy haven
86.64	Vanuatu	1	66.27	Bermuda	1
85.89	Samoa	1	65.24	Cayman Islands	1
82.96	Saint Lucia	1	64.93	Jersey	1
82.89	Liberia	1	64.07	Turkey	1
82.78	Brunei Darussalam	1	64	Montenegro	1
80.96	Antigua and Barbuda	1	63.8	Isle of Man	1
80	Maldives	1	63.56	Guernsey	1
79.48	Marshall Islands	1	63.06	Philippines	1
79.02	Bahamas	1	61.08	Saudi Arabia	1
79	Paraguay	1	60.2	Virgin Islands (British)	1
78.91	Nauru	1	60	United States	0
78.86	Belize	1	57.52	Japan	0
78.76	Lebanon	1	56.36	Germany	0
78.29	Barbados	1	55.11	Luxembourg	0
78.03	Saint Kitts & Nevis Anguilla	1	54.58	Costa Rica	0
77.98	Saint Vincent & Grenadines	1	54.29	China	0
77.44	United Arab Emirates	1	53.92	Chile	0
77	Gambia	1	53.71	Austria	0
77	Tanzania	1	53.56	Russian Federation	0
76.6	Andorra	1	52.76	Israel	0
76.16	Dominica	1	51.84	Brazil	0
76.04	Liechtenstein	1	50.11	Slovak Republic	0
76	Bolivia	1	49.82	Cyprus	0
75.92	Cook Islands	1	49.53	Malta	0
75.89	Grenada	1	48.49	Netherlands	0
75.69	Guatemala	1	46.48	New Zealand	0
75.33	Malaysia	1	45.84	Canada	0
74.36	Monaco	1	45.6	Iceland	0
73.67	Bahrain	1	45.02	Mexico	0
72.6	Switzerland	1	44.67	Latvia	0
72.36	Panama	1	44.24	Estonia	0
72.22	Mauritius	1	44.14	South Korea	0
72	Hong Kong	1	43.47	Australia	0
71.38	Botswana	1	42.54	France	0
71.27	Turks and Caicos Islands	1	41.57	South Africa	0
71.17	Seychelles	1	40.89	Belgium	0
71	Taiwan	1	40.84	Great Britain	0
70.86	Uruguay	1	40.37	Ireland	0
69.84	Macau	1	39.4	Portugal	0
69.56	San Marino	1	39.19	India	0
69.33	Virgin Islands (USA)	1	38.49	Norway	0
69.24	Anguilla	1	36.4	Greece	0
69	Dominican Republic	1	36.29	Poland	0
68.96	Singapore	1	36.02	Sweden	0
68	Venezuela	1	35.93	Hungary	0
67.74	Curaçao	1	35.18	Czech Republic	0
67.71	Aruba	1	35	Italy	0
67.36	Montserrat	1	33.96	Slovenia	0
67.11	Ghana	1	32.69	Spain	0
67.09	Gibraltar	1	31.38	Finland	0
66.4	Macedonia	1	30.87	Denmark	0

Notes: This table shows the countries in our sample with their secrecy scores and whether they are classified as secrecy havens (1) or not (0). A country is classified as a secrecy haven if its secrecy score exceeds 60. We examine other thresholds in robustness tests. The countries are ordered in a descending order, according to their secrecy scores.

Table A.3: Market reaction to secrecy haven acquisitions: Robustness tests I

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Haven affiliate acquisition	-0.00920***	-0.00949***	-0.00923***	-0.00901**	-0.00283	-0.02174***	-0.01589***
	(0.00323)	(0.00352)	(0.00310)	(0.00348)	(0.00189)	(0.00111)	(0.00225)
Haven affiliate acquisition · Ln(GDP)							0.01442
							(0.01160)
Ln(GDP)							0.00194**
							(0.00094)
	Baseline	No fixed effects	Year fixed effects	Fama French industries	Secrecy score >50	Secrecy score >70	GDP
R^2	0.020	0.002	0.029	0.019	0.019	0.023	0.023
Observations	5 035	5 035	5 035	5 035	5 035	5 035	5 035

Notes: The dependent variable is *Cumulative abnormal return*. Returns are cumulated over days around the acquisition, the event window is [-1;3] with respect to this date. Column 1 shows the baseline specification (column 1 of Table 3) for ease of comparison. Column 2 excludes any fixed effects and control variables. Column 3 adds year fixed effects to the main specification. Column 4 uses the Fama French 49 industry classification, instead of NACE Rev. 2 codes. Columns 5 and 6 explore other secrecy score thresholds to define a secrecy haven. Column 7 controls for target country's GDP per capita. Table A.1 provides detailed variable definitions. All specifications include industry fixed effects and control variables, except specification 2. Standard errors are clustered at the industry level and reported in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% levels.

Table A.4: Market reaction to secrecy haven acquisitions: Robustness tests II

	(1)	(2)	(3)	(4)
Haven affiliate acquisition	-0.00920***	-0.00772***	-0.00829**	-0.00933**
	(0.00323)	(0.00234)	(0.00358)	(0.00448)
	Baseline	Completion: 3 day event period	Rumour: 5 day event period	Announcement: 5 day event period
R^2	0.020	0.013	0.029	0.026
Observations	5 035	5 035	6 261	5 816

Notes: The dependent variable is *Cumulative abnormal return*. Returns are cumulated over days around the acquisition, the event window is [-1;3] with respect to this date in columns 1, 3 and 4. Column 1 shows the baseline specification (column 1 of Table 3) for ease of comparison. In column 2, the event window is [-1;1] with respect to the acquisition date. Table A.1 provides detailed variable definitions. All specifications include industry fixed effects and control variables. Standard errors are clustered at the industry level and reported in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% levels.

Chapter 2

Name and shame? Evidence from the European Union tax haven blacklist *

Aija Rusina†

Abstract

I study publication of the European Union (EU) tax haven blacklist on December 5, 2017 to examine whether and how the use of recognized tax havens affects firm value. I find that the tax haven naming and shaming by the EU was associated with a negative stock price reaction of firms with tax haven subsidiaries. Overall, publication of the blacklist erased $56 billion in market capitalization among the implicated firms. The largest reaction was for those tax havens, for which it was not foreseeable that they would be included in the blacklist. Retail firms experienced a larger decrease in share price than firms in other industries, which is consistent with a potential consumer backlash. Also more tax aggressive firms faced more negative returns, which suggests that investors expect firms might be audited or fined for past or overly aggressive tax avoidance. The negative reaction was less pronounced in countries with low levels of investor protection and weakly-governed firms with substantial conflicts of interest between principals and shareholders. This is consistent with increased scrutiny and potential for countermeasures associated with the blacklist, which reduce opportunities for managerial wealth diversion. Importantly, firms with the blacklisted tax haven subsidiaries subsequently demonstrate reduced economic activity in their tax haven subsidiaries, reduce their tax haven exposure and become less tax aggressive.

JEL classification: G12, G32, G38, H25, H26

Keywords: blacklisting, event study, governance, tax avoidance, tax haven

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2.1 Introduction

After months of screening of global tax policies, on December 5, 2017 the European Union (EU) finance ministers blacklisted 17 countries for refusing to cooperate with the EU's decade-long crackdown on tax havens.[1] The EU referred to the blacklist as list of non-cooperative tax jurisdictions, since the listed countries failed to make sufficient commitments in response to the EU's concerns. Large media sites, including the Financial Times, the Guardian, Thomson Reuters, among others, provided news coverage on the first-ever EU blacklist, naming and shaming tax havens. Before the blacklist was published the public was unaware of the countries featuring in the list and the potential EU sanctions. On the blacklist publication day it was revealed that, beyond being named, countries face few consequences for being blacklisted.[2] Since the blacklist does not have specific sanctions or financial penalties attached to it, it has been criticized as an insufficient response to the scale of tax evasion worldwide. Alex Cobham, the director of research at the Tax Justice Network (2017), commented that "tax avoiders and the countries that sponsor them will all be letting out a sigh of relief today".

In this study I examine the effect that publication of the EU tax haven blacklist had on share prices of firms with subsidiaries in the blacklisted countries. As there were no specific penalties associated with the blacklist, I expect that it worked mainly as a shaming mechanism, potentially inducing reputational costs for firms exposed to the blacklisted tax havens.[3] Investors of the exposed firms may be concerned with damage to firms' brand value, losing customers to a boycott, diminished prospects for recruiting and retaining employees, and a weakened ability to raise capital. Hence, a negative market reaction towards the users of the exposed tax havens can be expected.

My contribution to the existing literature on effects of blacklisting and shaming of tax havens is two-fold. First, this is the first paper to examine the publication of the first-ever EU tax haven blacklist, which was hotly anticipated by campaigners, lobbyists and politicians on both sides of the offshore debate. Second, the existing literature

[1] The blacklisted countries were American Samoa, Bahrain, Barbados, Grenada, Guam, South Korea, Macau, the Marshall Islands, Mongolia, Namibia, Palau, Panama, St Lucia, Samoa, Trinidad and Tobago, Tunisia and the United Arab Emirates.

[2] The Guardian (2017) claims that the blacklist could be linked to EU legislation so that jurisdictions implicated would not be eligible for funds from the bloc except where to aid development. According to Cable News Network (2017) the potential punitive measures are related to foreign policy, economic relations and development cooperation. The penalties could include special documentation requirements and withholding tax measures. EU states have also been told to conduct audits and monitor transactions with the blacklisted countries.

[3] I say that a firm is exposed to tax havens or a user of tax havens if it has at least one subsidiary in a blacklisted tax haven country.

examines blacklisting effects on tax havens themselves, while I examine effects on firms that are users of the blacklisted tax havens. The analysis provides important policy implications on whether tax haven blacklisting and shaming affect firm value.

I find significantly negative abnormal stock price returns following publication of the EU tax haven blacklist for firms that are users of the recognized tax havens. Publication of the blacklist reduced value of firms with the blacklisted haven subsidiaries by 0.56% relative to other firms. In economic terms, blacklist reduced the overall market capitalization of the exposed firms by $56 billion. The negative reaction increases with the proportion of tax haven subsidiaries the firm has, and the largest reaction is for those tax havens, for which it was not foreseeable that they would be included in the blacklist. To investigate the partial relationship between firm characteristics and stock price reaction to tax shelter news, I examine cross-sectional variation in the market reaction. I consider corporate citizenship, tax aggressiveness and expropriation as the potential mechanisms that can explain the negative market response to publication of the blacklist.

First, the possibility of negative consumer reaction to indication of bad corporate citizenship makes firms relatively vulnerable to news of their tax avoidance strategies, especially so for firms operating in the retail sector. In line with this, I find that retail firms experienced a larger stock price decrease than firms in other industries.

Further, potential countermeasures should matter most for more tax aggressive firms, since they have more to lose if the tax haven preferential treatment is limited as a consequence of the blacklist. Publication of the blacklist may result in regulatory fines and penalties for past actions or lead to lower tax avoidance in the future, both of which may decrease firm value. I measure tax avoidance as that part of the statutory tax rate less firm's effective tax rate that is unexplained by firm, country and industry characteristics. I find that the more tax aggressive firms have more negative returns around publication of the EU tax haven blacklist. This result shows that investors expect firms might be audited or fined for past or overly aggressive tax avoidance. The negative reaction might also reflect the potential future costs of restructuring the firms might incur in order to keep their corporate tax payments low. As maintaining such tax strategies has become costlier, firms might reduce their tax avoidance in response. When I use cash effective tax rates to measure firm's tax aggressiveness, I find that the market reacts positively to evidence that a firm tries to reduce taxes (has a high proportion of tax haven subsidiaries), when its financial reports would lead one to believe the firm is not tax aggressive (has a high cash effective tax rate).

Finally, the underlying secrecy of tax havens can be used for expropriation purposes

that destroy shareholder value. If investors suspect that managers who support tax avoidance activities might also be aggressive with reporting firm's accounting earnings, then the market may grow suspicious of accuracy of the company's financial statements.[4] Then, news on firm's tax avoidance might be perceived as evidence not only about firm's behaviour towards tax authorities, but also about insiders' willingness to be aggressive with investors as well. Moreover, use of tax havens should be more costly to shareholders in countries that feature high expropriation risk.

I use firm-level and country-level evidence to study expropriation as the possible cost to shareholders of having tax haven subsidiaries. If the blacklist was a credible threat, blacklisting should contribute towards higher scrutiny and less shareholder expropriation in the future. Then, weakly-governed firms and firms in countries with high expropriation risk should be less negatively affected by publication of the blacklist than strongly governed firms. The results conform to these expectations and show, for a range of governance variables, a smaller negative effect of the blacklist for weakly-governed firms. This suggests that the potentially increased auditing, monitoring, scrutiny and transparency following publication of the blacklist reduce some of the expropriation cost associated with having tax haven subsidiaries. Another explanation for the finding is that public shaming matters less for firms that are already exposed to high expropriation risk, and they therefore react less to publication of the blacklist.

Importantly, the obtained results show that firms with the blacklisted tax haven subsidiaries subsequently demonstrate reduced economic activity in their tax haven subsidiaries, reduce their tax haven exposure and become less tax aggressive. Moreover, investors react to the evolution of the blacklist and respond positively to countries being excluded from the blacklist. Overall, the results show that the EU was successful at shaming the users of tax havens, which resulted in negative market reaction towards the affected firms. The blacklist was considered as a credible threat to the retail firms and most tax aggressive firms, despite the lack of specific sanctions or financial penalties. The blacklist was perceived as positive news in weakly-governed firms and firms in countries with high expropriation risk. This is consistent with increased scrutiny by the EU and potential future countermeasures following publication of the blacklist, which should contribute towards less future expropriation of shareholders.

The set-up of the paper will be as follows. Section 2.2 presents the literature review, and section 2.3 discusses the institutional setting, data and methodology of the study. Section 2.4 presents the descriptive statistics, while section 2.5 discusses the results.

[4]Enron's chief financial officer used a sophisticated offshore web to tunnel $42 million out of the firm. Similarly, Parmalat's founder used offshore entities to expropriate $620 million from the firm.

Section 2.6 explores the cross-sectional variation in market reactions and section 2.7 discusses the evolution of the blacklist. Section 2.8 discusses the real implications of the blacklist and section 2.9 concludes.

2.2 Related literature

Earlier literature has examined market price reaction to news regarding corporate fraud, including non-tax related fraud against the government. For example, Bosch & Eckard (1991) study the idea that future fines and penalties constitute part of the market's response. They argue that news of one type of aggressiveness could indicate shareholders that the company's management is aggressive with everyone. First, customers and suppliers might become suspicious of dealing with the firm, thereby increasing future transaction costs and perhaps causing customers and suppliers to deal with other companies instead (Klein & Leffler, 1981). Second, it might signal that the firm could be engaging in other unknown aggressive activity that could lead to future prosecution and associated costs. In addition, it may signal that the dishonesty extends to financial accounting statements, and the management lies to the shareholders (Desai *et al.*, 2007). In sum, earlier literature has generally found negative stock market responses to corporate misdeeds, but has not investigated market responses to tax haven shaming.

While there are no previous analyses of stock market reaction to tax haven naming and shaming, there are several related studies. Desai & Dharmapala (2009) investigate how investors value managerial actions designed solely to minimize corporate tax obligations. They regress, over a cross-section of companies, Tobin's q (market value divided by replacement cost of assets) on a proxy for tax avoidance, measured as an estimate of the book-tax differences of the firm less an estimate of the portion of the book-tax differences arising from earnings management (total accruals of the firm). They find that their proxy for tax avoidance is positively related to firm value for well-governed firms, but unrelated to firm value for poorly-governed firms. The authors interpret their evidence as consistent with agency costs mitigating the benefits to shareholders of corporate tax avoidance. In other words, managers' tax sheltering decisions are related to their ability to divert value, so that in poorly-governed firms tax sheltering signals a higher likelihood of managerial wealth diversion and on net adds no value. In comparison with my study, Desai & Dharmapala (2009) is not an event study. My paper examines additional cross-sectional determinants beyond governance and uses the publication of the EU tax haven blacklist and the firm's exposure to the blacklisted tax havens to examine market's perception of the firm's behaviour. Nevertheless, findings of my paper correspond to those of Desai & Dharmapala (2009), since I find that

poorly-governed firms faced a less negative reaction to publication of the blacklist than better governed firms.

I contribute to the literature that has asserted that tax planning may occur in combination with managerial opportunism (Desai *et al.*, 2007; Kim *et al.*, 2011). Kim *et al.* (2011) use firm-level data to show that firms with higher tax-sheltering capabilities are more likely to experience future stock price crashes. The complex corporate structure arising from subsidiaries in many (secrecy) jurisdictions gives opportunistic managers the opportunity to stockpile negative news until a tipping point. In my setting this translates to rational expectations of a decrease in stock price following publication of the EU tax haven blacklist, especially so if the firm has a large proportion of subsidiaries in the blacklisted tax haven countries.

Recent literature has also shown that managers seem to be sensitive about engaging in tax planning. Evidence by Graham *et al.* (2014) shows that 69 percent of surveyed executives do not engage in tax planning because they are concerned about the firm's reputation. Akamah *et al.* (2018) discuss that such reputational concerns can cause managers to hide their haven subsidiaries in the guise of a more general geographic area (i.e. a subsidiary in Luxembourg would be reported as being in Europe). The authors find that there is indeed a reporting avoidance behaviour when tax and secrecy havens are implicated. Also my paper finds that the tax haven naming and shaming by the EU was associated with reputational concerns of investors, and hence a decrease in firms' value.

A strand of literature focuses on investor reaction to news on firms' tax avoidance strategies. Hanlon & Slemrod (2009) study the stock price reaction to news about corporate tax aggressiveness and find that a company's stock price declines when there is news about its involvement in tax shelters. Dyreng *et al.* (2016) find that public pressure from outside activist groups can exert a significant influence on the behaviour of large, publicly traded firms. Similarly, Johannesen & Larsen (2016) show that tax evasion creates considerable rents for firms in extractive industries and that disclosure rules have the potential to reduce these rents. These results correspond to my findings which show that public tax haven shaming by international organisations and news media does matter for investors.

Mixed evidence exists on the effects of tax haven blacklisting on tax havens themselves. Sharman (2009) argues that public blacklisting by international organizations can be an effective means of bringing about compliance, since it damages countries' reputations among investors, and produces pressure to comply. Even despite the absence of military and economic coercion, development of a blacklist is in and of itself

a powerful economic weapon. Tax havens place a big importance on preserving their international reputations, since it is their main point of competition (Sharman, 2006). This implies that inclusion in the blacklist should be an effective threat to tax havens themselves. On the contrary, Kudrle (2009) studies how blacklisting affects the volume of financial activity associated with tax havens, and finds that there is no substantial or consistent impact of blacklisting on banking investment in and out of the tax havens. Findings of these studies suggest that tax havens might respond to their inclusion in the blacklist. If investors expect that tax havens might agree to limit the preferential treatment of multinational firms, which could lower firms' future profits, investors are likely to react negatively to publication of the blacklist. This corresponds to findings in my paper.

2.3 Institutional setting, data and methodology

In this section I discuss the institutional background of publication of the EU tax haven blacklist. I then explain my data sources and empirical methodology.

2.3.1 EU tax haven blacklist institutional setting

In January 2017, 92 countries received a screening letter from the EU. They included some of the world's biggest countries, such as China, the United States and Japan; small European countries such as Monaco and Andorra; and tiny developing nations such as Niue in the Pacific. They were informed that they would be assessed against three broad criteria: tax transparency, fair taxation (not offering preferential measures or arrangements that enable companies to move profits to avoid taxes), and anti-profit-shifting measures (commitment to implement measures agreed by the Organisation for Economic Co-operation and Development (OECD) intended to stop countries stealing each others' tax bases). In October the commission wrote to 41 countries warning they had failed the test and were likely to be blacklisted, unless they promised to change their ways. Further, in a draft dated November 21, 36 countries were named, and the next draft on December 1 included about 20 jurisdictions.

On December 5, 2017 the news media started reporting about the first-ever EU tax haven blacklist, which named and shamed 17 countries in an attempt to suppress the billions of dollars lost to aggressive tax avoidance every year. Countries that had said they would make reforms were put on notice and added to a so-called grey list of 47 jurisdictions.[5]

[5]The grey-listed countries were Albania, Andorra, Armenia, Aruba, Belize, Bermuda, Bosnia and

Some EU funding legislation includes reference to the blacklist with potential punitive measures related to foreign policy, economic relations and development cooperation. The guidelines provide information on how the EU's partners should assess funding projects that involve entities in jurisdictions listed by the EU as non-cooperative for tax purposes. The assessment includes a series of checks designed to pinpoint the risk of tax avoidance. For example, before funding is channelled through an entity, it should be established that there are sound business reasons for the particular structuring of a project, which must not take advantage of the technicalities of a tax system or of mismatches between two or more tax systems for the purpose of reducing the tax bill (Lomas, 2018). These guidelines should guarantee in particular that EU external development and investment funds cannot be channelled or transited through entities in countries on the EU's list (European Commission, 2018).

Moreover, as claimed by Luxembourg and Malta representatives in the EU finance ministers meeting in November 2017, any blacklisting sanctions would be unnecessary because investors would be deterred from putting money in the highlighted tax havens (Guarascio, 2017). This is in line with previous literature which claims that public blacklisting by international organizations can be an effective means of bringing about compliance, since it damages countries' reputations among investors, and produces pressure to comply. Moreover, public pressure could result in backlash against the firm or its products from investors, politicians and customers (Graham *et al.*, 2014; Sharman, 2009). Investors of the exposed firms may be concerned with damage to firms' brand value, losing customers to a boycott, diminished prospects for recruiting and retaining employees, and a weakened ability to raise capital (Baron, 2003; Klein, 2000; Sasser *et al.*, 2006). Blacklists are known to provide basis for extra scrutiny, compliance costs and outright boycotts of certain jurisdictions by investors (Narci, 2012).

Conforming to this, both tax havens and the countries exposed to the tax havens reacted to publication of the blacklist. As an example, South Korea's foreign ministry was determined to persuade the European Union to exclude it from the blacklist immediately after its publication, since the inclusion could tarnish its national brand (The Korea Herald, 2017). Also, before the blacklist was published, there were speculations about inclusion of specific countries in the blacklist, and Turkey was mentioned as one of the potential uncooperative jurisdictions. As claimed by Bloomberg (Chrysoloras &

Herzegovina, Botswana, Cabo Verde, Cayman Islands, Cook Islands, Curaçao, Faroe Islands, Fiji, Greenland, Guernsey, Hong Kong, Jamaica, Jersey, Jordan, Lichtenstein, Labuan Island, Former Yugoslav Republic of Macedonia, Malaysia, Maldives, Isle of Man, Morocco, Mauritius, Montenegro, Nauru, Niue, New Caledonia, Oman, Peru, Qatar, Saint Vincent and the Grenadines, San Marino, Serbia, Seychelles, Switzerland, Swaziland, Taiwan, Thailand, Turkey, Uruguay, Vanuatu and Vietnam.

Dendrinou, 2017), while EU countries were split over whether financial sanctions should be used against such uncooperative jurisdictions, inclusion in the blacklist would result in reputational damage to Turkey and raise pressure on EU companies to hold back investment. Several states, including France, supported punitive measures, such as exclusion from international funding. Germany was exercising its influence with international development institutions to restrict financing to Turkey from the state-owned KfW bank, the European Investment Bank and the European Bank for Reconstruction and Development. German commercial banks were also reviewing their exposure to Turkey days after chancellor Angela Merkel said that the EU may cut pre-accession funding to Turkey.

