# Do Treasure Islands Create Firm Value?[*]

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## Abstract

They do! Otherwise, their use would not have been so prevalent among firms. How much firm value they create, however, is still an open question. Exploiting a political event in the U.K. that suddenly raised the cost of using tax havens, we find that there was a 0.87% reduction in cumulative abnormal return (CAR) among the sampled firms, corresponding to about £532 million in market capitalization. The firms of stronger corporate governance registered a stronger reduction in CAR. A simple linear extrapolation suggests that the firm value contributed by tax havens can be as much as £31 billion.

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# 1.   Introduction

Many countries implement policies to tackle tax avoidance and the use of tax havens (or "treasure islands" according to Hines, 2010) among their business taxpayers. One justification of such policies is fairness: it is unfair for businesses to make money while paying less than their fair shares of tax.

In this paper, we ask: "How much do tax havens bring to the table?" Desai and Dharmapala (2009) have asked a related but different question: "How much does tax avoidance bring to the table?" The Venn diagram in Figure 1 clarifies the similarities and differences between these two research questions. *A* represents the set of business activities associated with tax havens, while *B* represents the set of business activities associated with tax avoidance. Certainly the two sets overlap; but they are not necessarily the same. If *A* = *B*, it implies that a Californian firm which exploits the tax code differences between California and Oregon to lower its tax cannot be regarded as tax avoidance because neither California nor Oregon is a tax haven, or when a British firm finds Bermuda an appropriate base for its reinsurance business, every transaction involved has to do with tax avoidance. These counterexamples represent the non-overlapping areas of *A* and *B*, suggesting that "How much do tax havens bring to the table?" and "How much does tax avoidance bring to the table?" are two related but different questions.

**Figure 1: Tax havens vs. tax avoidance in a Venn diagram: the universe is the set of business activities firms use**
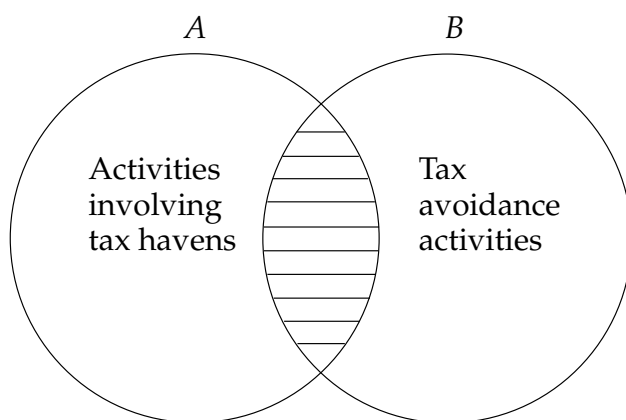


One approach to answer our question is to regress firm value on tax havens use. Doing so, however, involves various empirical challenges. For instance, there is no widely acceptable measure of a firm's use of tax havens. Even if one can come up with a reasonable measure, not only that it may not be comparable across firms, it is also likely to

be endogenous.[1] To overcome these challenges, we exploit a political event and use an approach similar to Fisman (2001) who estimates the value of political connections using news concerning the unexpected health problems of President Suharto.

The intuition is that if a firm has been using a specific business strategy (call it *X*), then *X* has to something to the table. Suharto's connection is the *X* in Fisman (2001), while tax havens use is our *X*. If there is an event leading to the sudden disappearance of *X*, then the drop in the firm value gives us an estimate of the contribution of *X*. In Fisman (2001), Suharto did not disappear; the events only suggested an unexpected increase in the likelihood that he might disappear. The events were news about the unexpected health problems of Suharto. Similarly, our *X* also did not disappear; we must identify other events that mimic the increased likelihood of *X*'s disappearance.

We look into an unexpected episode of political upheaval on tax havens use: The release of a report by ActionAid, an NGO in the U.K. on October 11, 2011 concerning the use of offshore subsidiaries in tax havens by FTSE 100 firms as a handy spreadsheet file listing all the affiliates of the FTSE 100 firms and their locations (ActionAid, 2011).[2] According to the report, these FTSE 100 firms in total have over 30,000 subsidiaries (as of July 26, 2011); 8,492 of them are located in the tax havens. The title of the report, "Addicted to Tax Havens," alone tells us that these firms are fairly liberal in their usage of tax havens. The U.K. market is one of the leading capital markets; its biggest firms are among the most frequently traded stocks in the world. For two consecutive days, two groups of members of parliament (MPs) sponsored and signed two early day motions in response to the report, urging the government and the U.K. tax authority, the HM Revenue & Customs (HMRC), to take immediate actions in tackling such dubious organizational strategies. Appendix A details the event and the political background that makes it an appropriate event study.

Our estimate shows that our sample of firms registered cumulative abnormal returns (CAR) of $-0.87\%$ from day 0 to day 1. This reduction was not a small amount, corresponding to about £532 million in market capitalization, or roughly 60% of the government's spending to tackle tax avoidance, or 0.9% of tax revenue in 2011.

Is the CAR really about the use of tax havens? After all, it is a one-off event. Since if the different groups contemplate giving more troubles to the firms, they are likely to

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[1]Morck and Yeung (1991) discuss in detail these two problems in estimating the value of a firm's multinationality.

[2]This event is therefore not a corporate event, which bypasses the problems mentioned in Hirshleifer (2001): "One explanation, event selection, is that a firm's decision whether and when to engage in the event depends on whether there is market mis-valuation. A second possibility, manipulation, is that around the time of the action the firm reconfigures other information reported to investors in order to induce mis-valuation." Besides, this political event, like Suharto's health, is exogenous to the firms, thereby lending credibility to the event study.

concentrate on a few firms to start with. They are more likely to pick on those firms with a lot of tax haven affiliates than those with very few. If the former group does register a bigger loss than the latter group, it lends confidence to the claim that the CAR really has something to do with the use of tax havens. We do find such a pattern. A number of other robustness checks also lend us confidence on this claim.

We may interpret the reduction in CAR