Based on this evidence, I expect that investors reacted negatively to publication of the blacklist. The blacklisted tax havens face public shaming and potential future countermeasures, and might take commitments to change their tax laws and limit the preferential treatment of multinational firms in the future. Moreover, any funding projects involving entities in the blacklisted jurisdictions can be subject to auditing and assessment. This can jeopardize firms' tax saving strategies or lead to future audits of the firm. Also firms' reputation is negatively affected, since they face potential public pressure or backlash against the firm or its products for being a bad corporate citizen. Investors are likely to react negatively to such news since firms' future reported earnings are likely to fall.

It is important to note that the EU refers to the blacklist as the list of non-cooperative tax jurisdictions, since the listed countries failed to meet agreed good tax governance standards. Most of the listed countries are small and might simply lack the administrative capabilities to deal with the EU's requests. The EU has received criticism for omitting the most notorious tax havens from the blacklist, instead placing them on the grey list of countries which have committed to improve their transparency standards.[6] The EU's response to this is that the list should raise the level of good tax governance globally and help prevent the large-scale tax abuse through tackling third countries that consistently refuse to play fair on tax matters. Therefore, even though many of the listed countries were not considered as tax havens previously, they were still shamed by the EU as being non-cooperative on tax matters and face potential sanctions. Since I am interested in the effect of EU shaming on firms with subsidiaries in these jurisdictions, I still expect a negative investor reaction towards the exposed firms.

[6]Sources agree that the blacklist omits several major offshore hubs, such as Bermuda, British Virgin Islands and the Cayman Islands, as well as important European countries, such as Ireland, Luxembourg and the Netherlands.

Finally, information about compilation of the EU tax haven blacklist was available to investors prior to December 5, 2017. The announcement was hotly anticipated by campaigners, lobbyists and politicians on both sides of the offshore debate. However, there was a lot of uncertainty regarding the blacklist itself. First, a debate was on about inclusion of some devastated Caribbean islands, and the suggestion that no EU state will be included. Second, it was not yet clear what the penalty for failing to pass the test would be, with opinions varying on the severity of the necessary response. Finally, ministers could still decide to postpone the adoption of the list, as the listing was far from a sure thing in November 2017. According to event study assumptions, an event is anything that results in new relevant information (McWilliams & Siegel, 1997). Therefore, when the blacklist was published on December 5, 2017, investors traded on the new information available to the market regarding the listed countries and potential penalties. Nevertheless, the public awareness of the blacklist compilation might weaken the power of my tests and cause an understatement (or more generally misstatement) of the economic impact that I find.

2.3.2 Data and variable construction

I obtain ownership and financial data of all listed firms in Bureau van Dijk's Orbis database as of 2016. Market data is obtained from Datastream and Orbis. I additionally rely on data from BNY Mellon, KPMG, Property Rights Alliance, PRS Group, RepRisk, Transparency International and the World Bank, among others. I focus on the main variables of interest and provide a complete list with variable definitions in Table A.1.

2.3.3 Sample selection

Table 1 presents a summary of the sample selection process. I obtain daily stock prices for all publicly listed active firms from Orbis and Datastream, listed on 111 stock exchanges worldwide.[7] I drop purely domestic firms (firms with no foreign subsidiaries) and firms with missing data for share prices during the event period and missing total assets. I also drop stocks not actively traded (no price changes between December 4, 2017 and December 8, 2017), penny stocks (prices below \$0.10), and firms with assets below \$5 million. I also drop firms operating within the financial services industries. I winsorize returns at the 1 and 99 percentiles to remove outliers. Besides using raw returns, I calculate one-factor alphas (abnormal returns or stock returns in excess of market returns after controlling for firms' exposure to the market index). Alphas are

[7] Table A.5 lists the stock exchanges represented in the study.

Table 1: Sample selection

All publicly listed active firms as of December 2017	67 113
Less:	
Stocks with less than 100 non-missing return observations during estimation window	15 926
Purely domestic firms with no foreign affiliates	10 613
Firms with no share price data for the event period	8 923
Firms with missing data for total assets	7 982
Stocks not actively traded (no price changes between December 4, 2017 and December 8, 2017)	3 968
Penny stocks with prices below \$0.10	3 329
Firms with total assets below \$5 mln	1 849
Firms operating in financial services industries	1 402
Remaining firms for the final sample	13 149

obtained from a one-factor model estimated from November 6, 2016 to November 5, 2017 (the year ending one month before the event date). I require stocks to have at least 100 non-missing return observations during that period. Local market indices and risk-free rates are not available for 13 countries in the sample, out of 102 countries in total. I therefore obtain stock prices in US dollars and use the US market index (MSCI USA Value Weighted Index) and US T-bill as market index and risk-free rate for these countries.[8]

2.3.4 Exposure to tax havens

My first key variable of interest, *Tax haven exposure*, indicates whether (1) or not (0) the firm has at least one subsidiary located in any of the blacklisted tax haven countries. I also consider the number of tax haven subsidiaries the firm has through variable *Log(Number of tax havens)*, and the proportion of tax havens, relative to all subsidiaries of the firm, through variable *Proportion of tax havens*.[9] I only focus on those tax havens that are known to outside investors with access to commercially available databases. The exposure variables are constructed, based on publicly available information on

[8]The countries for which market indices and risk-free rates are not available are Burkina Faso, Ghana, Gibraltar, Liberia, Malta, Nepal, Palestine, Sudan, Slovakia, Senegal, Ukraine, Uzbekistan and Zambia. For robustness, I try excluding firms located in these countries from the main sample (325 firms). The results do not change substantially.

[9]Domestic subsidiaries in the country of origin are also considered, when calculating tax haven exposure variables. Results hold also when I disregard domestic subsidiaries and only consider foreign tax haven subsidiaries for the exposure variables.

firms' corporate structures in Orbis Historical, provided by BvD. Companies disclose ownership data themselves, either when they disclose their shareholders or list their subsidiaries. Laws and regulations regarding disclosure of ownership data vary widely between countries. Also common company practices vary and often go beyond the legal requirements. BvD collects ownership information directly from the companies, from official bodies or from the associated information providers. The existence of unreported subsidiaries in other (haven) countries can potentially (downward) bias my estimates of tax haven exposure.[10]

2.3.5 Measures of firm value

I measure the impact of publication of the tax haven blacklist on firm value using daily returns for $[-1;3]$ event window around December 5, 2017 since markets often need time to digest new information. I include the day prior to the blacklist publication date to capture any effect of news available to the market before the event and three days after to provide time for the market to react and to take into account any lag and lead effects.[11]

2.3.6 Other firm characteristics

Finally, I construct measures of firms' corporate citizenship, tax aggressiveness and the potential for firm- and country-level expropriation.

I predict that firms which are more vulnerable to public perceptions of corporate citizenship could be more negatively affected after publication of the blacklist because consumers might react to the firm not being a good corporate citizen. Therefore, I predict that firms in the retail industry that deal directly with consumers will have a more negative reaction than other firms. Retail firms may be more susceptible to be publicly perceived and penalized for being unconscionable or unpatriotic, since consumers might decide to boycott firms' products.[12] I set an indicator variable *Retail* equal to one if the firm operates within the retail sector.[13]

[10]See, for example, Dyreng *et al.* (2018) for an analysis of subsidiary disclosure in the United States.

[11]The event window of three days has been used by Hanlon & Slemrod (2009), while the event window of five days has been used by O'Donovan *et al.* (2019). Previous event studies use various event windows, so I ensure that my results are also robust to using a different event period length.

[12]In 2012 it was revealed that Starbucks had not paid corporate tax since its entry in the United Kingdom (UK). The firm was implicated in funnelling its revenues offshore, to a Dutch subsidiary. These revelations resulted in a consumer boycott, which led to lower revenues for the Starbucks in 2012 and 2013.

[13]I also use an indicator variable *Brand value* equal to one if the firm was listed as having one of the top 100 brand names as ranked in Business Week magazine in 2017 (Interbrand, 2017). Business Week obtains the rankings from Interbrand, which ranks brands based upon the estimated amount the

Tax Aggressiveness is the residual of a regression of firm's *Tax Aggressiveness (unadjusted)* on return on assets, intangible assets divided by total assets and losses of the previous year (if any), scaled by assets, in line with O'Donovan *et al.* (2019). *Tax Aggressiveness (unadjusted)* is the statutory tax rate at the country level less firm's effective tax rate. The effective tax rate is defined as taxation over earnings before interest and tax (EBIT), observations with negative EBIT are denoted as missing, in line with O'Donovan *et al.* (2019).[14] A variation of the measure additionally controls for industry and country fixed effects when constructing the residual and accounts for profitability and industry- and country-specific tax treatments. For all variables, the higher the value, the more tax aggressive the firm is.[15]

As another proxy for tax aggressiveness, I use the *Cash effective tax rate (ETR)* from firms' financial statements, which is calculated as cash taxes paid divided by pre-tax income. The variable directly measures the market's ex-ante perceptions regarding firms' tax aggressiveness. I expect that the higher the cash ETR, the less likely that the market would expect the firm to be sufficiently tax aggressive, and the more likely the market would react to a high firm's exposure to blacklisted tax havens as a positive signal of optimal aggressiveness. I expect that the higher the firm's cash ETR, the more positive (or less negative) the reaction upon publication of the blacklist.[16]

At the firm level, I use measures of firm governance to capture the degree to which monitoring affects conflicts of interest between principals and shareholders. I capture exposure to the US regulations and potential enforcement actions arising from having any US subsidiaries through *Has US subsidiary* dummy. Further, I use the *RepRisk index score* provided by RepRisk (2017) that dynamically captures and quantifies a company's exposure to environmental, social and governance (ESG) and business conduct risks. The higher the index value, the higher the risk exposure. Since I am interested in the effect of governance, I calculate the reverse of RepRisk index score (1-score) and use that in the regression. I also use *Foreign institutional ownership* (direct or total) as another variable for firm-level governance, based on the idea that institutional investors monitor managerial performance more than individual owners, thus providing improved governance at the firm. This is in line with previous literature on corporate

brand is likely to earn the firm in the future. The findings are similar if I use this corporate citizenship measure, instead of the *Retail* dummy.

[14]Taxation measure includes all taxes related to the accounting period (paid, accrued or deferred). The findings are virtually unchanged if, instead of EBIT, I use EBITDA in the denominator to define the effective tax rate.

[15]Construction of these variables follows Chen *et al.* (2010); Desai & Dharmapala (2006, 2009); Frank *et al.* (2009); O'Donovan *et al.* (2019).

[16]In order to limit the influence of measurement error due to outliers, I reset any values of cash ETR greater than 0.5 to 0.5, and any values less than zero to zero.

governance (Aggarwal *et al.*, 2011; Desai & Dharmapala, 2009; Rao, 2018). I measure foreign institutional holdings using data from Orbis by computing the fraction of total shares outstanding that are held by foreign institutions (banks, insurance companies, mutual fund parent companies, pensions, endowments and professional investment advisors). Furthermore, I obtain cross-listings from BNY Mellon (2017), which subject firms to US regulations and potential enforcement actions (Coffee, 2002; Doidge, 2004; Doidge *et al.*, 2004, 2010; Lel & Miller, 2008; Stulz, 1999). I split American depositary receipts (ADRs) into those that are unsponsored (*Has unsponsored ADR*) and subject to less stringent regulatory requirements and those that are sponsored (*Has sponsored ADR*) and subject to more stringent requirements. Finally, firms with subsidiaries in the most corrupt countries might use tax havens as offshore vehicles to bribe foreign government officials and win business. Since bribery is illegal, more scrutiny following the blacklist might reveal such activities, leading to regulatory fines. Moreover, since the detection probability has increased, the expected costs of violating anti-bribery regulations increase as well. In order to control for that, I construct *Corruption exposure*, a dummy variable that is equal to one if the firm is exposed to the most perceptively corrupt tercile of countries using the Corruption Perception Index by Transparency International (2016). Again, since I am interested in the effect of governance, I construct (1-corruption) exposure or lack of corruption and use that in the regression.

Shareholder expropriation can be facilitated by weak institutions and by lack of monitoring. At the country level, I measure this with commonly used indices, including protection of property rights (Property Rights Alliance, 2017), country risk ratings (PRS Group, 2017), the rule of law (La Porta *et al.*, 1998), and protection of minority shareholders (The World Bank, 2017). These measures capture the extent to which individuals are protected from expropriation by the government and insiders. For each index, I construct a dummy variable equal to one if a country ranks above the median (has low expropriation risk).[17]

2.3.7 Event study methodology

According to the efficient market hypothesis, stock prices reflect all available information. Using this assumption, an event study can be used to calculate how an event changes stock prospects by quantifying its impact on the stock price. I use an event study methodology to test the market reaction to publication of the EU tax haven blacklist. I examine a 5-day window [-1; 3] around December 5, 2017 (day 0) as the event period. I include the day prior to the blacklist publication to capture any effect of

[17] The results are robust if I use continuous governance measures, instead of medians.

news available to the market before and three days after to provide time for the market to react. Daily returns for each stock are collected in two different periods. The first period is the event period, while the second period is the estimation period which is used to forecast the normal performance in the event window. The estimation window is the year ending one month before the blacklist publication date (November 6, 2016 to November 5, 2017).

For the baseline specifications, I implement the single factor market model to construct expected returns over the event window, according to MacKinlay (1997).[18] The parameters of the market model are estimated using Ordinary Least Square (OLS) regression over the estimation period. This method is used to control for relation between stock returns and market returns, and allows for variation in risk associated with the selected stock. The market model is based on the assumption of a constant and linear relation between individual asset returns and the return of the market index. The actual return of the stock is the return that the stock made in the event period and is calculated as follows:

$$ActualReturn_{it} = ln(Price_{it}) - ln(Price_{it-1}) = ln(Price_{it}/Price_{it-1}), \tag{1}$$

where $Price_{it}$ is the price of firm i at time t and $Price_{it-1}$ is the price of the firm i on the previous trading day $t-1$.

Then, the actual stock return is regressed on the market return in the estimation period to estimate market model parameters alpha (intercept) and beta (slope):

$$ActualReturn_{it} = \alpha_i + \beta_i MarketReturn_{mt} + u_{it}, \tag{2}$$

where $ActualReturn_{it}$ is the daily return of firm i and $MarketReturn_{mt}$ is the return of the local market index.[19]

The expected return for the firm on any day during the event window is then calculated as the beta estimate from the regression 2 multiplied by the actual market return

[18] I also calculate the expected returns according to the mean-adjusted model, market-adjusted model and capital asset pricing model. Methodology for these models is presented in Appendix A.1.1. Results are robust to using these models instead of the market model. The results are also robust to using cumulative raw returns instead of cumulative abnormal returns as the dependent variable. Since the event window is rather short, expected returns are small, so the actual returns are not very different from abnormal returns.

[19] When abnormal returns are calculated over such short intervals, the results are not overly sensitive to the benchmark used.

on the specific day:

$$ExpectedReturn_{it} = \hat{\alpha}_i + \hat{\beta}_i MarketReturn_{it}. \quad (3)$$

Abnormal returns are calculated by deducting the returns that would have been realized if the analysed event would not have taken place (normal or expected returns) from the actual returns:

$$AbnormalReturn_{it} = ActualReturn_{it} - ExpectedReturn_{it}. \quad (4)$$

The cumulative abnormal return is then obtained by summing up the abnormal returns over the event period:

$$CAR_i(T_1, T_2) = \sum_{i=T_1}^{T_2} AbnormalReturn_{it}. \quad (5)$$

2.3.8 Identification strategy

I use the event study technique to examine the market response of firms connected to the blacklisted tax havens around the publication of the EU tax haven blacklist. For my baseline results, I run the following regression:

$$CAR_i = \alpha + \beta TaxHavenExposure_i + \mathbf{X}_i\gamma + \epsilon_i, \quad (6)$$

where CAR_i denotes the cumulative abnormal return of firm i around the publication of the tax haven blacklist, $TaxHavenExposure_i$ indicates the proportion of firm's subsidiaries that are located in the blacklisted tax haven countries, and $\mathbf{X}_i$ contains controls, including country and industry fixed effects. ϵ_i is the error term. The coefficient of interest, β, captures whether exposure to the blacklisted tax havens impacts firm value. In parts of my analysis, I augment the equation 6 with other tax haven variables, additional firm characteristics and their interaction with $TaxHavenExposure_i$ to test whether certain types of activities are priced. Finally, I use two-way clustering and cluster the standard errors on country and industry. The event study methodology follows that used in O'Donovan *et al.* (2019) and Zhang (2007).

In order to analyse the real implications of the EU tax haven blacklist, I estimate the following regression:

$$Outcome_{i,t} = \alpha_i + \alpha_t + \beta PostPublication \cdot TaxHavenExposure_i + \mathbf{X}_{i,t}\gamma + \epsilon_{i,t}, \quad (7)$$

where $Outcome_{i,t}$ is the outcome for firm i at time t (tax haven exposure, tax haven activities or tax aggressiveness), α_i and α_t denote firm and time fixed effects, and $PostPublication$ is a dummy variable equal to one for observations made in year 2018. $\mathbf{X}_{i,t}$ includes firm and time fixed effects. Standard errors are clustered by time.

To alleviate concerns that event-day clustering may bias the coefficient estimates, I implement the calendar time portfolio and Fama-MacBeth approaches, following O'Donovan *et al.* (2019) and Schipper & Thompson (1983). For the portfolio approach, I construct daily abnormal returns of portfolios of firms that have tax haven subsidiaries and that do not. The returns are constructed for 60 days around publication of the blacklist (30 days before and 30 days after December 5, 2017). I then regress these portfolio returns on event day dummy interacted with tax haven exposure dummy, day fixed effects and tax haven exposure dummy. For the Fama-MacBeth approach, I regress daily abnormal returns on tax haven exposure for each date during the 60 days. I then regress the resultant tax haven exposure coefficients on event day dummy interacted with tax haven exposure dummy to establish whether the tax haven exposure coefficient is statistically different on the relevant event dates, as compared to non-event dates.

2.4 Descriptive statistics

Table A.2 provides summary statistics for firms with and without exposure to the blacklisted tax havens, providing a breakdown by country, with countries ranked in declining order by fraction of implicated firms. I find that 2 031 firms or 15.45% of the 13 149 sample firms have subsidiaries in the blacklisted tax haven countries. As discussed previously, this estimate is likely conservative. There is a substantial cross-country variation in the fraction of firms that have exposure to tax havens. At the top are firms located in Kuwait, Switzerland, South Korea, the Netherlands, Bermuda and United Kingdom with at least one in four firms being tax haven users.

The use of blacklisted tax havens extends across all industries, shown in Table A.3, and only a minority of industries have no firms with exposure to tax havens.

Furthermore, Table A.4 shows which tax havens are more frequently used, as a proportion of all tax haven subsidiaries in the data. Approximately 40% of tax haven subsidiaries are located in South Korea, and approximately 19% of tax haven subsidiaries are located in the United Arab Emirates, followed by Marshall Islands and Panama.

Next, I compare characteristics of firms with and without exposure to the blacklisted tax havens in Table 2. Firms that have tax haven subsidiaries are substantially larger, have more subsidiaries and are more exposed to foreign countries. These firms are more

tax aggressive and pay relatively lower effective corporate tax rates than firms without tax haven subsidiaries. The exposed firms seem to be better governed at both country- and firm-level, except for their RepRisk index score and corruption exposure. They are located in countries with higher GDP per capita or higher productivity and standard of living.

Since firms implicated by publication of the EU tax haven blacklist are substantially larger, both by assets and number of (foreign) subsidiaries, I match firms by headquarter country and number of foreign subsidiaries (nearest neighbour matching).[20] For the matched sample, shown in the last column of Table 2, firms with exposure to tax havens are no longer substantially different from firms with no exposure to blacklisted tax havens. The only remaining differences stem from their statutory corporate tax rate, corruption exposure, whether the firm has a US subsidiary and the country's GDP per capita. To alleviate concerns that my results might be explained by firm size, I control for size (number of foreign subsidiaries) throughout my analysis and ensure that my results are robust for matched samples (matching on either firms' total assets or number of foreign subsidiaries). I also examine whether firms' tax aggressiveness, corruption exposure, exposure to US regulations and country's GDP matter in my analysis in the cross-sectional tests.

[20]The results are nearly identical if I match firms by headquarter country and total assets.

Table 2: Summary statistics on firms with and without tax haven exposure

	Firms without tax haven exposure	Firms with tax haven exposure	Difference all	Difference matched
	Mean	Mean		
Firm characteristics				
Total assets (th USD)	1 528 649	7 043 511	-5 514 861***	1 531 323
Number of subsidiaries	15.60	62.63	-47.03***	-2.97
Proportion of foreign subsidiaries	0.52	0.62	-0.09***	0.04
Number of foreign subsidiaries	6.85	38.42	-31.57***	-0.19
Proportion of tax haven subsidiaries	0	0.18	-0.18***	-0.11***
Number of tax haven subsidiaries	0	3.57	-3.57***	-2.92***
Proportion of tax haven subsidiaries without South Korea	0	0.09	-0.09***	-0.09***
Proportion of South Korean subsidiaries	0	0.09	-0.09***	-0.02***
Retailer (0/1)	0.029	0.027	0.002	0
Previous tax haven list exposure measures				
Likely to be on EU list · Was on list	0	0.03	-0.03***	-0.04***
Likely to be on EU list · Was not on list	0.12	0.14	-0.02***	0.03
Not likely to be on EU list · Was on list	0	0.15	-0.15***	-0.07***
Was on all lists · Was on list	0	0.006	-0.006***	-0.008***
Was on all lists · Was not on list	0.003	0.007	-0.004***	0.003
Was on no lists · Was on list	0	0.11	-0.11***	-0.03***
Was on at least 1 list · Was on list	0	0.07	-0.07***	-0.08***
Was on at least 1 list · Was not on list	0.2	0.24	-0.04***	0.02
Tax aggressiveness measures				
Statutory corporate tax rate	0.25	0.24	0.01***	-0.03**
Effective tax rate	0.23	0.17	0.06***	-0.04
Cash effective tax rate	0.21	0.16	0.05***	-0.004
Tax aggressiveness (unadjusted)	0.02	0.07	-0.05***	0.02
Tax aggressiveness (no fixed effects)	-0.001	0.020	-0.021***	-0.002
Tax aggressiveness (with fixed effects)	-0.0003	0.0236	-0.024***	0.03
Firm-level governance measures				
Foreign institutional ownership (total)	0.25	0.44	-0.19***	-0.003
Foreign institutional ownership (direct)	0.28	0.32	-0.04***	0.003
Reverse RepRisk index score	0.99	0.95	0.04***	0.01
Has US subsidiary (0/1)	0.16	0.49	-0.33***	-0.12*

Continued on next page

Table 2: Summary statistics on firms with and without tax haven exposure

	Firms without tax haven exposure	Firms with tax haven exposure	Difference all	Difference matched
	Mean	Mean		
Has sponsored ADRs (0/1)	0.02	0.08	-0.06***	-0.03
Has unsponsored ADRs (0/1)	0.03	0.13	-0.09***	-0.01
Lack of corruption exposure (0/1)	0.84	0.50	0.34***	0.19**
Country-level governance measures				
Property rights	0.89	0.97	-0.08***	-0.02
Reverse country risk	0.91	0.96	-0.06***	0.01
Rule of law	0.70	0.72	-0.02*	0.02
Minority shareholder protection	0.87	0.91	-0.04***	0.01
GDP per capita	28 870.95	35 524.80	-6 653.85***	4 365.3**

Notes: This table shows characteristics of firms with and without exposure to the blacklisted tax havens. There are 2 031 firms with tax haven subsidiaries and 11 118 firms without tax haven subsidiaries. The column labelled *Difference all* captures the difference in means between the two groups for the full sample of firms. The column labelled *Difference matched* captures the difference in means between firms with exposure to the blacklisted tax havens and matched firms without tax haven exposure. Firms are matched by country and closest neighbour by number of foreign subsidiaries. Table A.1 provides detailed variable definitions. All continuous variables are winsorized at the 1% and 99% levels. *,**, and *** indicate statistical significance at the 10%, 5%, and 1% levels.

2.5 Market response to publication of the EU tax haven blacklist

In this section I begin by documenting the baseline effect of publication of the blacklist on firm value, using cumulative raw and abnormal returns, and provide some robustness tests.

2.5.1 Main result

Table 3 shows the main result of the analysis of market reaction to publication of the EU tax haven blacklist. The table presents the results of a univariate split by firms with tax haven subsidiaries and without tax haven subsidiaries. Firms without tax haven subsidiaries face negative cumulative returns; however, they are insignificant for all models, except the cumulative raw returns. Firms with tax haven subsidiaries face statistically significant negative cumulative returns during the event period, according to different expected return models. The cumulative returns of firms with tax haven

subsidiaries are significantly more negative than the returns of firms without tax haven subsidiaries in both full sample and matched sample. According to the baseline model (market model), firms with tax haven subsidiaries face negative cumulative abnormal returns during the event window that are 0.56% lower than those of firms that do not have any tax haven subsidiaries. Matching by country and closest neighbour by number of foreign subsidiaries reduces this differential to 0.34%. I obtain the overall market impact of the blacklist publication by multiplying each firm's market capitalization at the end of 2017 by its cumulative abnormal return. In economic terms, blacklist reduced the overall market capitalization of the exposed firms by $56 billion. Further, the regressions in Tables 4 and 5 introduce additional controls - firm size and country and industry fixed effects.

The dependent variable in Table 4 is *Cumulative raw return* around the event date. The control variables of interest are *Tax haven exposure* that indicates whether (1) or not (0) a firm is connected to the EU blacklisted tax havens, *Proportion of tax havens* that indicates the proportion of tax haven subsidiaries a firm has, and *Log(Number of tax havens)* that indicates the natural logarithm of the number of tax haven subsidiaries a firm has. All specifications include country and industry (49 Fama-French industries (French, 2018)) fixed effects. Also, specifications 2, 4 and 6 control for firm size (number of firm's foreign subsidiaries).[21]

The results show that firms connected to the EU blacklisted tax havens face negative cumulative raw returns during the event window, as compared to firms without any tax haven subsidiaries. In column 2 the raw returns are 0.57% lower for such firms than for same-country, same-industry firms without an exposure to tax havens, after controlling for firm size. Moreover, for a one percentage point increase in the percentage of tax havens a firm has, its raw returns decrease by 0.63%, as seen in column 4. Similarly, for a 1% increase in the number of tax havens the firm has, its raw returns decrease by 0.23%, as seen in column 6.

When I use *Cumulative abnormal returns* (alphas), calculated according to the market model, as the dependent variable in Table 5, results are largely unchanged, and firms that have tax haven subsidiaries are still significantly negatively affected.[22] I treat the

[21]Results are robust to controlling for firm's total assets as a size control. Results are also robust to correcting for the cross-sectional correlation of abnormal returns, according to Kolari & Pynnönen (2010). Finally, results do not change if I instead use NACE Rev. 2 industry classifications, instead of Fama French industries.

[22]Since the event window is rather short, expected returns are small, so the actual returns are not very different from abnormal returns. As a sensitivity test, I compute cumulative abnormal returns according to the other expected return models, discussed in Table 3. I then use these cumulative abnormal returns as the dependent variables in regressions. The obtained results are very similar, no matter which method of computing abnormal returns is used. Thus, my results do not appear to be

Table 3: Cumulative returns of firms after publication of the EU tax haven blacklist

	Firms without tax havens	Firms with tax havens	Full sample		Matched sample	
	Mean	Mean	Mean	Diff	Mean	Diff
CRR (%)	-0.64**	-1.15***	-0.7***	-0.51***	-1.14**	-0.49**
Market model						
CAR (%)	-0.74	-1.29***	-0.8*	-0.56***	-1.07*	-0.34**
Market-adjusted model						
CAR (%)	-0.69	-1.2***	-0.75*	-0.51***	-1.21*	-0.43**
Mean-adjusted model						
CAR (%)	-0.81	-1.37***	-0.88*	-0.55***	-1.32	-0.46*
Capital asset pricing model						
CAR (%)	-0.53	-1.66***	-0.7*	-1.13***	-1.13*	-1.07**

Notes: This table provides cumulative returns of the sample firms around publication of the EU tax haven blacklist, distinguishing between firms with affiliates in the blacklisted countries and firms without such affiliates. There are 2 031 firms with tax haven subsidiaries and 11 118 firms without tax haven subsidiaries. Returns are cumulated over days around December 5, 2017, the event window is [-1; 3] with respect to this date. The table distinguishes between cumulative returns of full sample and matched sample, where firms are matched by country and closest neighbour by number of foreign subsidiaries. Significance of the cumulative returns is tested via a test statistic, using the sample standard deviation and robust standard errors. *CRR* is the cumulative raw return, obtained by summing up raw daily returns during the event period. *CAR* is the cumulative abnormal return, obtained according to several models. Market model assumes a constant and linear relation between individual returns and return on the market index. Model parameters are obtained by OLS regression, based on estimation window. Market-adjusted model or market return model calculates abnormal returns by subtracting the contemporaneous return of the market index from the firm's actual return. Mean-adjusted model or constant mean return model assumes that expected asset returns differ by company, but are constant over time and equal to the arithmetic mean over the estimation window. Capital asset pricing model (CAPM) estimates the abnormal returns by a time-series regression based on realized returns, controlling for the risk free rate. *, **, and *** denote significance at the 10%, 5%, and 1% levels.

Table 4: Cumulative raw returns after publication of the EU tax haven blacklist

	(1)	(2)	(3)	(4)	(5)	(6)
Tax haven exposure	-0.00487**	-0.00568***				
	(0.00201)	(0.00099)				
Proportion of tax havens			-0.00461*	-0.00633***		
			(0.00268)	(0.00234)		
Log(Number of tax havens)					-0.00086	-0.00228**
					(0.00094)	(0.00096)
Log(Number of foreign subsidiaries)		0.00102**		0.00091**		0.00100**
		(0.00045)		(0.00045)		(0.00046)
R^2	0.087	0.088	0.087	0.088	0.087	0.088
Observations	13 149	13 149	13 149	13 149	13 149	13 149

Notes: This table provides regression analysis of cumulative raw returns of listed multinational firms after publication of the EU tax haven blacklist. The dependent variable is *Cumulative raw return*. Returns are cumulated over days around the publication, the event window is [-1; 3] with respect to this date. *Tax haven exposure* indicates whether (1) or not (0) a firm has at least one subsidiary located in the EU blacklisted tax haven countries. *Proportion of tax havens* indicates the proportion of tax haven subsidiaries the firm has. *Log(Number of tax havens)* is the natural logarithm of the number of tax haven subsidiaries the firm has. *Log(Number of foreign subsidiaries)* controls for firm size. Table A.1 provides detailed variable definitions. All continuous variables are winsorized at the 1% and 99% levels. All specifications include country and industry fixed effects (49 Fama-French industries). Standard errors are clustered at the country and industry level (2-way cluster) and are reported in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% levels.

column 4, −0.72% , as my baseline estimate.

Overall, firms connected to tax havens are adversely affected by publication of the tax haven blacklist. First, there are reputational effects of EU shaming of the blacklisted tax havens. Firms with a substantial share of the blacklisted tax haven subsidiaries face potential public pressure or backlash against the firm or its products (Graham *et al.*, 2014). Investors react negatively, since it can harm firms' future profits. Moreover, firms can be audited and their transactions with subsidiaries in tax havens are likely to be excessively monitored, inducing costs for the firm itself. Finally, tax havens face potential future countermeasures by the EU. As the blacklisted tax havens might not be eligible for funds from the bloc except where to aid development and might face further sanctions, the tax haven countries might decide to take commitments to change their tax laws (Sharman, 2009). This can jeopardise firms' tax saving strategies. The adverse market reaction to publication of the blacklist suggests that tax havens help firms with saving taxes and generate firm value on average.

Finally, Figure 1 shows the cumulative abnormal returns, calculated according to the market model, around publication of the EU tax haven blacklist for firms with and without tax haven subsidiaries. Publication of the EU tax haven blacklist does not affect firms without any blacklisted tax haven subsidiaries, so their cumulative abnormal returns are small and insignificant both before and after blacklist publication. Market reaction is significantly negative for firms with blacklisted tax haven subsidiaries, whose cumulative abnormal returns become negative and statistically significant right after December 5, 2017. The cumulative effect is approximately 1.3% reduction in firm's stock price 3 days after publication of the blacklist, and the cumulative effect over 10 days averages at approximately 1.7% reduction in firm's stock price. These observations support the regression results that the market reacted negatively to publication of the EU tax haven blacklist for the firms with blacklisted tax haven subsidiaries.

2.5.2 Robustness

Since all firms with tax haven subsidiaries have the same event date, significance levels in the main analysis can be influenced by event date clustering. Therefore, I repeat the analysis using two approaches that alleviate these concerns - portfolio approach and Fama MacBeth approach. Results of these specifications are depicted in Table 6 and show that firms with tax haven subsidiaries earn statistically significant negative cumulative abnormal returns after publication of the blacklist. The economic magnitude of the two approaches can be calculated by multiplying the main coefficients by five

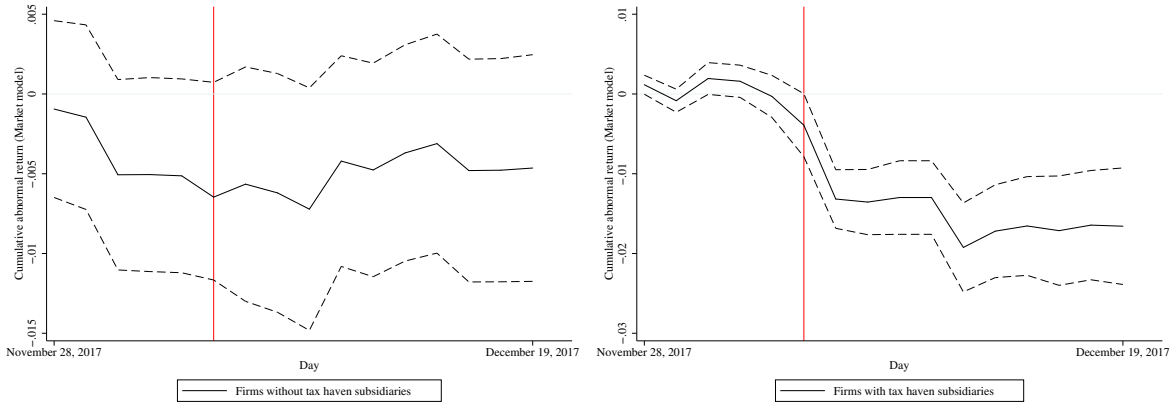
due to the method of computing the abnormal returns.

Table 5: Cumulative abnormal returns after publication of the EU tax haven blacklist

	(1)	(2)	(3)	(4)	(5)	(6)
Tax haven exposure	-0.00495**	-0.00525***				
	(0.00209)	(0.00104)				
Proportion of tax havens			-0.00495	-0.00715***		
			(0.00306)	(0.00270)		
Log(Number of tax havens)					-0.00142	-0.00327***
					(0.00105)	(0.00085)
Log(Number of foreign subsidiaries)		0.00129***		0.00116***		0.00130***
		(0.00043)		(0.00043)		(0.00043)
R^2	0.080	0.081	0.080	0.081	0.080	0.081
Observations	13 149	13 149	13 149	13 149	13 149	13 149

Notes: This table provides regression analysis of cumulative abnormal returns of listed multinational firms after publication of the EU tax haven blacklist. The dependent variable is *Cumulative abnormal return*. Returns are cumulated over days around the publication, the event window is [-1; 3] with respect to this date. *Tax haven exposure* indicates whether (1) or not (0) a firm has at least one subsidiary located in the EU blacklisted tax haven countries. *Proportion of tax havens* indicates the proportion of tax haven subsidiaries the firm has. *Log(Number of tax havens)* is the natural logarithm of the number of tax haven subsidiaries the firm has. *Log(Number of foreign subsidiaries)* controls for firm size. Table A.1 provides detailed variable definitions. All continuous variables are winsorized at the 1% and 99% levels. All specifications include country and industry fixed effects (49 Fama-French industries). Standard errors are clustered at the country and industry level (2-way cluster) and are reported in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% levels.

Figure 1: Market reaction to publication of the EU tax haven blacklist: Cumulative abnormal returns (Market model)



Notes: The graphs show the cumulative abnormal returns, calculated according to the market model, around publication of the EU tax haven blacklist (December 5, 2017) for firms with and without tax haven subsidiaries. The dashed lines represent the 95% confidence intervals for significance limits.

(the number of days in the event window). For the portfolio approach, the economic magnitude is -1.16%, while it is -0.97% for the Fama MacBeth approach. These are larger than the baseline effect, since they do not control for either country or industry fixed effects, or firm size.

Table 7 shows additional robustness tests of the main specification (Table 5, column 4). Column 1 shows the results of the main specification for the ease of comparison. Further, as shown in column 2 the coefficient of interest is larger than in the main specification when I repeat the analysis using a matched sample, matching by country and closest neighbour by number of foreign subsidiaries. Similarly, the coefficient is larger than in the main specification when I match firms by total assets in column 3. Moreover, the coefficient is larger than in the main specification when I exclude the size control and any fixed effects, as in column 4. This shows the importance of having both the size control and country and industry fixed effects in the regressions.

Furthermore, I examine whether investors reacted to the grey list of tax havens, which was published on the same day as the blacklist. Since the grey-listed countries committed to addressing deficiencies in their tax systems, according to the EU, I expect that there would be no significant shaming effect of firms with many subsidiaries in the grey-listed countries. Contrarily, as the EU said in a press release, "The EU listing process had a very positive impact as most jurisdictions engaged constructively with the EU during the listing process. Many made concrete, high-level commitments to improve their standards as a result of the EU screening exercise" (Commission, 2017).

Table 6: Robustness tests for event-date clustering

	(1)	(2)
Tax haven exposure · Event day	-0.00231***	-0.00194***
	(0.00086)	(0.00064)
Tax haven exposure	-0.00180**	
	(0.00086)	
Fixed effects	Yes (day)	No
	Portfolio approach	Fama-MacBeth approach
R^2	0.872	0.025
Observations	122	61

Notes: The table provides robustness tests to alleviate event-day clustering concerns. For the portfolio approach, I construct daily abnormal returns of portfolios of firms that have tax haven subsidiaries and that do not. The returns are constructed for 60 days around publication of the blacklist (30 days before and 30 days after December 5, 2017). I then regress these portfolio returns on event day dummy interacted with tax haven exposure dummy, day fixed effects and tax haven exposure dummy. For the Fama-MacBeth approach, I regress daily abnormal returns on tax haven exposure for each date during the 60 days. I then regress the resultant tax haven exposure coefficients on event day dummy interacted with tax haven exposure dummy to establish whether the tax haven exposure coefficient is statistically different on the relevant event dates, as compared to non-event dates. Table A.1 provides detailed variable definitions. Robust standard errors are reported in parentheses. *,**, and *** indicate statistical significance at the 10%, 5%, and 1% levels.

Since the EU was not shaming the grey-listed tax havens, and they do not face sanctions or penalties for being included in the grey list, I expect the investors to be indifferent regarding firms' exposure to the grey-listed tax havens. In order to control for firms' exposure to grey-listed tax havens, I create a variable *Proportion of grey tax havens*, equal to the proportion of grey-listed tax haven subsidiaries the firm has, as a proportion of all firm's subsidiaries. As column 5 shows, controlling for firms' exposure to grey-listed tax havens does not affect the main coefficient of interest significantly. There seems to be a small positive effect of having subsidiaries in the grey-listed countries, which corresponds to my intuition that these countries do not face any EU shaming or penalties.

Finally, most countries in the blacklist are countries with a relatively small GDP or overseas territory islands, with a notable exception of South Korea. South Korea had never been blacklisted before, but was included in the EU tax haven blacklist since it did not comply with transparency requirements. Almost every third South Korean firm owns a tax haven in my sample, and more than 40% of tax haven subsidiaries in the sample are located in South Korea. Therefore, I examine to what extent the baseline results are driven by South Korea being included in the EU tax haven blacklist in specifications 6, 7 and 8 in Table 7. In specification 6, I interact the *Proportion of tax*

havens variable with a dummy variable for whether the parent firm is located in South Korea. The interaction term shows a large negative reaction of South Korean firms, as compared to firms located in other countries. Similarly, in specification 7 I control for the proportion of tax haven subsidiaries a firm has, without considering South Korea as one of the 17 blacklisted countries. The estimated coefficient is smaller and less significant than the baseline coefficient. Finally, in specification 8 I control for the proportion of South Korean subsidiaries a firm has, and find a large and statistically significant negative effect of firms with a large proportion of subsidiaries located in South Korea. This suggests that the baseline results are to a substantial extent affected by South Korea's inclusion in the blacklist. However, since the main result holds also when excluding South Korea from the blacklisted tax haven list, the results are not entirely driven by South Korea. With these robustness tests in mind, I continue to use the specification in Table 5, column 4 as my main specification.

Table 7: Robustness tests

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Proportion of tax havens	-0.00715***	-0.01961***	-0.00939**	-0.01792***	-0.00708**	-0.00588**		
	(0.00270)	(0.00637)	(0.00394)	(0.00450)	(0.00308)	(0.00229)		
Proportion of grey tax havens					0.00515*			
					(0.00302)			
Proportion of tax havens · South Korean firm						-0.00814***		
						(0.00307)		
Proportion of tax havens without South Korea							-0.00530**	
							(0.00218)	
Proportion of South Korean subsidiaries								-0.00925***
								(0.00283)
Log(Number of foreign subsidiaries)	0.00116***	-0.00076	-0.00078		0.00116***	0.00117***	0.00113**	0.00116***
	(0.00043)	(0.00218)	(0.00081)		(0.00043)	(0.00043)	(0.00045)	(0.00043)
Fixed effects	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
	Main	Matched on number of foreign subsidiaries	Matched on total assets	No controls	Grey list	South Korean firm	No South Korea	South Korea only
R^2	0.081	0.330	0.169	0.001	0.081	0.081	0.081	0.081
Observations	13 149	382	2 554	13 149	13 149	13 149	13 149	13 149

Notes: The table provides robustness tests of the main specification (Table 5, column 4). The dependent variable is *Cumulative abnormal return*. *Proportion of tax havens* indicates the proportion of tax haven subsidiaries a firm has. *Proportion of grey tax havens* indicates the proportion of grey-listed tax haven subsidiaries a firm has. *Proportion of tax havens without South Korea* indicates the proportion of tax haven subsidiaries a firm has, without considering South Korea as a tax haven. *Proportion of South Korean subsidiaries* indicates the proportion of South Korean subsidiaries a firm has. *South Korean firm* is a dummy variable equal to 1 if the firm is located in South Korea. *Log(Number of foreign subsidiaries)* controls for firm size. Column 1 shows the main specification. Column 2 matches firms with tax haven subsidiaries to firms without such subsidiaries by country and number of foreign subsidiaries. Column 3 matches firms with tax haven subsidiaries to firms without such subsidiaries by country and total assets. In column 4 the main specification is estimated without controls. Column 5 controls for firms' exposure to grey-listed tax havens. Columns 6 to 8 control for South Korea exposure. Table A.1 provides detailed variable definitions. All continuous variables are winsorized at 1% and 99% levels. All specifications include country and industry fixed effects, while column 4 does not include any fixed effects or controls. Standard errors are clustered at country and industry level and are reported in parentheses. *,**, and *** indicate statistical significance at the 10%, 5%, and 1% levels.

2.5.3 Interaction with previous tax haven lists

As discussed in the media, the EU tax haven blacklist is not exclusive, and the sources agree that it omits several major offshore hubs, such as Bermuda, British Virgin Islands and the Cayman Islands, as well as important European countries, such as Ireland, Luxembourg and the Netherlands that have been recognized as tax havens in other tax haven lists. As new research shows, Ireland is the biggest tax haven for multinationals (Tørsløv *et al.*, 2018). Moreover, the EU tax haven blacklist has been said to merely include non-cooperative jurisdictions, which are small and lack administrative capabilities to deal with the EU's request. Table A.6 in the Appendix shows the different tax haven lists that have been used in the previous literature, while Tables A.7 and A.8 compare countries represented in the previous lists with countries in the EU tax haven blacklist. The EU tax haven blacklist features Panama, which has appeared in all previous lists, and it also includes countries that have not appeared in any previous tax haven lists, such as Mongolia, Namibia and South Korea. Nevertheless, the EU blacklist does not include Cayman Islands and Isle of Man, which have been included in all previous tax haven lists. I expect that investor reaction to inclusion of particular countries in the blacklist could differ, based on whether these countries were previously known to be tax havens or not.

To examine whether investors reacted differently to different types of blacklisted tax havens, I split all tax havens into groups, based on how foreseeable they were to be included in the blacklist. If the tax haven was included in at least half of the previous tax haven lists (e.g. 3 lists), it is likely that it could be included in the EU blacklist as well. Similarly, if the haven was included in only 2 of the previous lists, it is less foreseeable it would be included in the EU tax haven blacklist. Based on this, I create 3 groups of countries - *Likely to be on EU list and was on EU list*, *Likely to be on EU list and was not on EU list* and *Not likely to be on EU list and was on EU list*. Similarly, I create another 3 groups of countries - *Was on all previous lists and was on EU list*, *Was on all previous lists and was not on EU list* and *Was on no previous lists and was on EU list*. Finally, I create another 2 groups of countries - *Was on at least one list and was on EU list* and *Was on at least one list and was not on EU list*.[23] I then calculate each firm's exposure to the specific group through the proportion of subsidiaries the firm has in these countries. Finally, I regress the stock returns on the proportion of subsidiaries the firms have in the different groups.

The results are displayed in Table 8 and show that the larger the firm's exposure to the tax havens that were unlikely to be on the EU blacklist but were actually included,

[23] Composition of the groups can be found in Table A.8.

the worse the investor reaction. Similar results can be observed for firms with a large exposure to the tax havens that had never been on a blacklist before, but were included in the EU list. Since it was not foreseeable that these countries would be included in the blacklist and might face potential sanctions and countermeasures, investors reacted negatively to the new information, which was immediately priced in the firm value. Interestingly, there is a small positive market reaction of the firms exposed to those countries that were on at least one previous tax haven blacklist, but not on the EU list.[24] These are the countries that are considered as tax havens by the market, but escaped inclusion in the blacklist, such as Bahamas, Bermuda, Cayman Islands, Ireland, Isle of Man, Jersey, Luxembourg and others. They were not shamed by the EU and do not face any future sanctions. Since these countries are often used for firms' tax saving strategies, and they managed to escape the blacklisting, these are positive news for the investors.

2.6 Cross-sectional variation in market reactions

To further examine the partial relationship between firm characteristics and investor reaction to publication of the blacklist, I investigate the cross-sectional relation between firm characteristics and the event window returns. Results of the different specifications are displayed in Tables 9, 10 and 11. Column 1 shows the results of the main specification for the ease of comparison (Table 5, column 4).

[24]The cumulative abnormal returns of firms exposed to the particular groups of countries are displayed in Table A.9.

Table 8: Cumulative abnormal returns after publication of the EU tax haven blacklist: Interaction with previous tax haven lists

	(1)	(2)	(3)
Likely to be on EU list · Was on EU list	0.00224		
	(0.00937)		
Likely to be on EU list · Was not on EU list	0.00469		
	(0.00363)		
Not likely to be on EU list · Was on EU list	-0.00878***		
	(0.00246)		
Was on all lists · Was on EU list		-0.08084	
		(0.05108)	
Was on all lists · Was not on EU list		0.01520	
		(0.01135)	
Was on no lists · Was on EU list		-0.00855***	
		(0.00289)	
Was on at least one list · Was on EU list			-0.00426
			(0.00749)
Was on at least one list · Was not on EU list			0.00338*
			(0.00192)
Log(Number of foreign subsidiaries)	0.00118***	0.00113***	0.00111**
	(0.00043)	(0.00043)	(0.00045)
R^2	0.081	0.082	0.081
Observations	13 149	13 149	13 149

Notes: This table examines investor reaction to the EU tax haven blacklist, while controlling for firms' exposure to previous tax haven lists. A country is likely to be on the EU tax haven blacklist if it has been included in at least 3 previous tax haven lists, out of 5. The composition of the different groups can be seen in Tables A.6, A.7 and A.8. The variables represent each firm's exposure to the particular group. The dependent variable is *Cumulative abnormal return*. *Log(Number of foreign subsidiaries)* controls for firms' size. Table A.1 provides detailed variable definitions. All continuous variables are winsorized at the 1% and 99% levels. All specifications include country and industry fixed effects (49 Fama-French industries). Standard errors are clustered at the country and industry level (2-way cluster) and are reported in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% levels.

Table 9: Cumulative abnormal returns after publication of the EU tax haven blacklist: Firm-level cross-sectional variation

	(1)	(2)	(3)	(4)	(5)	(6)
Proportion of tax havens	-0.00715***	-0.00599*	-0.00756**	-0.00775**	-0.00681**	-0.00707**
	(0.00270)	(0.00309)	(0.00288)	(0.00303)	(0.00309)	(0.00303)
Proportion of tax havens · Retail		-0.10399**				
		(0.05079)				
Proportion of tax havens · Tax aggressiveness (unadjusted)			-0.02527***			
			(0.00880)			
Tax aggressiveness (unadjusted)			0.00410**			
			(0.00185)			
Proportion of tax havens · Tax aggressiveness (without FE)				-0.01900**		
				(0.00880)		
Tax aggressiveness (without FE)				0.00334		
				(0.00203)		
Proportion of tax havens · Tax aggressiveness (with FE)					-0.02606***	
					(0.00969)	
Tax aggressiveness (with FE)					0.00284	
					(0.00209)	
Proportion of tax havens · Cash effective tax rate						0.33116***
						(0.00115)
Cash effective tax rate						0.01949*
						(0.01113)
	Main	Retail	Tax agg (unadj.)	Tax agg (w/o FE)	Tax agg (w/ FE)	Cash ETRs
R^2	0.081	0.082	0.082	0.081	0.081	0.081
Observations	13 149	13 149	13 149	13 149	13 149	13 149

Notes: This table examines firm-level cross-sectional variation. *Retail* is a dummy variable equal to 1 if a firm operates within retail sector. *Tax aggressiveness (unadjusted)* is statutory tax rate at the country level less firm's effective tax rate. *Tax aggressiveness (without FE)* is the residual of a regression of firm's *Tax aggressiveness (unadjusted)* on ROA, intangible assets divided by total assets and losses of the previous year (if any), scaled by assets. *Tax aggressiveness (with FE)* additionally controls for country and industry fixed effects. *Cash ETR* is cash taxes paid over total pre-tax book income. Table A.1 provides detailed variable definitions. All continuous variables are winsorized at 1% and 99% levels. All specifications include country and industry fixed effects and control for firm size via *Log(Number of foreign subsidiaries)*, which is not reported. Standard errors are clustered at country and industry level and are reported in parentheses. *,**, and *** indicate statistical significance at 10%, 5%, and 1% levels.

2.6.1 Corporate citizenship

Specification 2 of Table 9 examines corporate citizenship as an explanation for the negative market response to publication of the blacklist. The possibility of a negative consumer reaction to indication of bad corporate citizenship makes retail firms relatively more vulnerable to news of their tax avoidance strategies. The results show that investors of firms operating within the retail sector reacted more negatively, compared to firms in other industries. This is consistent with the potential consumer backlash, which can harm firms' future profits.[25]

I recognize that interpretation of the results is subject to the concern that engagement in tax shelters is endogenous. It is possible that retail firms are less likely to have subsidiaries in tax shelters but, if they do so, the expected benefit would be higher than otherwise in order to offset the higher expected costs. It is also possible that the type of shelters that retail firms engage in is systematically different than the type of shelters that are important in other sectors. The results should be interpreted with these caveats in mind.

2.6.2 Tax aggressiveness

Specifications 3 to 6 of Table 9 test whether tax aggressive firms were affected differently around publication of the EU tax haven blacklist than less tax aggressive firms. In column 3, I control for tax aggressiveness using an unadjusted measure, which subtracts the firm's effective tax rate from the country's statutory corporate tax rate. In column 4, I use a measure which is obtained by regressing the unadjusted tax aggressiveness on firm's return on assets, intangible assets divided by total assets and losses of the previous year (if any), scaled by assets. The measure in column 5 additionally adds industry and country fixed effects. All specifications show that the more tax aggressive firms have more negative returns around publication of the EU tax haven blacklist.

The results are consistent with investors expecting that firms might be audited or fined for past tax evasion or overly aggressive tax avoidance. Even though the blacklist does not incorporate any specific sanctions or penalties, it was effective at shaming and increasing public scrutiny on the more tax aggressive firms to a larger extent than less tax aggressive firms. As tax saving strategies through the use of tax havens are most relevant for relatively tax aggressive firms, they would be more negatively affected if tax havens had to limit their preferential treatment. The negative reaction might also

[25]Nearly identical results are obtained when, instead of using Fama French industry classification to define retail industry, I use NAICS or NACE industry classification. Similar results are also obtained when I use the *Brand value* as a measure for corporate citizenship.

reflect the potential future costs of restructuring the firms might incur in order to keep their corporate tax payments low. Investors react negatively to such information since firm's future after-tax profits are likely to fall.

These findings are in line with literature on corporate tax abuse (Blank, 2009; Madhavan, 2002). Hedge funds and private equity funds own significant stakes in multinational firms, and fund managers spend considerable time searching for information about corporate managers' tax planning behaviour. Many funds seek to maximize the economic return on their investment within a relatively short period of time. They may enjoy a firm's claimed tax benefits today; however, when they get to know that the tax authorities might audit or reject the firm's tax position, they would sell the stock.

As another test, in column 6 I look at cash effective tax rates as a measure of tax aggressiveness. The larger the cash effective tax rate, the less tax aggressive the firm is. The results show that the market reaction is less negative for firms that are viewed to be generally less tax aggressive, controlling for the proportion of tax haven subsidiaries. This is consistent with market reacting positively to evidence that a firm tries to reduce taxes (has a high proportion of tax haven subsidiaries), when its financial reports would lead one to believe the firm is not tax aggressive (has high cash effective tax rate). The results also correspond to the previous literature (Hanlon & Slemrod, 2009), which claims that in order to maximize the value of the firm, shareholders would like to minimize corporate tax payments net of the private costs of doing so - they want the company to be optimally aggressive. Investors could consider this behaviour to be an attractive attribute of a corporation because it could increase the economic return on their investments in the corporation's stock. Exposure to the blacklisted subsidiaries could signal that the corporation's tax director was willing to claim risky tax positions that could generate substantial benefits for investors in the future. Investors often comment that they do not seek to invest in corporations whose tax directors break the tax law, but rather that claim tax positions that "push the envelope" (Blank, 2009). When a tax director pushes the envelope, he claims tax positions that technically appear to comply with the tax rules. Investors may respect this type of tax director for pursuing aggressive tax positions that yield economic returns on their investments, but refrain from violating explicit tax rules.

2.6.3 Firm-level governance

In Table 10 I use measures of firm-level governance to capture the degree to which monitoring efforts reduce conflicts of interest between principals and shareholders. In poorly-governed firms, managers may find it easier to extract resources for their own

gain. If tax havens are used to expropriate shareholders, I expect the publication of the blacklist and the resulting increased scrutiny to reduce such activities, particularly in weakly-governed firms. Thus, I expect weakly-governed firms to be less negatively affected by publication of the blacklist. For all my firm-level governance measures, higher values indicate stronger governance. Specification 1 shows the results of the main specification for the ease of comparison.

Specifications 2 and 3 consider foreign institutional ownership or the firm-level fraction of foreign total or direct investment, as firm-level governance measures. The larger the foreign institutional ownership (the better governed the firm), the worse the investor reaction.

Further, in specification 4 I interact the *Proportion of tax havens* with the reverse of RepRisk index score as firm-level governance measure. The index gives a score that dynamically captures and quantifies a company's exposure to environmental, social and governance (ESG) and business conduct risks.[26] Again, I observe evidence that worse governance is associated with less negative returns for firms that are exposed to the blacklisted tax havens.

Specifications 5 and 6 examine the effect of having unsponsored or sponsored American Depositary Receipts (ADRs) and hence being subject to stringent US regulations, as firm-level governance measures. The results show that firms with ADRs faced more negative investor reaction that worse governed firms.

Further, specification 7 examines exposure to the United States legislation and regulations as an explanation for the market response. After the matching analysis conducted in Table 2, having a US subsidiary was one of the variables that were still different between the two groups. To examine whether firms with subsidiaries in the United States reacted differently to the blacklist, I interact the tax haven exposure variable with the US subsidiary dummy. The coefficient on the interaction term is insignificant, so the results suggest that having a subsidiary in the United States does not affect investor reaction to publication of the blacklist.

Finally, specification 8 of Table 10 examines the reverse of corruption as an explanation for the stock price reaction to publication of the blacklist. Firms with subsidiaries in corrupt countries might use tax havens as offshore vehicles to bribe foreign government officials. Moreover, after the matching analysis conducted in Table 2, corruption exposure was one of the variables that were still significantly different between the two groups. To examine whether investors of more corrupt firms reacted differently to the

[26]The higher the RepRisk index value, the higher the risk exposure. Since I am interested in the effect of governance, I calculate the reverse of RepRisk index score (1-score) and use that in the regression.

blacklist, I interact the tax haven exposure variable with the (1-corruption) exposure or lack of corruption. As the results show, having subsidiaries in perceptively corrupt countries is not associated with more negative abnormal returns. Based on this, it seems that investors of relatively more corrupt firms did not react differently than those of less corrupt firms, and public shaming does not seem to matter more or less for firms more exposed to corruption.

Taken together, the results of this subsection are consistent with the view that weakly-governed firms may benefit from publication of the tax haven blacklist, since it potentially reduces expropriation. The results suggest that shareholders benefit from the potentially additional auditing, monitoring, scrutiny and transparency following publication of the blacklist, especially so in weakly-governed firms. Another explanation for the results is that when the market learns of tax shelter activity for firms with good governance, it reacts negatively because this confirms the suspicion of poor governance that was previously thought not to be value-decreasing. On the other hand, the market price for firms with bad governance already reflects a reduction in value related to poor governance provisions, so investors do not react negatively (Hanlon & Slemrod, 2009). Finally, investors of firms with worse firm-level governance might simply react less to EU shaming than investors of well-governed firms.

Table 10: Cumulative abnormal returns after publication of the EU tax haven blacklist: Firm-level governance

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Proportion of tax havens	-0.00715***	-0.00994***	-0.00624*	-0.00533*	-0.00759***	-0.00728**	-0.00696***	-0.00599*
	(0.00270)	(0.00232)	(0.00283)	(0.00279)	(0.00279)	(0.00299)	(0.00262)	(0.00299)
Proportion of tax havens · Governance		-0.00823***	-0.00354***	-0.04831**	-0.03093***	-0.02695**	-0.00215	-0.00130
		(0.00263)	(0.00159)	(0.02042)	(0.01030)	(0.01086)	(0.00696)	(0.00432)
Governance		-0.00152	0.00178	0.00734	0.00014	0.00019	0.00157	0.00107
		(0.00236)	(0.00172)	(0.01006)	(0.00277)	(0.00369)	(0.00126)	(0.00114)
Log(Number of foreign subsidiaries)	0.00116***	0.00124***	0.00112***	0.00127***	0.00114**	0.00115***	0.00107**	0.00123***
	(0.00043)	(0.00040)	(0.00041)	(0.00044)	(0.00044)	(0.00042)	(0.00042)	(0.00045)
	Main	Foreign total ownership	Foreign direct ownership	Reverse RepRisk index	Unsponsored ADRs	Sponsored ADRs	US subsidiary	Lack of corruption
R^2	0.081	0.081	0.081	0.081	0.081	0.081	0.081	0.081
Observations	13 149	13 149	13 149	13 149	13 149	13 149	13 149	13 149

Notes: This table examines investor reaction to the EU tax haven blacklist, while controlling for firm-level governance. The dependent variable is *Cumulative abnormal return*. *Proportion of tax havens* indicates the proportion of tax haven subsidiaries a firm has. *Governance* is the firm-level governance, measured by several variables - foreign total and direct institutional ownership, reverse RepRisk index (no exposure to environmental, social and governance and business conduct risks), ownership of unsponsored and sponsored American Depository Receipts (ADRs), ownership of a US subsidiary, and lack of corrupt affiliates. For all governance measures, higher values indicate stronger governance. Table A.1 provides detailed variable definitions. All continuous variables are winsorized at 1% and 99% levels. All specifications include country and industry fixed effects. Standard errors are clustered at country and industry level (2-way cluster) and are reported in parentheses. *,**, and *** indicate statistical significance at the 10%, 5%, and 1% levels.

2.6.4 Country-level governance

To support my interpretation of the firm-level governance results, I next turn to country-level evidence in Table 11. I expect that the use of tax havens comes at a particularly high cost in countries where investors face high expropriation risk and low levels of investor protection. Publication of the blacklist should make expropriation harder to maintain in the future, and therefore benefit outside shareholders, more so in countries with high expropriation risk. I test this by augmenting the main specification by several country-level measures associated with expropriation risk and investor protection. This set-up allows me to compare firms affected by publication of the blacklist to other firms headquartered in the same country. For all my country-level governance measures, higher values indicate stronger governance.

The results suggest that the negative investor reaction is more pronounced for firms headquartered in countries with low expropriation risk and high investor protection. Specifically, firms both exposed to tax havens and high country-level governance are more adversely affected. The results correspond to my intuition in the firm-level governance analysis - the weakly-governed firms are likely to benefit from publication of the blacklist, while for the well-governed firms, the exposure to blacklisted tax havens confirms the suspicion of poor governance, which is then priced in firm's value.

Importantly, this effect is distinct from any effects of firms' headquarters country development. I do not find a differential effect on firm value for firms in countries with higher economic development, when looking at the interaction between tax haven exposure and the natural logarithm of country's GDP per capita. This suggests that my measures of expropriation risk and investor protection do not merely reflect economic development.

In sum, the results suggest that, due to their opaqueness, tax havens might be used for expropriation of corporate resources, at the cost of shareholders. Publication of the blacklist and the potential future countermeasures reduce some of that cost. Another explanation for the finding is that investors of firms with worse governance seem to react less to EU shaming than investors of well-governed firms.

Table 11: Cumulative abnormal returns after publication of the EU tax haven blacklist: Country-level governance

	(1)	(2)	(3)	(4)	(5)
Proportion of tax havens	-0.00715***	-0.00568*	-0.00592**	-0.00358***	-0.00445**
	(0.00270)	(0.00267)	(0.00244)	(0.00104)	(0.00277)
Proportion of tax havens · Governance		-0.03442**	-0.04770**	-0.04740***	-0.05998***
		(0.01460)	(0.01990)	(0.00924)	(0.02327)
Proportion of tax havens · Log(GDP per capita)		0.00088	0.00030	-0.00051	0.00017
		(0.00122)	(0.00104)	(0.00206)	(0.00160)
Log(Number of foreign subsidiaries)	0.00116***	0.00116**	0.00116**	0.00116***	0.00116***
	(0.00043)	(0.00044)	(0.00047)	(0.00043)	(0.00043)
R^2	0.081	0.081	0.081	0.081	0.081
Observations	13 149	13 149	13 149	13 149	13 149
	Main	Property rights	Reverse country risk	Rule of law	Minority shareholder protection

Notes: This table investigates the role of expropriation measured at the country level in explaining returns of publicly listed multinational firms around publication of the EU tax haven blacklist. The dependent variable is *Cumulative abnormal return*. *Proportion of tax havens* indicates the proportion of tax haven subsidiaries a firm has. Column 1 shows the main specification (Table 5, column 4). *Proportion of tax havens · Governance* denotes the interaction between *Proportion of tax havens* and the respective country-level governance measures. Countries are split into those with above-median and below-median scores, where above-median score indicates better governance. The governance measures are dummies equal to one if the country has strong governance. Measures include property rights, country risk index, rule of law index, and minority shareholder protection. All specifications control for country's productivity and standard of living via GDP per capita variable. *Log(Number of foreign subsidiaries)* controls for firms' size. Table A.1 provides detailed variable definitions. All continuous variables are winsorized at 1% and 99% levels. All specifications include country and industry fixed effects (49 Fama-French industries). Standard errors are clustered at country and industry level (2-way cluster) and reported in parentheses. *,**, and *** indicate statistical significance at the 10%, 5%, and 1% levels.

2.7 Evolution of the EU tax haven blacklist

On 5 December 2017, the EU Council adopted the first common EU tax haven blacklist resulting from the assessment of third countries against distinctive criteria. Pursuing the assessment process, the Council continuously updated the list on the basis of commitments received, while also reviewing countries that had not yet been assessed. First, on 23 January 2018 8 jurisdictions were moved from the blacklist to the grey list, since, following the publication of the list, several jurisdictions sent new commitments. Countries that were moved to the grey list were Barbados, South Korea, Grenade, Macau, Mongolia, Panama, Tunisia and United Arab Emirates. Further, on 13 March 2018 Bahrain, Marshall Islands and Saint Lucia were moved from the blacklist to the grey list, while Bahamas, Saint Kitts and Nevis and US Virgin Islands were added to the blacklist. Further, on 25 May 2018, Bahamas and Saint Kitts and Nevis were moved to the grey list, on 2 October 2018 Palau was moved to the grey list and on 6 November 2018 Namibia was moved to the grey list. I examine whether the evolution of the blacklist had an impact on firm value for firms with subsidiaries in the countries that were either added or removed from the blacklist. I calculate each firm's exposure to either the removed countries or the added countries through the number of firm's subsidiaries in these countries, as a proportion of firm's total subsidiaries. I then calculate the firm's cumulative abnormal returns over the five day window around the blacklist evolution dates and use the cumulative abnormal returns as the dependent variable in the regressions. The results are depicted in Table 12, where specification 1 shows the baseline specification of the initial blacklist publication date on December 5, 2017.

The results in Table 12 show that firms with subsidiaries in those countries that are removed from the EU tax haven blacklist are positively affected. The market reaction is significant for the first time when countries were removed from the blacklist on 23 January 2018, as seen in specification 2. Eight jurisdictions were removed from the blacklist on January 23, including relatively large GDP countries, such as South Korea and United Arab Emirates, and also previously-known tax havens, such as Grenada, Macau and Panama. The reaction is also significant on 25 May 2018 when previously-known tax havens Bahamas and Saint Kitts and Nevis were removed from the blacklist, as seen in specification 4. For the countries that were unlikely to be listed, removal from the blacklist gave evidence to investors that these countries should not be considered as tax havens and maybe should not have been blacklisted in the first place. For the countries that were likely to be listed and were de-listed, removal from the blacklist signalled investors that these tax havens are willing to address their main shortfalls and commit to reforms to increase tax transparency. Since the grey-listed countries do not

face any sanctions or financial penalties, investors can be less concerned when investing in firms with subsidiaries in these countries.

Table 12: Cumulative abnormal returns during evolution of the EU tax haven blacklist

	(1)	(2)	(3)	(4)	(5)	(6)
Exposure to removed countries		0.03652***	0.02342	0.06947***	0.17623	0.00587
		(0.00529)	(0.02742)	(0.00302)	(0.17591)	(0.02156)
Exposure to added countries	-0.00715***		-0.05663			
	(0.00270)		(0.06548)			
Log(Number of foreign subsidiaries)	0.00116***	0.00110***	0.00103***	0.00197***	-0.00043	-0.00045
	(0.00043)	(0.00034)	(0.00035)	(0.00038)	(0.00033)	(0.00035)
R^2	0.081	0.062	0.023	0.043	0.006	0.009
Observations	13 149	13 149	13 149	13 149	13 149	13 149
Blacklist evolution dates	December 5, 2017	January 23, 2018	March 13, 2018	May 25, 2018	October 2, 2018	November 6, 2018

Notes: This table examines investor reaction to EU tax haven blacklist evolution over time after the blacklist publication on 5 December 2017. On 23 January 2018 8 jurisdictions were moved from the blacklist to the grey list (Barbados, South Korea, Grenada, Macau, Mongolia, Panama, Tunisia and UAE). On 13 March 2018 Bahrain, Marshall Islands and Saint Lucia were moved from the blacklist to the grey list, and Bahamas, Saint Kitts and Nevis and US Virgin Islands were moved to the blacklist. On 25 May 2018 Bahamas and Saint Kitts and Nevis were moved from the blacklist to the grey list. On 2 October 2018 Palau was moved to the grey list, while on 6 November 2018 Namibia was moved to the grey list. The dependent variable is *Cumulative abnormal return* during the five day event window around the different blacklist evolution dates. *Exposure to removed countries* is the percentage of affiliates the firm has in the countries that were removed from the blacklist, as a proportion of firm's total affiliates. *Exposure to added countries* is the percentage of affiliates the firm has in the countries that were added to the blacklist, as a proportion of firm's total affiliates. Table A.1 provides detailed variable definitions. All continuous variables are winsorized at 1% and 99% levels. All specifications include country and industry fixed effects and control for firm size via *Log(Number of foreign subsidiaries)*. Standard errors are clustered at country and industry level and are reported in parentheses. *,**, and *** indicate statistical significance at 10%, 5%, and 1% levels.

2.8 Real implications

Finally, I consider the real implications of the EU tax haven blacklist in Table 13. In specifications 1 to 3 I examine firms' tax haven exposure after publication of the blacklist. I find that firms with blacklisted tax haven subsidiaries have significantly reduced their presence in the blacklisted countries after publication of the blacklist. Relative to firms without any tax haven subsidiaries, the exposed firms face a 10% reduction in the proportion of tax haven subsidiaries they have and a 51% reduction in the number of their tax haven subsidiaries. Moreover, sales of firms' tax haven subsidiaries have decreased, as seen in specification 4. Relative to firms without tax haven subsidiaries, the exposed firms experience approximately 31% reduction in sales of their tax haven subsidiaries. Finally, I also examine parent firm's tax aggressiveness after publication of the blacklist in specifications 5 and 6. The results show that firms have become less tax aggressive and their tax aggressiveness has declined by approximately 6%(= 1.57%/27.5%) of one standard deviation.[27]

These results suggest that firms' tax haven ownership structures and tax saving strategies have been affected by the EU tax haven blacklist. This confirms the idea that part of the negative market reaction to publication of the blacklist reflects the restructuring costs and the reduction in firms' future tax avoidance. These estimates of negative real effects may be conservative if the impact on firms' operations is not instantaneous; for instance, if firms have long-term contracts in the blacklisted tax haven countries. More data for post-periods is necessary in order to evaluate the long-term real implications of the blacklist.

[27]Since the tax aggressiveness measures have a mean of zero by construction, the economic effects relative to the mean are less useful.

Table 13: Real implications

Dependent variable	(1) Tax haven exposure	(2) Proportion of tax havens	(3) Log(Number of tax havens)	(4) Log(Sales in tax havens)	(5) Tax aggressiveness (w/o fixed effects)	(6) Tax aggressiveness (w/ fixed effects)
Post publication · Tax haven exposure	-0.42146***	-0.10200***	-0.51033***	-0.30715***	-0.03206***	-0.01565***
	(0.06846)	(0.02586)	(0.06168)	(0.07192)	(0.00256)	(0.00204)
Log(Number of foreign subsidiaries)	0.00096	0.00016	0.00372**	0.00572**	-0.00521***	-0.00160**
	(0.00180)	(0.00017)	(0.00162)	(0.00182)	(0.00258)	(0.00065)
R^2	0.768	0.462	0.806	0.706	0.464	0.345
Observations	156 096	156 096	156 096	619 440	156 096	156 096

Notes: This table examines the real implications of the EU tax haven blacklist. The dependent variables are specified in the table and measure firms' tax haven exposure (columns 1-3), tax haven activities (column 4) and tax aggressiveness (columns 5-6). All measures are at the annual level over years 2007 until 2018, except for sales activity in column 4, which is measured at the quarterly level. *Tax haven exposure* indicates whether (1) or not (0) a firm has at least one subsidiary located in the EU blacklisted tax haven countries. *Proportion of tax havens* indicates the proportion of tax haven subsidiaries the firm has. *Log(Number of tax havens)* is the natural logarithm of the number of tax haven subsidiaries the firm has. *Log(Sales in tax havens)* is the natural logarithm of total sales in USD in firm's tax haven subsidiaries. *Tax aggressiveness (unadjusted)* is statutory tax rate at the country level less firm's effective tax rate. *Tax aggressiveness (without fixed effects)* is the residual of a regression of firm's *Tax aggressiveness (unadjusted)* on return on assets, intangible assets divided by total assets and losses of the previous year (if any), scaled by assets. *Tax aggressiveness (with fixed effecst)* additionally controls for country and industry fixed effects. *Post publication* is a dummy variable equal to one for year 2018. *Log(Number of foreign subsidiaries)* controls for firm size. Table A.1 provides detailed variable definitions. All continuous variables are winsorized at 1% and 99% levels. All specifications include firm and year fixed effects (column 4 includes firm fixed effects and year-quarter fixed effects). Standard errors are clustered at year level (year-quarter level in column 4) and are reported in parentheses. *,**, and *** indicate statistical significance at 10%, 5%, and 1% levels.

2.9 Conclusion

Consistent with the notion that firms use tax havens to create shareholder value, I find that publication of the EU tax haven blacklist on December 5, 2017 led to negative abnormal returns of firms with the blacklisted tax haven subsidiaries. In economic terms, blacklist reduced the overall market capitalization of these firms by $56 billion. The reaction was driven by the EU shaming of tax havens and by the potential future countermeasures and financial penalties associated with the blacklist. The largest reaction was for those tax havens, for which it was not foreseeable that they would be blacklisted. Investors reacted negatively to the new information, which was immediately priced in the firm value. Further, I observe no share price impact of having subsidiaries in the grey-listed tax havens, since the EU was not shaming these countries and they do not face sanctions or penalties of being included in the grey list.

Firms operating within the retail sector faced particularly large share price decrease since consumers might react negatively to an indication of bad corporate citizenship. This is consistent with the potential consumer backlash, which can harm firms' future profits. Also more tax aggressive firms faced more negative returns, which shows that investors expect that firms might be audited or fined for past or overly aggressive tax avoidance. The negative reaction might also reflect the potential future costs of restructuring the firms might incur in order to keep their corporate tax payments low. Firms with relatively high cash effective tax rates had a less negative reaction, consistent with the market reacting positively to evidence that these firms were not as tax-passive as previously believed. The negative reaction was also less pronounced in countries with low levels of investor protection and weakly-governed firms with substantial conflicts of interest between principals and shareholders. The finding suggests that tax sheltering signals a higher likelihood of managerial wealth diversion, at the cost of shareholders. The increased transparency following publication of the blacklist, as well as the potential for countermeasures reduce some of that cost.

Importantly, firms with the blacklisted tax haven subsidiaries subsequently demonstrate reduced economic activity in their tax haven subsidiaries, reduce their tax haven exposure and become less tax aggressive. Moreover, investors react to the evolution of the blacklist and respond positively to countries being excluded from the blacklist. The findings of my paper show that public tax haven shaming by international organisations and news media does matter for investors, which is the main policy implication of my study. Even despite the lack of any specific sanctions or penalties, the exposed firms faced negative returns after publication of the blacklist. The potential for negative investor reaction might deter firms' managers to engage in tax avoidance activities, or at

least increase costs associated with tax avoidance. What should matter most is whether these spotlights are actually followed by improvements in firms' corporate tax strategies and contribute towards less corporate tax avoidance in the future.

References

Aggarwal, Reena, Erel, Isil, Ferreira, Miguel, & Matos, Pedro. 2011. Does governance travel around the world? Evidence from institutional investors. *Journal of Financial Economics*, **100**(1), 154–181.

Akamah, Herita T, Hope, Ole-Kristian, & Thomas, Wayne B. 2018. Tax havens and disclosure aggregation. *Journal of International Business Studies*, **49**(1), 49–69.

Baron, David P. 2003. Private politics. *Journal of Economics & Management Strategy*, **12**(1), 31–66.

Blank, Joshua D. 2009. What's wrong with shaming corporate tax abuse. *Tax Law Review*, **62**.

BNY Mellon. 2017. *BNY Mellon Classic ADR Index*. Online; accessed 26 January 2018.

Bosch, Jean Claude, & Eckard, Woodrow E. 1991. The profitability of price fixing: Evidence from stock market reaction to federal indictments. *The Review of Economics and Statistics*, **32**(2), 309–317.

Brown, S.J., & Warner, J.B. 1980. Measuring security price performance. *Journal of Financial Economics*, **8**.

Brown, S.J., & Warner, J.B. 1985. Using daily stock returns: The case of event studies. *Journal of Financial Economics*, **14**, 3–31.

Cable News Network. 2017. *EU names and shames 17 tax havens*. Online; accessed 12 February 2018.

Chen, Shuping, Chen, Xia, Cheng, Qiang, & Shevlin, Terry. 2010. Are family firms more tax aggressive than non-family firms? *Journal of Financial Economics*, **95**(1), 41–61.

Chrysoloras, Nikos, & Dendrinou, Viktoria. 2017 (Nov.). *EU Mulls Including Turkey on Blacklist of Tax Havens*. Bloomberg.

Coffee, John C Jr. 2002. Racing towards the top?: The impact of cross-listings and stock market competition on international corporate governance. *Columbia Law Review*, **102**(7), 1757–1831.

Commission, European. 2017 (Dec.). *Fair Taxation: EU publishes list of non-cooperative tax jurisdictions*.

Desai, Mihir A, & Dharmapala, Dhammika. 2006. Corporate tax avoidance and high-powered incentives. *Journal of Financial Economics*, **79**(1), 145–179.

Desai, Mihir A, & Dharmapala, Dhammika. 2009. Corporate tax avoidance and firm value. *The Review of Economics and Statistics*, **91**(3), 537–546.

Desai, Mihir A, Dyck, Alexander, & Zingales, Luigi. 2007. Theft and taxes. *Journal of Financial Economics*, **84**(3), 591–623.

Doidge, Craig. 2004. U.S. cross-listings and the private benefits of control: Evidence from dual-class firms. *Journal of Financial Economics*, **72**(3), 519–553.

Doidge, Craig, Karolyi, Andrew G, & Stulz, Rene M. 2004. Why are foreign firms listed in the U.S. worth more? *Journal of Financial Economics*, **71**(2), 205–238.

Doidge, Craig, Karolyi, Andrew G, & Stulz, Rene M. 2010. Why do foreign firms leave U.S. equity markets? *Journal of Finance*, **65**(4), 1507–1553.

Dyreng, Scott, Hoopes, Jeffrey L., Langetieg, Patrick, & Wilde, Jaron H. 2018 (Mar.). *Strategic subsidiary disclosure.*

Dyreng, S.D, Hoopes, J.L, & Wilde, J.H. 2016. Public pressure and corporate tax behavior. *Journal of Accounting Research*, **54**(1), 147–186.

EU. 2017. *List of non-cooperative tax jurisdictions.* Online; accessed 7 December 2017.

European Commission. 2018 (Mar.). *Fair Taxation: Commission puts in place first EU counter-measures on listed non-cooperative tax jurisdictions.*

Frank, Mary Margaret, Lynch, Luann J, & Rego, Sonja Olhoft. 2009. Tax reporting aggressiveness and its relation to aggressive financial reporting. *The Accounting Review*, **84**(2), 467–496.

French, Kenneth. 2018. *Fama French Data Library.* Online; accessed 24 May 2018.

Graham, John R, Hanlon, Michelle, Shevlin, Terry, & Shroff, Nemit. 2014. Incentives for tax planning and avoidance: Evidence from the field. *The Accounting Review*, **89**(3), 991–1023.

Guarascio, Francesco. 2017 (Nov.). *EU tax havens blacklist seen in December, but enforcement unclear.*

Hanlon, Michelle, & Slemrod, Joel. 2009. What does tax aggressiveness signal? Evidence from stock price reactions to news about tax shelter involvement. *Journal of Public Economics*, **93**(1), 126–141.

Hines, James R., & Rice, Eric M. 1994. Fiscal paradise: Foreign tax havens and American business. *The Quarterly Journal of Economics,*, **109**(1), 149–182.

Interbrand. 2017. *Best Global Brands 2017*. Online; accessed 24 May 2018.

Johannesen, Niels, & Larsen, Dan Thor. 2016. The power of financial transparency: An event study of country-by-country reporting standards. *Economics Letters*, **145**(Aug.), 120–122.

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

Kim, J., Li, Y., & Zhang, L. 2011. Corporate tax avoidance and stock price crash risk: Firm-level analysis. *Journal of Financial Economics*, **100**(3), 639–662.

Klein, Benjamin, & Leffler, Keith B. 1981. The role of market forces in assuring contractual performance. *Journal of Political Economy*, **89**(4), 615–641.

Klein, Naomi. 2000. *No Logo: Taking Aim at the Brand Bullies*. 1st edn. New York: Picador.

Kolari, James W., & Pynnönen, Seppo. 2010. Event study testing with cross-sectional correlation of abnormal returns. *Review of Financial Studies*, **23**(11), 3996–4025.

Kudrle, Robert Thomas. 2009. Did blacklisting hurt the tax havens? *Journal of Money Laundering Control*, **12**(1), 33–49.

La Porta, Rafael, Lopez-de Silanes, Florencio, & Shleifer, Andrei. 1998. Law and finance. *Journal of Political Economy*, **106**(6), 1113–1155.

Lel, Ugur, & Miller, Darius P. 2008. International cross-listing, firm performance, and top management turnover: A test of the bonding hypothesis. *Journal of Finance*, **63**(4), 1897–1937.

Lomas, Ulrika. 2018 (Mar.). *EU Announces Sanctions For 'Blacklisted' Countries*.

MacKinlay, Craig A. 1997. Event studies in economics and finance. *Journal of Economic Literature*, **35**(Mar.), 13–39.

Madhavan, Ananth N. 2002. Implementation of hedge fund strategies. *Hedge Fund Strategies: A Global Outlook*, **2002**(1), 74–80.

McWilliams, Abagail, & Siegel, Donald. 1997. Event studies in management research: Theoretical and empirical issues. *The Academy of Management Journal*, **40**(3), 626–657.

Narci, Hakan. 2012. *Tax Havens & The OECD Campaign Against them.* M.Phil. thesis, Norwegian School of Economics and Louvain School of Management.

O'Donovan, James, Wagner, Hannes F., & Zeume, Stefan. 2019. The value of offshore secrets: Evidence from the Panama Papers. *The Review of Financial Studies*, Feb.

OECD. 2000. *List of Unco-operative Tax Havens.* Online; accessed 7 December 2017.

Property Rights Alliance. 2017. *International Property Rights Index.* Online; accessed 18 January 2018.

PRS Group. 2017. *International Country Risk Guide.* Online; accessed 18 January 2018.

Rao, Sandeep. 2018. Effect of foreign institutional investors on corporate board attributes: A literature review. *Journal of Finance and Marketing*, **2**(2), 24–30.

RepRisk. 2017. *RepRisk Index.* Online; accessed 1 February 2018.

Sasser, E., Prakash, A., Cashore, B., & Auld, G. 2006. Direct targeting as an NGO political strategy: Examining private authority regimes in the forestry sector. *Business and Politics*, **8**(3), 1–32.

Schipper, Katherine, & Thompson, Rex. 1983. The impact of merger-related regulations on the shareholders of acquiring Firms. *Journal of Accounting Research*, **21**(1), 184–221.

Senate of the United States. 2009. *Stop Tax Haven Abuse Act.* Online; accessed 7 December 2017.

Sharman, Jason Campbell. 2006. *Havens in a Storm: The Struggle for Global Tax Regulation.* Cornell University Press.

Sharman, J.C. 2009. The bark is the bite: International organizations and blacklisting. *Review of International Political Economy*, **16**(4), 573–596.

Stulz, Rene M. 1999. Globalization, corporate finance, and the cost of capital. *Journal of Applied Corporate Finance*, **12**(3), 8–25.

Tax Justice Network. 2015. *Financial Secrecy Index.* Online; accessed 29 November 2016.

Tax Justice Network. 2017. *The EU flunks the tax haven test.* Online; accessed 12 February 2018.

The Guardian. 2017. *EU blacklist names 17 tax havens and puts Caymans and Jersey on notice.* Online; accessed 12 February 2018.

The Korea Herald. 2017 (Dec.). *Korea to persuade EU to exclude it from tax haven blacklist.*

The World Bank. 2017. *Protecting Minority Investors.* Online; accessed 18 January 2018.

Tørsløv, Thomas R., Wier, Ludvig S., & Zucman, Gabriel. 2018. The missing profits of nations. *NBER Working Paper No. 24701.*

Transparency International. 2016. *Corruption Perceptions Index.* Online; accessed 17 January 2018.

Zhang, Ivy Xiying. 2007. Economic consequences of the Sarbanes-Oxley Act of 2002. *Journal of Accounting and Economics*, **44**(1-2), 74–115.

A.1 Appendix

A.1.1 Expected return models

Abnormal returns are the crucial measure to assess the impact of an event. The general idea of this measure is to isolate the effect of the event from other general market movements. The abnormal return of firm i and event date t is defined as the difference between the realized (actual) return and the expected return given absence of the event:

$$AbnormalReturn_{it} = ActualReturn_{it} - ExpectedReturn_{it}. \tag{8}$$

The time period over which parameters are estimated is denoted as the estimation window. A number of different empirical models have been employed in the literature to estimate abnormal performance around the event. They include the market model, described in section 2.3.7, market-adjusted model, mean-adjusted model and capital asset pricing model. In the following, I describe these normal return models.

Market-adjusted (market return) model

The expected return is the market return at the same period of time, assuming that all stocks, on average, generate the same rate of return. Expected returns are constant across securities but not across time. A separate estimation window is not necessary.

$$ExpectedReturn_{it} = MarketReturn_{mt} \tag{9}$$

Mean-adjusted (constant mean return) model

The expected asset returns differ by company, but are constant over time. The expected returns are equal to the arithmetic mean of estimation window returns. Even though the constant mean return model is simple and restrictive, its results do not systematically deviate from results based on more sophisticated models (Brown & Warner, 1980, 1985).

$$ExpectedReturn_{it} = AverageReturn_{i} \tag{10}$$

Capital asset pricing model (CAPM)

Using the CAPM, the expected return is the outcome of the risk-free rate plus market risk premium. β of the model measures the risk of the stock, assuming that an investor requires higher return to compensate for higher risk. Parameters are estimated based on the estimation window.

$$ExpectedReturn_{it} = RiskFreeRate_{ft} + \hat{\beta}_i(MarketReturn_{mt} - RiskFreeRate_{ft}) \tag{11}$$

Table A.1: Data appendix

Variable	Description	Source
Tax haven variables		
Tax haven exposure	A dummy variable equal to 1 if the firm has at least 1 subsidiary located in any of the blacklisted tax haven countries.	Orbis
Number of tax havens	The number of blacklisted tax haven subsidiaries the firm has. Regressions use natural logarithm.	Orbis
Proportion of tax havens	The proportion of blacklisted tax haven subsidiaries, relative to all subsidiaries of the firm.	Orbis
Proportion of grey tax havens	The proportion of grey-listed tax haven subsidiaries, relative to all subsidiaries of the firm.	Orbis
Proportion of tax havens without South Korea	The proportion of blacklisted tax haven subsidiaries, relative to all subsidiaries of the firm, disregarding South Korea as a tax haven.	Orbis
Exposure to removed countries	The proportion of those tax haven subsidiaries that were removed from the blacklist, relative to all firm's subsidiaries.	Orbis
Exposure to added countries	The proportion of those tax haven subsidiaries that were added to the blacklist, relative to all firm's subsidiaries.	Orbis
Measures of firm value		
Cumulative abnormal returns [a;b]	Cumulative daily abnormal returns in % from closing on day a-1 to closing on day b relative to the event date. Daily abnormal returns (alphas) are obtained from parameters of a one-factor model estimated over days [-365; -30] relative to the event date. The factor is the excess return on the local market index over and above the risk-free rate.	Datastream, Orbis
Cumulative raw returns [a;b]	Cumulative daily stock returns in % from closing on day a-1 to closing on day b relative to the event date.	Datastream, Orbis
Tax aggressiveness measures		
Statutory corporate tax rate	Statutory corporate tax rate.	KPMG
Effective tax rate	The effective tax rate is defined as taxation over EBIT. Observations with negative EBIT are denoted as missing.	KPMG, Orbis
Cash effective tax rate	The cash effective tax rate is defined as cash taxes paid over total pre-tax book income.	KPMG, Orbis
Tax aggressiveness (unadjusted)	The statutory tax rate at the country level less firm's effective tax rate.	KPMG, Orbis
Tax aggressiveness (no FE)	Residual of regression of firm's tax aggressiveness (unadjusted) on return on assets, intangible assets divided by total assets and losses of the previous year (if any), scaled by assets. High values denote high aggressiveness.	KPMG, Orbis
Tax aggressiveness (FE)	Residual of regression of firm's tax aggressiveness (unadjusted) on return on assets, intangible assets divided by total assets and losses of the previous year (if any), scaled by assets, as well as country fixed effects, and industry fixed effects. High values denote high tax aggressiveness.	KPMG, Orbis
Firm-level measures		
Total assets	Total assets. Regressions use the natural logarithm.	Orbis
Number of subsidiaries	Number of domestic and foreign subsidiaries.	Orbis

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Table A.1: Data appendix

Variable	Description	Source
Brand value	Dummy variable equal to one if the firm was listed as having one of the top 100 brand names as ranked in Business Week magazine in 2017.	Interbrand
Retail	Dummy variable equal to 1 if firm operates in the retail sector.	Orbis, Fama French Data Library
Number of foreign subsidiaries	Number of foreign subsidiaries outside of the parent's headquarter country. Regressions use the natural logarithm.	Orbis
Proportion of foreign subsidiaries	Fraction of firm's subsidiaries headquartered outside of its parent's headquarter country.	Orbis
Proportion of South Korean subsidiaries	Fraction of firm's subsidiaries headquartered in South Korea.	Orbis
South Korean firm	A dummy variable equal to 1 if firm is located in South Korea.	Orbis
Has US subsidiary	A dummy variable equal to 1 if a firm is not headquartered in the US and has a US subsidiary.	Orbis
Foreign institutional ownership	Fraction of shares held by foreign institutional owners, calculated in terms of total ownership.	Orbis
RepRisk index score	Score that dynamically captures and quantifies a company's exposure to environmental, social and governance (ESG) and business conduct risks. The higher the value, the higher the risk exposure. Regressions use the reverse RepRisk index score, where the higher the value, the lower the risk exposure.	RepRisk
Has sponsored ADR	A dummy variable equal to 1 if firm is not headquartered in US and has a sponsored American Depositary Receipt (ADR).	BNY Mellon
Has unsponsored ADR	A dummy variable equal to 1 if a firm is not headquartered in the US and has an unsponsored ADR.	BNY Mellon
Corruption exposure	A dummy variable that is equal to one if a firm is exposed to the most perceptively corrupt tercile of countries using Transparency International's Corruption Perception Index. Regressions use the reverse corruption exposure dummy, where one corresponds to no exposure to corruption.	Orbis, Transparency International
Sales in tax havens	Total sales in USD in firm's tax haven subsidiaries. Measured quarterly. Regressions use natural logarithm.	Orbis
Post publication	A dummy variable equal to 1 for year 2018.	Orbis
Country-level measures		
Property rights	An assessment of ability of individuals to accumulate private property, secured by clear laws that are fully enforced by the state. Regressions use dummy equal to 1 if country scores among the 50% of countries with strongest property rights.	Property Rights Alliance
Reverse country risk	Country risk as per the International Country Risk Guide. Takes value between 0 and 100. Regressions use dummy equal to one if country scores among the 50% of countries with lowest country risk.	PRS Group
Rule of law	Rule of Law from La Porta, Lopez-de-Silanes, Shleifer, and Vishny (LLSV; 1998). Regressions use dummy equal to one if country scores among the 50% of countries with strongest rule of law.	La Porta, Lopez-de-Silanes, Shleifer, and Vishny (LLSV; 1998)

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Table A.1: Data appendix

Variable	Description	Source
Minority shareholder protection index	A measure of the strength of minority shareholder protection against misuse of corporate assets by directors, of shareholder rights, of governance safeguards, and transparency. Regressions use dummy equal to one if country scores among the 50% of countries with the highest minority shareholder protection.	The World Bank
GDP per capita	Country-level GDP per capita. Regressions use logarithm.	Orbis
Likely to be on EU list	A dummy variable equal to 1 if the country has been included in at least 3 previous tax haven lists (as of 5).	Table A.8
Not likely to be on EU list	A dummy variable equal to 1 if the country has been included in at most 2 previous tax haven lists (as of 5).	Table A.8
Was on all lists	A dummy variable equal to 1 if the country has been included in all previous tax haven lists (as of 5).	Table A.8
Was on no lists	A dummy variable equal to 1 if the country has been included in no previous tax haven lists (as of 5).	Table A.8
Was on EU list	A dummy variable equal to 1 if the country was included in the EU tax haven blacklist.	Table A.8
Was not on EU list	A dummy variable equal to 1 if the country was not included in the EU tax haven blacklist.	Table A.8

Table A.2: Sample firms by country and tax haven exposure

Country	Number of firms	Fraction of tax haven exposure	Country	Number of firms	Fraction of tax haven exposure
Kuwait	78	64.10%	Mexico	73	10.96%
Switzerland	129	31.78%	Norway	65	10.77%
South Korea	329	30.40%	Greece	66	10.61%
Netherlands	92	28.26%	Brazil	137	8.76%
Bermuda	375	27.73%	Turkey	173	8.67%
United Kingdom	426	25.59%	Singapore	307	8.47%
India	1 016	24.21%	Canada	263	6.46%
Chile	51	23.53%	Australia	269	6.32%
Japan	1 061	23.47%	Russia	72	5.56%
Egypt	74	22.97%	Spain	61	4.92%
Hong Kong	196	21.94%	Malaysia	238	4.62%
Germany	244	20.90%	Israel	167	4.19%
Italy	59	18.64%	Pakistan	190	3.68%
Belgium	61	16.39%	Thailand	182	2.20%
Finland	107	15.89%	Poland	72	1.39%
Denmark	76	15.79%	Indonesia	163	1.23%
France	272	15.44%	Sri Lanka	121	0.83%
China	1 069	14.78%	Bangladesh	199	0.00%
Taiwan	557	14.18%	Vietnam	135	0.00%
Cayman Islands	945	13.76%	Rest of world	205	21.95%
United States of America	2 506	11.97%			
Sweden	268	11.19%	**Total**	**13 149**	**15.45%**

Notes: This table provides summary statistics on the sample global ultimate owners (parent firms). It provides the total number of firms headquartered in each country and the fraction of firms with tax haven exposure. Domestic affiliates in the country of origin are also considered in the *Fraction of tax haven exposure*. The table shows countries with at least 50 firms; countries with fewer than 50 firms are aggregated to *Rest of world*.

Table A.3: Sample firms by industry

	Number of firms	Fraction of tax haven exposure
Wholesale	976	30.53%
Entertainment	110	29.09%
Measuring and control equipment	12	25.00%
Coal	17	23.53%
Healthcare	428	21.73%
Chemicals	621	21.10%
Business supplies	1 275	20.94%
Pharmaceutical products	519	19.27%
Food products	672	18.15%
Utilities	71	16.90%
Automobiles and trucks	74	16.22%
Shipping containers	427	16.16%
Construction	300	15.67%
Construction materials	692	15.32%
Business services	668	15.12%
Retail	509	14.34%
Restaurants, hotels, motels	350	14.00%
Non-metallic and industrial metal mining	689	13.64%
Petroleum and natural gas	194	13.40%
Consumer goods	255	12.94%
Printing and publishing	288	11.81%
Agriculture	435	10.11%
Apparel	311	9.97%
Textiles	258	9.69%
Precious metals	42	9.52%
Transportation	1 120	9.11%
Tobacco products	805	8.70%
Personal services	399	6.77%
Rubber and plastic products	37	5.41%
Machinery	247	5.26%
Other	118	5.08%
Electrical equipment	23	4.35%
Recreation	15	0.00%
Steel works	192	0.00%
Total	**13 149**	**15.45%**

Notes: This table provides summary statistics on sample firms. It provides the total number of firms and the fraction of firms with tax haven exposure by industry. Fama French 49 industry classifications are used.

Table A.4: Affiliates of sample firms in tax haven countries

Country	Number of tax haven subsidiaries	Fraction of all tax haven subsidiaries
South Korea	7 157	40.88%
United Arab Emirates	3 309	18.90%
Marshall Islands	1 381	7.89%
Panama	1 282	7.32%
Tunisia	932	5.32%
Namibia	663	3.79%
Macau	655	3.74%
Barbados	559	3.19%
Bahrain	542	3.10%
Samoa	483	2.76%
Trinidad and Tobago	238	1.36%
Mongolia	174	0.99%
Saint Lucia	120	0.69%
Grenada	10	0.06%
Palau	2	0.01%
Total	**17 507**	**100%**

Notes: This table shows the number of subsidiaries of sample firms that are located in each blacklisted tax haven country. It also provides the fraction of the total number of tax haven subsidiaries that are located in the specific country.

Table A.5: Main stock exchanges

Stock exchange	Number of firms	Stock exchange	Number of firms
New York Stock Exchange (NYSE)	2 146	Euronext Brussels	44
NASDAQ	1 819	Moscow Exchange MICEX - RTS	43
Hong Kong Stock Exchange	1 019	Johannesburg Stock Exchange	42
Tokyo Stock Exchange	1 006	Borsa Italiana - MTA	38
Bombay Stock Exchange	925	Warsaw Stock Exchange	36
Shanghai Stock Exchange	801	Bolsa Mexicana de Valores	32
London Stock Exchange	556	Santiago Stock Exchange	32
Shenzhen Stock Exchange	430	Colombo Stock Exchange	29
Taiwan Stock Exchange	401	Egyptian Exchange	24
Singapore Exchange	387	Bolsa de Comercio de Buenos Aires	21
Korea Stock Exchange	276	Zagreb Stock Exchange	21
OTC Taiwan	239	Saudi Stock Exchange	19
Toronto Stock Exchange	219	TSX Venture Exchange	19
Euronext Paris	214	Athens Stock Exchange	17
Bursa Malaysia	208	New Zealand Stock Exchange	15
Nasdaq OMX - Stockholm	205	Philippine Stock Exchange	15
Australian Securities Exchange	185	Qatar Exchange	15
Swiss Exchange (SWX)	167	Bulgarian Stock Exchange	14
Boerse Frankfurt	155	Irish Stock Exchange	14
KOSDAQ	128	Mauritius Stock Exchange	13
OTC Bulletin Board	106	Nagoya Stock Exchange	13
Nasdaq OMX - Helsinki	95	Ljubljana Stock Exchange	12
Euronext Amsterdam	90	Bolsa de Valores de Colombia	11
Bangkok Stock Exchange	81	Dubai Financial Market	11
Tel Aviv Stock Exchange	73	NYSE MKT	11
BM&F Bovespa	71	Nasdaq OMX - Tallinn	11
Istanbul Stock Exchange	69	Nordic Growth Market (NGM)	11
Indonesia Stock Exchange	68	Wiener Boerse	11
Bolsa de Madrid	60	Boerse Berlin	10
Nasdaq OMX - Copenhagen	59	Pakistan Stock Exchange	10
Oslo Bors	48	Rest of exchanges	182
Kuwait Stock Exchange	47		
		Total	**13 149**

Notes: The table lists the main stock exchanges represented in the sample. The table shows stock exchanges with at least 10 firms; stock exchanges with fewer than 10 firms are aggregated to *Rest of exchanges*.

Table A.6: Tax haven lists

Country	Hines and Rice (1994)	OECD's list of uncooperative tax havens (2000)	Stop Tax Haven Abuse Act (2009)	Johannesen and Zucman (2014)	Financial Secrecy Index (secrecy score>60) (2015)	EU tax haven blacklist (2017)
American Samoa	0	0	0	0	0	1
Andorra	0	1	0	0	1	0
Anguilla	0	1	1	0	1	0
Antigua and Barbuda	0	1	1	0	1	0
Aruba	0	1	1	0	1	0
Austria	0	0	0	1	0	0
Bahamas	0	1	1	0	1	0
Bahrain	0	1	0	0	1	1
Barbados	0	0	1	0	1	1
Belgium	0	0	0	1	0	0
Belize	1	1	1	0	1	0
Bermuda	1	1	1	0	1	0
Bolivia	0	0	0	0	1	0
Botswana	0	0	0	0	1	0
Brunei Darussalam	0	0	0	0	1	0
Cayman Islands	1	1	1	1	1	0
Chile	0	0	0	1	0	0
Cook Islands	1	1	1	0	1	0
Costa Rica	0	0	1	0	0	0
Curaçao	0	0	0	0	1	0
Cyprus	1	1	1	1	0	0
Dominica	1	1	1	0	1	0
Dominican Republic	0	0	0	0	1	0
Gambia	0	0	0	0	1	0
Ghana	0	0	0	0	1	0
Gibraltar	1	1	1	0	1	0
Great Britain	1	0	0	0	0	0
Grenada	1	1	1	0	1	1
Guam	0	0	0	0	0	1
Guatemala	0	0	0	0	1	0
Guernsey	0	1	1	1	1	0
Hong Kong	1	0	1	0	1	0
Ireland	1	0	0	0	0	0
Isle of Man	1	1	1	1	1	0
Jersey	0	1	1	1	1	0
Jordan	1	0	0	0	0	0
Latvia	0	0	1	0	0	0
Lebanon	1	0	0	0	1	0
Liberia	1	1	0	0	1	0
Liechtenstein	1	1	1	0	1	0
Luxembourg	1	0	1	1	0	0
Macau	1	0	0	1	1	1
Macedonia	0	0	0	0	1	0
Malaysia	0	0	0	1	1	0
Maldives	1	0	0	0	1	0
Malta	1	1	1	0	0	0
Marshall Islands	1	1	0	0	1	1
Mauritius	0	1	0	0	1	0
Monaco	1	1	0	0	1	0
Mongolia	0	0	0	0	0	1
Montenegro	0	0	0	0	1	0
Montserrat	1	1	0	0	1	0
Namibia	0	0	0	0	0	1
Nauru	0	1	1	0	1	0
Netherlands Antilles	1	1	1	0	0	0
Niue	0	1	0	0	0	0
Palau	0	0	0	0	0	1
Panama	1	1	1	1	1	1
Paraguay	0	0	0	0	1	0
Philippines	0	0	0	0	1	0
Saint Kitts & Nevis Anguilla	1	1	1	0	1	0
Saint Lucia	1	1	1	0	1	1
Saint Martin	1	0	0	0	0	0
Saint Vincent & Grenadines	1	1	1	0	1	0
Samoa	0	1	1	0	1	1
San Marino	0	1	0	0	1	0
Saudi Arabia	0	0	0	0	1	0
Seychelles	0	1	0	0	1	0
Singapore	1	0	1	0	1	0
South Korea	0	0	0	0	0	1
Switzerland	1	0	1	1	1	0
Taiwan	0	0	0	0	1	0
Tanzania	0	0	0	0	1	0
Trinidad and Tobago	0	0	0	0	0	1
Tunisia	0	0	0	0	0	1
Turkey	0	0	0	0	1	0
Turks and Caicos Islands	1	1	1	0	1	0
United Arab Emirates	0	0	0	0	1	1
Uruguay	0	0	0	0	1	0
Vanuatu	1	1	1	0	1	0
Venezuela	0	0	0	0	1	0
Virgin Islands (British)	1	1	1	0	1	0
Virgin Islands (USA)	0	1	0	0	1	0

Notes: The table presents countries that have been included in previous tax haven lists in an ascending order of list publication year. The different tax haven lists are compiled by Hines & Rice (1994), OECD (2000), Senate of the United States (2009), Johannesen & Zucman (2014), Tax Justice Network (2015), and finally the EU (2017).

Table A.7: Descriptives on tax haven lists I

Country	Number of previous lists (5)	Percentage of previous lists	Percentage of previous lists · In EU list	Percentage of previous lists · Not in EU list
American Samoa	0	0	0	0
Andorra	2	0.4	0	0.4
Anguilla	3	0.6	0	0.6
Antigua and Barbuda	3	0.6	0	0.6
Aruba	3	0.6	0	0.6
Austria	1	0.2	0	0.2
Bahamas	3	0.6	0	0.6
Bahrain	2	0.4	0.4	0
Barbados	2	0.4	0.4	0
Belgium	1	0.2	0	0.2
Belize	4	0.8	0	0.8
Bermuda	4	0.8	0	0.8
Bolivia	1	0.2	0	0.2
Botswana	1	0.2	0	0.2
Brunei Darussalam	1	0.2	0	0.2
Cayman Islands	5	1	0	1
Chile	1	0.2	0	0.2
Cook Islands	4	0.8	0	0.8
Costa Rica	1	0.2	0	0.2
Curaçao	1	0.2	0	0.2
Cyprus	4	0.8	0	0.8
Dominica	4	0.8	0	0.8
Dominican Republic	1	0.2	0	0.2
Gambia	1	0.2	0	0.2
Ghana	1	0.2	0	0.2
Gibraltar	4	0.8	0	0.8
Great Britain	1	0.2	0	0.2
Grenada	4	0.8	0.8	0
Guam	0	0	0	0
Guatemala	1	0.2	0	0.2
Guernsey	4	0.8	0	0.8
Hong Kong	3	0.6	0	0.6
Ireland	1	0.2	0	0.2
Isle of Man	5	1	0	1
Jersey	4	0.8	0	0.8
Jordan	1	0.2	0	0.2
Latvia	1	0.2	0	0.2
Lebanon	2	0.4	0	0.4
Liberia	3	0.6	0	0.6
Liechtenstein	4	0.8	0	0.8
Luxembourg	3	0.6	0	0.6
Macau	3	0.6	0.6	0
Macedonia	1	0.2	0	0.2
Malaysia	2	0.4	0	0.4
Maldives	2	0.4	0	0.4
Malta	3	0.6	0	0.6
Marshall Islands	3	0.6	0.6	0
Mauritius	2	0.4	0	0.4
Monaco	3	0.6	0	0.6
Mongolia	0	0	0	0
Montenegro	1	0.2	0	0.2
Montserrat	3	0.6	0	0.6
Namibia	0	0	0	0
Nauru	3	0.6	0	0.6
Netherlands Antilles	3	0.6	0	0.6
Niue	1	0.2	0	0.2
Palau	0	0	0	0
Panama	5	1	1	0
Paraguay	1	0.2	0	0.2
Philippines	1	0.2	0	0.2
Saint Kitts & Nevis Anguilla	4	0.8	0	0.8
Saint Lucia	4	0.8	0.8	0
Saint Martin	1	0.2	0	0.2
Saint Vincent & Grenadines	4	0.8	0	0.8
Samoa	3	0.6	0.6	0
San Marino	2	0.4	0	0.4
Saudi Arabia	1	0.2	0	0.2
Seychelles	2	0.4	0	0.4
Singapore	3	0.6	0	0.6
South Korea	0	0	0	0
Switzerland	4	0.8	0	0.8
Taiwan	1	0.2	0	0.2
Tanzania	1	0.2	0	0.2
Trinidad and Tobago	0	0	0	0
Tunisia	0	0	0	0
Turkey	1	0.2	0	0.2
Turks and Caicos Islands	4	0.8	0	0.8
United Arab Emirates	1	0.2	0.2	0
Uruguay	1	0.2	0	0.2
Vanuatu	4	0.8	0	0.8
Venezuela	1	0.2	0	0.2
Virgin Islands (British)	4	0.8	0	0.8
Virgin Islands (USA)	2	0.4	0	0.4

Notes: The table presents countries that have been included in previous tax haven lists. It shows the number and percentage of previous lists where each country has been included. Finally it shows whether the particular country was also included in the EU tax haven blacklist.

Table A.8: Descriptives on tax haven lists II

Country	Likely to be on EU list · Was on list	Likely to be on EU list · Was not on list	Not likely to be on EU list · Was on list	Was on all lists · Was on list	Was on all lists · Was not on EU list	Was on no lists · Was on list	Was on at least one list · Was on EU list	Was on at least one list · Was not on EU list
American Samoa	0	0	1	0	0	1	0	0
Andorra	0	0	0	0	0	0	0	1
Anguilla	0	1	0	0	0	0	0	1
Antigua and Barbuda	0	1	0	0	0	0	0	1
Aruba	0	1	0	0	0	0	0	1
Austria	0	0	0	0	0	0	0	1
Bahamas	0	1	0	0	0	0	0	1
Bahrain	0	0	1	0	0	0	1	0
Barbados	0	0	1	0	0	0	1	0
Belgium	0	0	0	0	0	0	0	1
Belize	0	1	0	0	0	0	0	1
Bermuda	0	1	0	0	0	0	0	1
Bolivia	0	0	0	0	0	0	0	1
Botswana	0	0	0	0	0	0	0	1
Brunei Darussalam	0	0	0	0	0	0	0	1
Cayman Islands	0	1	0	0	1	0	0	1
Chile	0	0	0	0	0	0	0	1
Cook Islands	0	1	0	0	0	0	0	1
Costa Rica	0	0	0	0	0	0	0	1
Curaçao	0	0	0	0	0	0	0	1
Cyprus	0	1	0	0	0	0	0	1
Dominica	0	1	0	0	0	0	0	1
Dominican Republic	0	0	0	0	0	0	0	1
Gambia	0	0	0	0	0	0	0	1
Ghana	0	0	0	0	0	0	0	1
Gibraltar	0	1	0	0	0	0	0	1
Great Britain	0	0	0	0	0	0	0	1
Grenada	1	0	0	0	0	0	1	0
Guam	0	0	1	0	0	1	0	0
Guatemala	0	0	0	0	0	0	0	1
Guernsey	0	1	0	0	0	0	0	1
Hong Kong	0	1	0	0	0	0	0	1
Ireland	0	0	0	0	0	0	0	1
Isle of Man	0	1	0	0	1	0	0	1
Jersey	0	1	0	0	0	0	0	1
Jordan	0	0	0	0	0	0	0	1
Latvia	0	0	0	0	0	0	0	1
Lebanon	0	0	0	0	0	0	0	1
Liberia	0	1	0	0	0	0	0	1
Liechtenstein	0	1	0	0	0	0	0	1
Luxembourg	0	1	0	0	0	0	0	1
Macau	1	0	0	0	0	0	1	0
Macedonia	0	0	0	0	0	0	0	1
Malaysia	0	0	0	0	0	0	0	1
Maldives	0	0	0	0	0	0	0	1
Malta	0	1	0	0	0	0	0	1
Marshall Islands	1	0	0	0	0	0	1	0
Mauritius	0	0	0	0	0	0	0	1
Monaco	0	1	0	0	0	0	0	1
Mongolia	0	0	1	0	0	1	0	0
Montenegro	0	0	0	0	0	0	0	1
Montserrat	0	1	0	0	0	0	0	1
Namibia	0	0	1	0	0	1	0	0
Nauru	0	1	0	0	0	0	0	1
Netherlands Antilles	0	1	0	0	0	0	0	1
Niue	0	0	0	0	0	0	0	1
Palau	0	0	1	0	0	1	0	0
Panama	1	0	0	1	0	0	1	0
Paraguay	0	0	0	0	0	0	0	1
Philippines	0	0	0	0	0	0	0	1
Saint Kitts & Nevis Anguilla	0	1	0	0	0	0	0	1
Saint Lucia	1	0	0	0	0	0	1	0
Saint Martin	0	0	0	0	0	0	0	1
Saint Vincent & Grenadines	0	1	0	0	0	0	0	1
Samoa	1	0	0	0	0	0	1	0
San Marino	0	0	0	0	0	0	0	1
Saudi Arabia	0	0	0	0	0	0	0	1
Seychelles	0	0	0	0	0	0	0	1
Singapore	0	1	0	0	0	0	0	1
South Korea	0	0	1	0	0	1	0	0
Switzerland	0	1	0	0	0	0	0	1
Taiwan	0	0	0	0	0	0	0	1
Tanzania	0	0	0	0	0	0	0	1
Trinidad and Tobago	0	0	1	0	0	1	0	0
Tunisia	0	0	1	0	0	1	0	0
Turkey	0	0	0	0	0	0	0	1
Turks and Caicos Islands	0	1	0	0	0	0	0	1
United Arab Emirates	0	0	1	0	0	0	1	0
Uruguay	0	0	0	0	0	0	0	1
Vanuatu	0	1	0	0	0	0	0	1
Venezuela	0	0	0	0	0	0	0	1
Virgin Islands (British)	0	1	0	0	0	0	0	1
Virgin Islands (USA)	0	0	0	0	0	0	0	1

Notes: The table presents countries that have been included in previous tax haven lists and the probabilities of how likely they were to be included in the EU tax haven blacklist. A country is likely to be included in the EU tax haven blacklist if it has been included in at least 3 previous tax haven lists.

Table A.9: Cumulative abnormal returns of firms after publication of the EU tax haven blacklist: Interaction with previous tax haven lists

	Firms without these subsidiaries		Firms with these subsidiaries		Full sample		Matched sample	
	Number	Mean	Number	Mean	Mean	Difference	Mean	Difference
Likely to be on EU list · Was on EU list	12 622	-0.79%***	527	-1.09%***	-0.8%***	-0.31%***	-1.07%***	-0.15%*
Likely to be on EU list · Was not on EU list	7 739	-1.36%***	5 410	0.12%***	-0.8%***	1.48%***	-1.07%***	0.73%*
Not likely to be on EU list · Was on EU list	11 645	-0.64%***	1 504	-2.33%***	-0.8%***	-1.69%***	-1.07%***	-0.33%***
Was on all lists · Was on EU list	12 981	-0.79%***	168	-1.32%***	-0.8%***	-0.53%*	-1.07%***	-0.38%
Was on all lists · Was not on EU list	12 580	-0.84%***	569	0.25%***	-0.8%***	1.09%**	-1.07%***	0.46%*
Was on no lists · Was on EU list	12 079	-0.69%***	1 070	-2.36%***	-0.8%***	-1.67%***	-1.07%***	-0.31%***
Was on at least one list · Was on EU list	11 980	-0.76%***	1 169	-1.23%***	-0.8%***	-0.48%	-1.07%***	-0.15%
Was on at least one list · Was not on EU list	5 997	-1.80%***	7 152	0.13%***	-0.8%***	1.93%***	-1.07%***	0.05%*

Notes: This table provides cumulative abnormal returns of the sample firms around publication of the EU tax haven blacklist, while controlling for firms' exposure to previous tax haven lists. A country is likely to be on the EU tax haven blacklist if it has been included in at least 3 previous tax haven lists, out of 5. The composition of the different groups can be seen in Tables A.6, A.7 and A.8. The table distinguishes between firms with exposure to the particular group and without such exposure. Returns are cumulated over days around December 5, 2017, the event window is [-1; 3] with respect to this date. The table distinguishes between cumulative returns of full sample and matched sample, where firms are matched by country and closest neighbour by number of foreign subsidiaries. Significance of the cumulative returns is tested via a test statistic, using the sample standard deviation and robust standard errors. *, **, and *** denote significance at the 10%, 5%, and 1% levels.

Chapter 3

Profit shifting under a destination-based cash-flow tax*

Aija Rusina† Guttorm Schjelderup‡

Abstract

We study how a multinational's choice to centralize or decentralize its decision structure affects profit shifting incentives under a destination-based cash-flow tax (DBCFT) system. When decisions are centralized and the DBCFT is universally adopted, profit shifting incentives vanish. If a single country adopts the DBCFT and decisions are centralized, profits are shifted to the adopting country. When there are strategic reasons to decentralize decisions, we show that profit shifting incentives exist both under universal and unilateral adoption.

Keywords: destination-based cash-flow tax, multinationals, profit shifting, transfer pricing, tax reform

JEL classification: F23, G32, H21, H25, H26

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3.1 Introduction

This paper investigates how a multinational's choice to centralize or decentralize its decision structure affects profit shifting under a destination-based cash-flow tax (DBCFT) system. When decisions are centralized and the DBCFT is adopted universally, profit shifting incentives vanish. If a single country adopts the DBCFT, profits are shifted to this country. When there are strategic reasons for delegating decisions to decentralized levels, universal adoption of the DBCFT does not eliminate the incentive multinationals (MNEs) have to shift profits. We identify cases where universal adoption actually may increase profit shifting. If a single country adopts the DBCFT and decisions are delegated, the incentive to shift profits depends on whether it is the country that hosts an exporting affiliate or the country that hosts an importing affiliate that implements the DBCFT, and whether price or quantity is the strategic variable.

Multinational companies aim to maximize global after-tax profits. This can be achieved by either taking all decisions at a central authority level, or delegating some decisions to a decentralized authority level. As shown by Nielsen *et al.* (2008) - who study the decision structure in MNEs as an endogenous choice - centralization is more profitable when tax differentials are large. When tax differentials are small, delegating some decisions to the affiliate level will boost profits. The theoretical underpinnings of delegation are described in the industrial organization (IO) literature, where a principal may benefit from hiring an agent and giving the agent the incentive to maximize something other than the welfare of the principal.[1]

Delegation is a crucial component of corporate decision structures. It affects compensation, strategic decisions, production chains, capital allocation, performance evaluation, productivity, and research and development (R&D).[2] Delegation of decision making to national affiliates is, for example, common in the car industry, where the parent company (the producer) determines the export price (transfer price) to foreign affiliates, but leaves the task of deciding the final price to consumers to the importing affiliate. Bourgeois & Eisenhardt (1988) show that delegation of decision making is not only relevant for established industries, but also for high-velocity environments, such as the microcomputer industry and R&D intensive industries.[3]

In the accounting and public finance literature, the transfer price has a tax-minimizing

[1] See, e.g., Vickers (1985), Fershtman & Judd (1987), Sklivas (1987), and Katz (1991).

[2] See Baldenius & Ziv (2003) for an evaluation of performance in firms with delegated decision making and Bloom *et al.* (2010) for low profitability in firms without delegated decision making. Graham *et al.* (2015) provide a survey of decision making authority within firms.

[3] There exists a large literature that both documents and explains the extent of decentralization that takes place within MNEs, see e.g., Grandstand (1992), Almeida (1996), and Papanastasiou & Pearce (2005).

role. The IO literature has stressed issues of delegation within MNEs, and transfer prices have been seen as instruments for obtaining strategic advantages vis-á-vis competitors. Thus, transfer prices may have a dual role, that is, a tax-minimizing instrument and a strategic instrument. These two roles may be conflicting depending on the corporate tax system in place. As far as we are aware, the role of the transfer price under decentralized decisions and the DBCFT system has not been studied.

Corporate tax differences are integral to the problem of profit shifting by abusive transfer prices. Crivelli *et al.* (2016) estimate the revenue loss from base erosion and profit shifting by multinationals at around one percent of gross domestic product in the OECD countries.[4] Revenue losses from profit shifting have been a key factor when discussing corporate tax reform. In 2016, the United States (US) House Republican Task Force on Tax Reform proposed a destination-based cash-flow tax to replace the current federal income tax system for corporations. The proposal claimed that a DBCFT would reduce profit shifting and give US companies a tax advantage.[5] It is well understood that under a pure version of the DBCFT, export revenue and import costs are exempted from taxation. For this reason, proponents of the DBCFT have argued that if such a system is well designed and adopted universally, it will effectively eliminate profit shifting (see Auerbach *et al.* (2017)).

In order to bring forward our arguments as clearly as possible, we choose a model with a multinational enterprise that consists of two affiliates (1 and 2) located in countries 1 and 2, respectively. These affiliates are governed by a headquarters (HQs) that can be located in either country, without consequence for our results. The aim of the HQs is to maximize global after-tax profits. Affiliate 1 produces a good where part of its production is sold at home and the rest is exported to affiliate 2, which can be seen as a sales arm. In the absence of taxes and with affiliate 2 facing a local competitor, it is profitable for the HQs to let the affiliates decide on the price (or output) in their local markets, while the HQs decides the transfer price that affiliate 2 pays for the good it imports from affiliate 1. Assuming that affiliate 2 operates in a market where price is the strategic variable (Bertrand competition), delegation of authority leads the central authority to set a high transfer price. A high transfer price results in higher prices in the market where affiliate 2 faces a local competitor, and thus in higher joint profits. This is the essence of the delegation principle. Transfer price can be used as a precommitment device to align the incentives of the HQs and the decentralized authority

[4]Guvenen *et al.* (2017) calculate that MNEs shifted USD 280 billion in profits abroad in 2012. Clausing (2016) arrives at a similar figure using a regression-based method.

[5]The proposal prompted a discussion of whether it was in violation of the World Trade Agreement (WTO), see Cui (2017).

(the affiliates) to take global profit maximizing actions.[6]

Tax differentials may alter the incentives that the HQs has when setting the transfer price. If affiliate 1 faces sufficiently high taxes, the HQs wants to use the transfer price as a tax saving device and shift profits to affiliate 2 by a low transfer price. A low transfer price inevitably interferes with the pricing game of affiliate 2, which prescribes a high transfer price. The potentially conflicting incentives are, in the end, what matters for profit shifting incentives.

The main result of the paper is that universal adoption of the DBCFT under decentralized decisions does not eliminate profit shifting incentives. The reason is that when production occurs in one country and sales occur in another, sales revenue is subject to a different tax rate than production costs. This gives rise to corporate tax differentials that lead to profit shifting. In particular, taxation reduces the value of winning market shares, but at the same time it introduces a subsidy since production costs are tax deductible. It is the sum of these two effects that alters how the transfer price is set compared to a situation when taxes are zero.

An underlying assumption in our analysis is that MNEs do not keep two sets of books where different transfer prices are used in order to save tax payments and provide managerial incentives. In some countries the practice of two sets of books is illegal, while in some countries it is legal if one set is provided for tax accounting and the other for internal resource allocation. The idea that MNEs may assign one transfer price to provide managerial incentives and one to save tax payments, however, does not fit with reality. Most MNEs insist on using only one set of prices both for simplicity and to avoid the risk of multiple transfer prices becoming evidence in any disputes with the tax authorities (Baldenius *et al.* (2004), p. 592). This statement is supported by a series of studies on multinationals and transfer pricing behaviour. Ernst & Young (2003), for example, indicate that over 80 % of parent companies use a single set of transfer prices for management and tax purposes.

A few papers have recognized the multiple role of transfer prices. Elitzur & Mintz (1996) model the transfer price both as a tax-minimizing instrument and as an instrument to influence decisions of a self-interested manager in the subsidiary company. More closely related to our paper are studies by Schjelderup & Sørgard (1997) and Nielsen *et al.* (2003) where the transfer price takes on the same dual role as in our paper, and where the decision structure of the MNE is taken as given.

[6]Since the HQs can easily alter the transfer price, the decentralization choice is not necessarily contingent on pre-commitment of the transfer price. Nielsen *et al.* (2008) show that letting the affiliates choose their prices or output levels, and finally choosing the transfer price that maximizes global profits sometimes gives the highest profits.

Our analysis is also related to a small but expanding literature on tax reform and the DBCFT. Auerbach *et al.* (2017) consider implications of the DBCFT for three common ways of shifting taxable profits between countries. They conclude that manipulation of transfer prices, use of debt, and locating intangible assets in low-taxed jurisdictions are no longer viable options for MNEs under a DBCFT system, if adopted universally. Shome & Schutte (1993) and Auerbach & Devereux (2017) suggest that income shifting incentives via transfer prices persist under unilateral adoption of the DBCFT. Bond & Gresik (2018) study the economic effects of unilateral adoption of corporate tax policies that include destination-based taxes and/or cash-flow taxes in a heterogeneous agent model in which multinational firms can endogenously shift income between countries by using transfer prices. They find that welfare in the adopting country can decrease both with adoption of destination-based taxes and adoption of cash-flow taxes, and that profit shifting incentives remain under unilateral adoption of the DBCFT.

In what follows, we set up a model, and in the subsequent chapters we discuss modes of decision making and bilateral (all countries) and unilateral adoption (one country) of the DBCFT.

3.2 Centralized decisions

The model is one of horizontally integrated trade in secondary processed goods.[7] A multinational firm (MNE) consists of affiliates 1 and 2 located in country 1 and country 2. The affiliates are governed by a headquarters. We assume monopolistic competition in national markets.

The affiliate in country 1 produces quantities s_1 and s_2, with a cost function $c(s_1+s_2)$, where $c' \geq 0$ and $c'' \geq 0$. Quantity s_1 is sold in country 1 at a price $p(s_1)$, yielding revenue $r_1(s_1)$. Quantity s_2 is exported to the affiliate in country 2 at a transfer price q and resold in country 2 at a price $p(s_2)$, earning revenue $r_2(s_2)$. For both affiliates, $r'' \leq 0$ and $p' < 0$. In line with the literature and in order to bring forward the tax incentives in the simplest possible way, we assume that the MNE is able to practice systematic price discrimination between the two markets. Based on these assumptions, the affiliates' profits (absent taxes) are,

$$\pi_1^u = r_1(s_1) - c(s_1 + s_2) + qs_2 \quad \text{and} \quad \pi_2^u = r_2(s_2) - qs_2.$$

In what follows, we investigate the role of the transfer price. We start our analysis by studying transfer pricing when all decisions are made at a central level (HQs). We then

[7] An early example of this type of model is Horst (1971).

relax the assumption about monopoly in national markets and introduce oligopolistic competition in country 2. In this setting we shall assume that decisions about quantities (or prices) in national markets are delegated to national affiliates. We examine two different cases. The first case is when all countries adopt the DBCFT. Since there are only two countries in our model, we label this case as bilateral adoption of the DCBFT. The second case is when only one country implements the DBCFT. We refer to this case as unilateral adoption of the DBCFT. Under unilateral adoption it is useful to investigate transfer pricing incentives both when the exporting affiliate is located in a DBCFT country, and when the importing affiliate is located in a DBCFT country. In either case, the country that does not implement the DBCFT is assumed to have a conventional source tax system (sometimes referred to as separate accounting in the literature).

3.2.1 Bilateral adoption and centralized decisions

Let t_1 and t_2 be the tax rate in country 1 and country 2 respectively. If both countries adopt the DBCFT, affiliate 1 exempts the export revenue from its tax base while affiliate 2 is subject to tax on the imported quantity, but can deduct its import costs against revenue from sales. Consequently, the after-tax profit of each affiliate under the DBCFT is

$$\pi_1 = (1 - t_1)[r_1(s_1) - c(s_1 + s_2)] + qs_2,$$

$$\pi_2 = (1 - t_2)[r_2(s_2) - qs_2] - t_2 qs_2 = (1 - t_2)r_2(s_2) - qs_2.$$

The global profit maximizing function of the MNE is the sum of after-tax profits of the affiliates and is given by

$$\Pi = (1 - t_1)[r_1(s_1) - c(s_1 + s_2)] + (1 - t_2)r_2(s_2).$$

As seen from the global after-tax profit function, the transfer pricing terms are eliminated from the equation. Thus, the MNE will not gain anything from altering the transfer price, so $\partial\Pi/\partial q = 0$. We have:

Proposition 1. *Under centralized decision making and bilateral adoption of the DBCFT, transfer pricing incentives are eliminated.*

Since exports and imports are tax exempt in all countries, the MNE will not save tax by manipulating the transfer price.

3.2.2 Unilateral adoption and centralized decisions

In this section we study profit shifting incentives when only one country adopts the DBCFT. The outcome of the analysis depends on whether it is the country that hosts the exporting or the importing affiliate that implements the DBCFT.

Exporting country adopts DBCFT

If country 1 implements the DBCFT whereas country 2 has a source-based tax system, profit functions of affiliates 1 and 2 are given by

$$\pi_1 = (1-t_1)[r_1(s_1) - c(s_1+s_2)] + qs_2 \quad \text{and} \quad \pi_2 = (1-t_2)[r_2(s_2) - qs_2].$$

The global after-tax profit function of the MNE is the sum of the two profit functions and is given by

$$\Pi = (1-t_1)[r_1(s_1) - c(s_1+s_2)] + qs_2 + (1-t_2)[r_2(s_2) - qs_2].$$

In this case, the transfer pricing policy of the MNE depends on the sign of

$$\frac{\partial \Pi}{\partial q} = s_2 - (1-t_1)s_2 = t_1 s_2 > 0. \tag{1}$$

As seen from equation (1), $t_1 s_2 > 0$ and a high transfer price is desirable since export revenue is not taxed, while import costs are tax deductible. Thus, profits are shifted to the exporting affiliate located in the country that has adopted the DBCFT.

We do not derive the optimal high transfer price since the purpose of our analysis is to highlight incentives for abusive transfer pricing. Absent any costs of mispricing, it is straightforward to verify that the optimal high transfer price is to set q so that profits in country 2 become zero.[8] Such a transfer price would shift all profits of affiliate 2 to affiliate 1.

Importing country adopts DBCFT

If country 2 adopts DBCFT and country 1 maintains a source tax based system, cross-border intra-group transactions would not appear in the tax base of country 2. After-tax profits of the two affiliates in this case are

$$\pi_1 = (1-t_1)[r_1(s_1) - c(s_1+s_2) + qs_2] \quad \text{and} \quad \pi_2 = (1-t_2)r_2(s_2) - qs_2,$$

[8] See Kant (1988).

and the sum of the two profit functions yields the global after-tax profit function

$$\Pi = (1 - t_1)[r_1(s_1) - c(s_1 + s_2) + qs_2] + (1 - t_2)r_2(s_2) - qs_2.$$

The transfer pricing policy of the MNE depends on the sign of

$$\frac{\partial \Pi}{\partial q} = -s_2 + (1 - t_1)s_2 = -t_1 s_2 < 0. \tag{2}$$

As seen from equation (2), global after-tax profits are increased by a low transfer price, since revenue from exports by affiliate 1 is subject to tax, whereas affiliate 2's import costs are not tax deductible. The incentive to underinvoice exports means that the MNE shifts profits to country 2, which is the country that has unilaterally adopted the DBCFT. To sum up our results under centralized decision making:

Proposition 2. *When decisions are centralized and only one country implements the DBCFT (unilateral adoption), profits are shifted to the country that has unilaterally adopted the DBCFT.*

These findings are similar in nature to those of Bond & Gresik (2018). In a general equilibrium model with centralized decision making and trade, they show that MNEs use transfer prices to shift income to the country that unilaterally adopts the DBCFT.

3.3 Decentralized decisions under Cournot

We now consider the case when the MNE sets its transfer price centrally, but decentralizes output decisions to its entities. The game we consider has two stages. At stage one, the transfer price is determined. At stage two, the affiliates take the transfer price as given and set quantities.

Affiliate 2 located in country 2 faces a local competitor. The local competitor, firm 3, sells s_3 units in country 2. The revenue function of affiliate 2 is given by $r_2(s_2, s_3)$ with $\partial^2 r_2/\partial s_2^2 \leq 0$ and $\partial r_2/\partial s_3 < 0$, so the two competing products are imperfect substitutes. The headquarters must take into account the effect of the transfer price on competition. We assume that decentralization is implemented by a pre-commitment of the transfer price. As is usual, we solve this game backwards by considering how affiliates set quantities for a given fixed transfer price, and use this information when the headquarters decides on the optimal transfer price.

The maximization procedure has the following sequence of stages: at stage 1 the headquarters sets q; at the second stage, affiliates 1 and 2, and firm 3 (the competitor in country 2) set quantities: $s_1^* = s_1^*(q)$, $s_2^* = s_2^*(q)$, and $s_3^* = s_3^*(q)$.

3.3.1 Cournot and zero taxes

As a benchmark case for both unilateral and bilateral adoption of the DBCFT under Cournot competition, it is instructive to set taxes equal to zero initially in order to highlight the strategic effect under quantity competition.

The game we have described above is solved backwards and we start with the choices made by the affiliates. Both affiliates take the transfer price as exogenous, and maximize their profits as given by

$$\pi_1 = r_1(s_1) - c(s_1 + s_2) + qs_2 \quad \text{and} \quad \pi_2 = r_2(s_2, s_3) - qs_2.$$

The global after-tax profit function of the MNE is the sum of π_1 and π_2,

$$\Pi = r_1(s_1) + r_2(s_2, s_3) - c(s_1 + s_2).$$

In order to arrive at the transfer pricing equation, we totally differentiate the global after-tax profit function with respect to the transfer price, and then insert the first order conditions of affiliates 1 and 2 that follow from maximizing π_1 with respect to s_1 and π_2 with respect to s_2.[9] The transfer pricing equation is then

$$q - \frac{\partial c}{\partial s_2} = -\frac{\partial r_2}{\partial s_3}\frac{\partial s_3}{\partial s_2} \equiv S^C < 0. \tag{3}$$

The right hand side (RHS) of equation (3) is the pure strategic effect of transfer pricing. Under Cournot competition, for a large class of demand functions, $\partial s_3/\partial s_2 < 0$, so firm 3's optimal response to an increase in affiliate 2's sales is to reduce its own sales. Furthermore, $\partial r_2/\partial s_3 < 0$, since profits of affiliate 2 fall when the competitor (firm 3) increases its sales. Thus, the strategic effect S^C is negative, and we can conclude:

Proposition 3a. *When taxes are zero and quantity is the strategic variable, the MNE sets a transfer price below the marginal cost of production.*

$$q < \frac{\partial c}{\partial s_2}$$

A low transfer price will make the importing affiliate behave aggressively and set a large quantity. The competitor will anticipate this and will set a low quantity. Such a strategy increases profits for the importing affiliate and for the MNE as a whole. Since taxes are zero, Proposition 3a is a benchmark case for both bilateral and unilateral

[9] Detailed calculations are available in Appendix A.1.1.

adoption of the DBCFT when quantity is the strategic variable.

3.3.2 Cournot and bilateral adoption of DBCFT

In the presence of taxation, affiliates' profits are given by

$$\pi_1 = (1-t_1)[r_1(s_1) - c(s_1+s_2)] + qs_2 \quad \text{and} \quad \pi_2 = (1-t_2)r_2(s_2,s_3) - qs_2.$$

The global after-tax profit function of the MNE is the sum of π_1 and π_2,

$$\Pi = (1-t_1)[r_1(s_1) - c(s_1+s_2)] + (1-t_2)r_2(s_2,s_3),$$

and the transfer pricing equation is[10]

$$q - \frac{\partial c}{\partial s_2} = (1-t_2)S^C - t_1\frac{\partial c}{\partial s_2} = S_B^C + T_B^C < 0, \tag{4}$$

where $S_B^C \equiv (1-t_2)S^C < 0$ and $T_B^C \equiv -t_1\frac{\partial c}{\partial s_2} < 0$.

S_B^C is negative and indicates, all else equal, a higher transfer price than in the absence of taxation. The reason is that taxation has reduced the value of winning market shares in country 2. T_B^C is a tax term. It is negative. Since production costs of s_2 are tax deductible for affiliate 1, this is a production subsidy that makes it more profitable to win market shares in country 2 and indicates a lower transfer price. Both terms are negative so the transfer price should be set below the marginal cost of production.

The main insight from equation (4) is that universal adoption of the DBCFT may lead to more or less underinvoicing compared to the case when taxes are zero. To see this, notice that if t_2 is sufficiently low and t_1 is sufficiently high, the transfer price is lower than in the case when taxes are zero. In this case, the strategic effect is almost unchanged compared to when taxes are zero and the production subsidy is large. Taken together, these effects lead to an even lower transfer price than in the absence of taxation. Thus, even when all countries adopt the DBCFT, a tax incentive that affects the profit shifting behaviour of the MNE is in place. We have:

Proposition 3b. *When $t_i > 0$ and quantity is the strategic variable, bilateral adoption of the DBCFT leads the MNE to set a transfer price below the marginal cost of production.*

$$q < \frac{\partial c}{\partial s_2}$$

[10] See Appendix A.1.1 for the steps that lead to the transfer pricing equation.

The transfer price is underinvoiced (overinvoiced) compared to the case when taxes are zero for a sufficiently low (high) t_2 and a sufficiently high (low) t_1.

This result goes to show that unilateral adoption of the DBCFT does not eliminate profit shifting incentives when decisions are decentralized. Comparing equation (4) to equation (3), it is clear that a profit shifting motive exists. It arises from the fact that tax deductible production costs related to sales in country 2 are taxed at the tax rate of country 1, whereas sales in country 2 are taxed at the tax rate of country 2. The transfer price may therefore be higher or lower than when tax rates are zero, but the MNE will always set a transfer price below the marginal cost of production. The profit shifting motive does not change the strategic incentive to set a low transfer price, but may dampen or exacerbate it.

3.3.3 Cournot and unilateral adoption of DBCFT

In this section we consider unilateral adoption of the DBCFT. We start by analysing transfer pricing incentives when the country that hosts the exporting affiliate unilaterally implements the DBCFT.

Exporting country adopts DBCFT

Profits of the two affiliates are given by

$$\pi_1 = (1-t_1)[r_1(s_1) - c(s_1+s_2)] + qs_2 \quad \text{and} \quad \pi_2 = (1-t_2)[r_2(s_2,s_3) - qs_2],$$

and the global after-tax profit function is the sum of these profit functions

$$\Pi = (1-t_1)[r_1(s_1) - c(s_1+s_2)] + qs_2 + (1-t_2)[r_2(s_2,s_3) - qs_2].$$

It is seen from the global after-tax profit function that when the country that hosts the exporting affiliate adopts the DBCFT, export revenue is tax exempt, whereas import costs are tax deductible in the country that hosts the importing affiliate. Thus, the multinational can save tax by overinvoicing exports, since this would reduce taxable revenue for the importing affiliate without generating tax costs for the exporting affiliate.

By the same procedure as in the previous section, the optimal transfer price is given by[11]

$$q - \frac{\partial c}{\partial s_2} = S_B^C + T_{UE}^C \lesseqgtr 0, \tag{5}$$

[11] See Appendix A.1.1 for the steps that lead to the transfer pricing equation.

where

$$T_{UE}^{C} \equiv \underbrace{T_{B}^{C}}_{-} - \underbrace{\frac{t_2 s_2}{\partial s_2/\partial q}}_{-} \lesseqgtr 0$$

is the tax effect when the exporting country (country 1) adopts the DBCFT. The tax term T_{UE}^{C} has an additional term compared to the case of bilateral adoption, which is positive since $\partial s_2/\partial q < 0$. All else equal it indicates a transfer price above marginal cost. There are two conflicting tax incentives at play when signing the tax effect. Production costs are tax deductible in country 1 making it profitable to set a low transfer price. However, country 2 has not adopted the DBCFT, and a high transfer price saves tax, since it reduces the taxable profits of affiliate 2 and shifts profits to affiliate 1 where export revenue is untaxed. In sum, these incentives are conflicting and we cannot sign T_{UE}^{C}. We have:

Proposition 4a. *If the country that hosts the exporting affiliate implements the DBCFT, the MNE sets a transfer price that may be higher or lower than the marginal cost of production.*

$$q \lesseqgtr \frac{\partial c}{\partial s_2}$$

When country 1 adopts the DBCFT, two conflicting tax effects are present. If the profit shifting element dominates the production subsidy, the tax effects, all else equal, warrant a high transfer price. The strategic effect, S_{B}^{C}, indicates a low transfer price. It is the relative magnitudes of these two effects that determine whether the transfer price will be set above or below marginal cost. The tax incentive may then lead to profits being shifted to the country that has adopted the DBCFT if the profit shifting effect is sufficiently strong enough.

Importing country adopts DBCFT

In this case, import costs are not tax deductible in country 2, whereas the exporting affiliate in country 1 is subject to tax on export revenue. The after-tax profits of the two affiliates are given by

$$\pi_1 = (1-t_1)[r_1(s_1) - c(s_1+s_2) + qs_2] \quad \text{and} \quad \pi_2 = (1-t_2)[r_2(s_2,s_3)] - qs_2.$$

The global after-tax profit function is

$$\Pi = (1-t_1)[r_1(s_1) - c(s_1+s_2) + qs_2] + (1-t_2)[r_2(s_2,s_3)] - qs_2.$$

The global profit function indicates that the multinational firm can save tax by

underinvoicing its sales to the importing affiliate, since export revenue is subject to tax whereas import costs are not tax deductible.

By the same procedure as previously, the optimal transfer price can be derived as[12]

$$q - \frac{\partial c}{\partial s_2} = S_B^C + T_{UI}^C < 0, \tag{6}$$

where

$$T_{UI}^C = \underbrace{T_B^C}_{-} + \underbrace{\frac{t_1 s_2}{\partial s_2 / \partial q}}_{-} < 0 \tag{7}$$

is the tax effect under unilateral adoption of DBCFT when the importing country adopts the DBCFT. It is negative since $\partial s_2/\partial q < 0$. Since $S_B^C < 0$ and $T_{UI}^C < 0$, we may state:

Proposition 4b. *If the country that hosts the importing affiliate implements the DBCFT, the MNE sets a transfer price below the marginal cost of production.*

$$q < \frac{\partial c}{\partial s_2}$$

In contrast to the case when the exporting country adopted the DBCFT, we can unambiguously sign the tax term T_{UI}^C. The reason is that the profit shifting term goes in the same direction as the production subsidy, indicating a low transfer price. Export revenue is subject to tax in country 1, whereas import costs are not tax deductible in country 2 so the MNE saves tax by setting a low transfer price. Thus, both the strategic effect and the profit shifting effect indicate a low transfer price.

3.4 Decentralized decisions under Bertrand

Under Bertrand competition, the affiliate in country 2 faces a local rival, and the two competing firms are price setters. We denote the price set by the rival in country 2 as p_3, and revenue of the affiliate in country 2 as $r_2(p_2, p_3)$. The two firms' products in country 2 are imperfect substitutes.

As under Cournot competition, the MNE chooses q at a central level in order to maximise net global profits, but delegates decisions about price in local markets to its affiliates. The maximisation procedure has the following sequence of stages: at stage 1, a central authority within the MNE sets q; at the second stage, affiliate 1 in country

[12]See Appendix A.1.1 for the steps that lead to the transfer pricing equation.

1, affiliate 2 in country 2, and the local competitor in country 2 set prices: $p_1^* = p_1^*(q)$, $p_2^* = p_2^*(q)$, and $p_3^* = p_3^*(q)$.

We first examine the benchmark case when taxes are zero. We then turn to examine how the transfer price should be set under bilateral and unilateral adoption of DBCFT.

3.4.1 Bertrand and zero taxes

When taxes are zero, profits by affiliate 1 and affiliate 2 are given by

$$\pi_1 = r_1(p_1) - c(s_1(p_1) + s_2(p_2)) + qs_2(p_2, p_3) \quad \text{and} \quad \pi_2 = r_2(p_2, p_3) - qs_2(p_2, p_3).$$

The global profit function is the sum of affiliates' profits

$$\Pi = r_1(p_1) - c(s_1(p_1) + s_2(p_2)) + r_2(p_2, p_3).$$

As before, we totally differentiate the global profit function with respect to the transfer price, and then insert the first order conditions of affiliates 1 and 2. Doing so yields the transfer pricing equation[13]

$$q - \frac{\partial c}{\partial s_2} = (\frac{\partial s_2}{\partial p_2})^{-1} \frac{\partial p_3}{\partial p_2} [\frac{\partial c}{\partial s_2} \frac{\partial s_2}{\partial p_3} - \frac{\partial r_2}{\partial p_3}] \equiv S^B > 0, \tag{8}$$

which is the pure strategic effect under Bertrand competition.

The expression in the squared bracket on the right hand side of equation (8) is negative, since an increase in the competitor's price (p_3) increases profits of the MNE. Since the products are strategic substitutes, we have that $\partial p_3/\partial p_2 > 0$. Furthermore, the own price effect is negative, $\partial s_2/\partial p_2 < 0$, so $(\frac{\partial s_2}{\partial p_2})^{-1} \frac{\partial p_3}{\partial p_2} < 0$ and the strategic effect, S^B, is positive. We may state:

Proposition 5a. *When taxes are zero and price is the strategic variable, the MNE sets a transfer price above the marginal cost of production.*

$$q > \frac{\partial c}{\partial s_2}$$

A high transfer price induces the affiliate in country 2 to set a high price on its sales in country 2. The local rival will anticipate this, and its best response is to set a high price as well. Such a non-aggressive response from the local rival maximizes the profits of the affiliate in country 2 and the MNE as a whole.

[13] Detailed calculations are available in Appendix A.1.2.

3.4.2 Bertrand and bilateral adoption of DBCFT

After-tax profits of affiliates 1 and 2 are given by

$$\pi_1 = (1 - t_1)[r_1(p_1) - c(s_1(p_1) + s_2(p_2))] + qs_2(p_2, p_3),$$

$$\pi_2 = (1 - t_2)r_2(p_2, p_3) - qs_2(p_2, p_3).$$

The global after-tax profit function is the sum of the after-tax profits

$$\Pi = (1 - t_1)[r_1(p_1) - c(s_1(p_1) + s_2(p_2))] + (1 - t_2)r_2(p_2, p_3).$$

After deriving the equations to solve for the value of q that maximizes the global after-tax profit function of the MNE, we derive the transfer pricing equation. The transfer pricing equation is given by[14]

$$q - \frac{\partial c}{\partial s_2} = S_B^B + T_B^B \lesseqgtr 0, \tag{9}$$

where

$$S_B^B = (\frac{\partial s_2}{\partial p_2})^{-1}\frac{\partial p_3}{\partial p_2}[(1 - t_1)\frac{\partial c}{\partial s_2}\frac{\partial s_2}{\partial p_3} - (1 - t_2)\frac{\partial r_2}{\partial p_3}] \lesseqgtr 0 \tag{10}$$

is the tax-adjusted strategic effect under bilateral adoption of DBCFT and

$$T_B^B = -t_1\frac{\partial c}{\partial s_2} < 0 \tag{11}$$

is the tax effect under bilateral adoption of DBCFT, which is equal to the tax effect under Cournot competition.

In our discussion when taxes were zero (confer equation (8)), we showed that $(\frac{\partial s_2}{\partial p_2})^{-1}\frac{\partial p_3}{\partial p_2} < 0$. When taxes are positive, the squared bracket on the RHS in equation (10) may be negative or positive depending on the relative magnitudes of t_1 and t_2. It is clear, then, that we cannot sign the tax-adjusted strategic effect S_B^B. The reason is that production costs are tax deductible at the tax rate of country 1, whereas sales revenue by affiliate 2 is subject to tax in country 2. If the tax rate in country 2 is high, after-tax sales revenue may be low compared to after-tax production costs in country 1. If so, the strategic effect S_B^B may become negative. In this case, the right hand side of equation (9) is negative warranting a low transfer price. In general, we have:

Proposition 5b. *When $t_i > 0$, and price is the strategic variable, bilateral adoption*

[14] See Appendix A.1.2 for the steps that lead to the transfer pricing equation.

of the DBCFT leads the MNE to set a transfer price above or below the marginal cost of production depending on the relative size of t_1 *and* t_2*.*

$$q \lesseqgtr \frac{\partial c}{\partial s_2}$$

As was the case under bilateral adoption of the DBCFT under Cournot competition, we can conclude that when all countries adopt the DBCFT and price is the strategic variable, profit shifting incentives remain. When price is the strategic variable, the profit shifting effect may overturn the strategic incentive to set a high transfer price. For a sufficiently low t_1 and a sufficiently high t_2, the MNE sets the transfer price below the after-tax marginal cost of production, reversing the strategic incentive. The reason is that costs related to production are tax deductible at the rate of t_1, whereas the corresponding sales revenue is taxed at t_2. Due to these tax incentives, bilateral adoption of the DBCFT does not eliminate abusive transfer pricing.

3.4.3 Bertrand and unilateral adoption of DBCFT

We start by investigating transfer pricing incentives when the country that hosts the exporting affiliate adopts the DBCFT.

Exporting country adopts DBCF

After-tax profits of affiliates 1 and 2 are given by

$$\pi_1 = (1-t_1)[r_1(p_1) - c(s_1(p_1) + s_2(p_2,p_3)] + qs_2(p_2,p_3),$$

$$\pi_2 = (1-t_2)[r_2(p_2,p_3) - qs_2(p_2,p_3)].$$

The global after-tax profit of the multinational firm is

$$\begin{aligned}\Pi = (1-t_1)[r_1(p_1) - c(s_1(p_1) + s_2(p_2,p_3)] + qs_2(p_2,p_3)\\ +(1-t_2)[r_2(p_2,p_3) - qs_2(p_2,p_3)].\end{aligned}$$

The transfer pricing equation can be written as[15]

$$q - \frac{\partial c}{\partial s_2} = S^B_{UE} + T^B_{UE} \lesseqgtr 0, \tag{12}$$

[15]See Appendix A.1.2 for the steps that lead to the transfer pricing equation.

where

$$S^B_{UE} = (\frac{\partial s_2}{\partial p_2} + t_2 \frac{\partial s_2}{\partial p_3}\frac{\partial p_3}{\partial p_2})^{-1} \cdot \\ [((1-t_1)(1-t_2)\frac{\partial c}{\partial s_2}\frac{\partial s_2}{\partial p_3}\frac{\partial p_3}{\partial p_2} - (1-t_2)\frac{\partial r_2}{\partial p_3})] \lesseqgtr 0 \tag{13}$$

is the tax-adjusted strategic effect, and

$$T^B_{UE} = T^B_B - (\frac{\partial s_2}{\partial p_2} + t_2 \frac{\partial s_2}{\partial p_3}\frac{\partial p_3}{\partial p_2})^{-1} \frac{t_2 s_2}{\partial p_2 / \partial q} \lesseqgtr 0 \tag{14}$$

is the tax effect under unilateral adoption of DBCFT when the exporting country adopts the DBCFT.

We know that $[\frac{\partial s_2}{\partial p_2} + t_2 \frac{\partial s_2}{\partial p_3}\frac{\partial p_3}{\partial p_2}] < 0$ because the own price effect dominates the cross price effect. Similar to the case of bilateral adoption of DBCFT (confer equation (10)), we cannot sign S^B_{UE}, since it depends on the relative magnitudes of t_1 and t_2.

We also cannot sign the tax effect T^B_{UE}, since the first term on the RHS of equation (14) is negative, while the second term is positive.

Proposition 6a. *If the country that hosts the exporting affiliate adopts the DBCFT and price is the strategic variable, the MNE sets a transfer price that may be above or below the marginal cost of production.*

$$q \lesseqgtr \frac{\partial c}{\partial s_2}$$

In the absence of taxation, the strategic incentive indicates a high transfer price, but the incentive to save tax may go in either direction because production costs are tax deductible in country 1 whereas sales revenue is taxed in country 2. The relative magnitudes of the two tax effects determine the sign of the tax-adjusted strategic effect. If the tax rate in country 1 (t_1) is very low, both strategic effect S^B_{UE} and tax effect T^B_{UE} may lead to a high transfer price. If t_1 is high, the chosen transfer price depends on the relative magnitudes of the two effects.

Importing country adopts DBCFT

After-tax profits of affiliates 1 and 2 are given by

$$\pi_1 = (1-t_1)[r_1(p_1) - c(s_1(p_1) + s_2(p_2, p_3)) + q s_2(p_2, p_3)],$$

$$\pi_2 = (1-t_2) r_2(p_2, p_3) - q s_2(p_2, p_3).$$

The global profit maximizing function of the multinational firm is

$$\Pi = (1-t_1)[r_1(p_1) - c(s_1(p_1) + s_2(p_2,p_3)) + qs_2(p_2,p_3)] \\ +(1-t_2)r_2(p_2,p_3) - qs_2(p_2,p_3).$$

We see from the global after-tax profit function that import costs are not tax deductible while export income is subject to tax. In order to save tax, a low transfer price is desirable. The transfer pricing equation can be written as

$$q - \frac{\partial c}{\partial s_2} = S^B_{UI} + T^B_{UI}, \tag{15}$$

where we define the tax-adjusted strategic effect as

$$S^B_{UI} = \{(1-t_1)\frac{\partial s_2}{\partial p_2} - t_1\frac{\partial s_2}{\partial p_3}\frac{\partial p_3}{\partial p_2}^{-1}\}\Psi \lesseqgtr 0, \tag{16}$$

where $\Psi \equiv [\frac{\partial p_3}{\partial p_2}(\frac{\partial c}{\partial s_2}\frac{\partial s_2}{\partial p_3} - (1-t_2)\frac{\partial r_2}{\partial p_3})] \lesseqgtr 0$ depending on the size of t_2. Thus, even though we know that the expression in the curly bracket on the RHS is negative we can no longer sign the strategic effect. The tax effect is given by

$$T^B_{UI} = [(1-t_1)\frac{\partial s_2}{\partial p_2} - t_1\frac{\partial s_2}{\partial p_3}(\frac{\partial p_3}{\partial p_2})^{-1}]\frac{t_1 s_2}{\partial p_2/\partial q} < 0. \tag{17}$$

Since $\partial s_2/\partial p_3 > 0$, $\partial s_2/\partial p_2 < 0$, and the products are strategic substitutes so that $\partial p_3/\partial p_2 > 0$, the expression in the squared bracket is negative. Since $\partial p_2/\partial q > 0$, we have that $T^B_{UI} < 0$. Thus, we may state:

Proposition 6b. *If the country that hosts the importing affiliate adopts the DBCFT under price competition, the MNE sets a transfer price that may be higher or lower than the marginal cost.*

$$q \lesseqgtr \frac{\partial c}{\partial s_2}$$

To conclude, the incentive to save tax dictates a low transfer price. The reason is that export revenue is subject to tax in country 1, whereas import costs are not tax deductible in country 2, so the MNE saves tax by setting a low transfer price. However, the tax-adjusted strategic effect can be either positive or negative. For a sufficiently large t_2, the strategic effect might be positive, which would mitigate (but not necessarily offset) the tax incentive to set a low transfer price. If t_2 is low, the chosen transfer price depends on the relative magnitudes of the two effects.

3.5 Concluding remarks

The main contribution of this paper is to study the profit shifting incentives of MNEs under the DBCFT when the headquarters of the MNE delegates decisions about prices or output to its affiliates, but sets the transfer price at a central level. As shown in previous research and discussed in the introduction, delegation is widespread and enhances firm performance.

Contrary to conventional wisdom, we find that when the DBCFT is universally adopted, profit shifting incentives still remain when decisions are delegated. Abusive transfer pricing may actually increase when the DBCFT is universally adopted compared to a conventional source tax system. Our findings are summarized in Table 1. Note that in Table 1, any deviation from the marginal cost of production means that the transfer price is either too low or too high.

Table 1: Summary of results under delegation of authority

	Bilateral adoption		Exporting country adopts		Importing country adopts	
	Cournot	Bertrand	Cournot	Bertrand	Cournot	Bertrand
$t = 0$	$q < c'$	$q > c'$	$q < c'$	$q > c'$	$q < c'$	$q > c'$
$t > 0$	$q < c'$	$q \lessgtr c'$	$q \lessgtr c'$	$q \lessgtr c'$	$q < c'$	$q \lessgtr c'$

Table 1 shows that the nature of competition and which country adopts the DBCFT are of vital importance to the transfer pricing strategy of the MNE.

Our study points to policy challenges with the DBCFT related to production costs. In our set-up, production occurs in country 1 and part of the production is sold in country 1, whilst the rest is exported to the affiliate in country 2. Since production costs are tax deductible in country 1, the tax deductibility amounts to a production subsidy if the producing affiliate's exports are tax exempt. In principle, one could separate the production costs related to exports and not allow the firm to deduct them but, in practice, production costs are hard to observe and may not be separable. Recently, Cui (2017) discusses whether features of the DBCFT may be in violation of the World Trade Organization rules. Our analysis shows that the combination of exemption of export revenue and tax deductibility of all costs amounts to an export subsidy that also exacerbates abusive transfer pricing.

A second point that follows from our analysis is related to the growing importance of the digital economy. The business model of digital firms is to a large extent based on intellectual property. Investment costs related to the development of patents are tax deductible and digital firms, such as Google, export their services (browser and digital footprints) to different customers in foreign jurisdictions. Compared to setting

up daughter companies in tax havens that collect revenues, the DBCFT offers better tax savings. This is so because the DBCFT allows firms to avoid any tax on repatriated earnings from foreign affiliates, and, at the same time, leaves revenues untaxed. If taxing the digital economy is a challenge, then the DBCFT is not the way forward.

Finally, unilateral adoption of the DBCFT creates profit shifting incentives depending on which country adopts the DBCFT, and suggests that universal adoption after all is preferable to unilateralism at least from a tax revenue perspective.

References

Almeida, Paul. 1996. Knowledge sourcing by foreign multinationals: Patent citation analysis in the US semiconductor industry. *Strategic Management Journal*, **17**(S2), 155–165.

Auerbach, A., & Devereux, M.P. 2017. Cash-flow taxes in an international setting. *American Economic Journal: Economic Policy*, **10**(3), 69–94.

Auerbach, Alan J, Devereux, Michael P, Keen, Michael, & Vella, John. 2017. International tax planning under the destination-based cash flow tax. *National Tax Journal*, **70**(4), 783–801.

Baldenius, Tim, & Ziv, Amir. 2003. Performance evaluation and corporate income taxes in a sequential delegation setting. *Review of Accounting Studies*, **8**(2-3), 283–309.

Baldenius, Tim, Melumad, Nahum D, & Reichelstein, Stefan. 2004. Integrating managerial and tax objectives in transfer pricing. *The Accounting Review*, **79**(3), 591–615.

Bloom, Nicholas, Mahajan, Aprajit, McKenzie, David, & Roberts, John. 2010. Why do firms in developing countries have low productivity? *American Economic Review*, **100**(2), 619–23.

Bond, W. Eric, & Gresik, Thomas A. 2018. *Unilateral tax reform: Border adjusted taxes, cash flow taxes, and transfer pricing.* Mimeo, University of Notre Dame.

Bourgeois, L. J. III, & Eisenhardt, K. M. 1988. Strategic decision processes in high velocity environments: Four cases in the microcomputer industry. *Management Science*, **34**(57), 816–835.

Clausing, Kimberly A. 2016. The effect of profit shifting on the corporate tax base in the United States and beyond. *National Tax Journal*, **69**(4), 905–934.

Crivelli, Ernesto, De Mooij, Ruud, & Keen, Michael. 2016. Base erosion, profit shifting and developing countries. *FinanzArchiv: Public Finance Analysis*, **72**(3), 268–301.

Cui, Wei. 2017. Destination-based cash-flow taxation: A critical appraisal. *University of Toronto Law Journal*, **67**(3), 301–347.

Elitzur, Ramy, & Mintz, Jack. 1996. Transfer pricing rules and corporate tax competition. *Journal of Public Economics*, **60**(3), 401–422.

Ernst, & Young. 2003. *Transfer Pricing 2003 Global Survey.* International Tax Services.

Fershtman, C., & Judd, K.L. 1987. Equilibrium incentives in oligopoly. *The American Economic Review*, **77**(5), 927–940.

Graham, John R, Harvey, Campbell R, & Puri, Manju. 2015. Capital allocation and delegation of decision-making authority within firms. *Journal of Financial Economics*, **115**(3), 449–470.

Grandstand, O., Hakanson L. Sjolander S. 1992. *Technology management and international business.* Wiley & Sons.

Guvenen, Fatih, Mataloni Jr, Raymond J, Rassier, Dylan G, & Ruhl, Kim J. 2017. *Offshore profit shifting and domestic productivity measurement.* Tech. rept. National Bureau of Economic Research.

Horst, T. 1971. The theory of the MNE: Optimal behavior under different tariff and tax rates. *Journal of Political Economy*, **79**, 1059–1072.

Kant, Chander. 1988. Foreign subsidiary, transfer pricing and tariffs. *Southern Economic Journal*, 162–170.

Katz, Michael L. 1991. Game-playing agents: Unobservable contracts as precommitments. *The RAND Journal of Economics*, 307–328.

Nielsen, Søren Bo, Raimondos-Møller, Pascalis, & Schjelderup, Guttorm. 2003. Formula apportionment and transfer pricing under oligopolistic competition. *Journal of Public Economic Theory*, **5**(2), 419–437.

Nielsen, Søren Bo, Raimondos-Møller, Pascalis, & Schjelderup, Guttorm. 2008. Taxes and decision rights in multinationals. *Journal of Public Economic Theory*, **10**(2), 245–258.

Papanastasiou, M., & Pearce, R. 2005. Funding sources and the strategic roles of decentralized R&D in multinationals. *R&D Management*, **35**(3), 89–99.

Schjelderup, G., & Sørgard, L. 1997. Transfer pricing as a strategic device for decentralized multinationals. *International Tax and Public Finance*, **4**, 277–290.

Shome, Parthasarathi, & Schutte, Christian. 1993. Cash-flow tax. *Staff Papers*, **40**(3), 638–662.

Sklivas, S.D. 1987. The strategic choice of managerial incentives. *The RAND Journal of Economics*, **18**(3), 452–458.

Tirole, Jean. 1988. *The theory of industrial organization*. MIT press.

Vickers, J. 1985. Delegation and the theory of the firm. *The Economic Journal*, **95**, 138–147.

A.1 Appendix

A.1.1 Cournot and bilateral adoption of DBCFT

The first order conditions of the two affiliates are

$$\frac{\partial \pi_1}{\partial s_1} = (1 - t_1)[\frac{\partial r_1}{\partial s_1} - \frac{\partial c}{\partial s_1}] = 0, \tag{18}$$

$$\frac{\partial \pi_2}{\partial s_2} = (1 - t_2)\frac{\partial r_2}{\partial s_2} - q = 0. \tag{19}$$

The first stage of the game is solved by finding the value of q that maximizes the global after-tax profit function of the MNE. A marginal change in q affects the global after-tax profit function as follows

$$\begin{aligned}\frac{\partial \Pi}{\partial q} = (1 - t_1)[(\frac{\partial r_1}{\partial s_1} - \frac{\partial c}{\partial s_1})\frac{\partial s_1}{\partial s_2}\frac{\partial s_2}{\partial q} - (\frac{\partial c}{\partial s_2}\frac{\partial s_2}{\partial q})] \\ +(1 - t_2)[\frac{\partial r_2}{\partial s_2}\frac{\partial s_2}{\partial q} + \frac{\partial r_2}{\partial s_3}\frac{\partial s_3}{\partial q}].\end{aligned} \tag{20}$$

A change in q affects the affiliate's optimal sales and thereby also the rival's optimal sales. This means that q affects s_3 indirectly through its effect on s_2. The term $\partial s_3/\partial q$ is the strategic effect of a change in the transfer price. As in Tirole (1988), p. 326, it can be rearranged in the following way:

$$\frac{\partial s_3}{\partial q} = \frac{\partial s_3}{\partial s_2}\frac{\partial s_2}{\partial q} > 0. \tag{21}$$

Under Cournot competition, it is well known that for a large class of demand functions, $\partial s_3/\partial s_2 < 0$, which means that firm 3's optimal response to an increase in firm 2's sales is to reduce its own sales. Since the two products are substitutes, it also follows that $\partial s_2/\partial q < 0$. Taken together these terms mean that a high transfer price triggers the competitor to behave more aggressively and expand its sales, that is, $\partial s_3/\partial q > 0$.

Substituting equations (18), (19) and (21) into (20), we obtain the transfer pricing equation.

A.1.2 Bertrand and bilateral adoption of DBCFT

Each affiliate maximizes its local profits and decides on its optimal price. The affiliates' first order conditions for profit maximization are:

$$\frac{\partial \pi_1}{\partial p_1} = (1-t_1)[\frac{\partial r_1}{\partial p_1} - \frac{\partial c}{\partial s_1}\frac{\partial s_1}{\partial p_1}] = 0, \tag{22}$$

$$\frac{\partial \pi_2}{\partial p_2} = (1-t_2)\frac{\partial r_2}{\partial p_2} - q\frac{\partial s_2}{\partial p_2} = 0. \tag{23}$$

The effect on global after-tax profits from a change in q is:

$$\begin{aligned}\frac{\partial \Pi}{\partial q} = (1-t_1)[(\frac{\partial r_1}{\partial p_1} - \frac{\partial c}{\partial s_1}\frac{\partial s_1}{\partial p_1})\frac{\partial p_1}{\partial s_2}\frac{ds_2}{dq} - \frac{\partial c}{\partial s_2}\frac{ds_2}{dq}] \\ +(1-t_2)[\frac{\partial r_2}{\partial p_2}\frac{\partial p_2}{\partial q} + \frac{\partial r_2}{\partial p_3}\frac{\partial p_3}{\partial q}].\end{aligned} \tag{24}$$

The strategic effect can be expressed in the same manner as under Cournot competition, that is,

$$\frac{\partial p_3}{\partial q} = \frac{\partial p_3}{\partial p_2}\frac{\partial p_2}{\partial q} > 0. \tag{25}$$

Bertrand competition implies that, for a large class of demand and cost functions, the products are strategic substitutes so that $\partial p_3/\partial p_2 > 0$. Since $\partial p_2/\partial q > 0$, we have that, $\partial p_3/\partial q > 0$.

Substituting equations (22), (23) and (25) into equation (24), we obtain the transfer pricing equation.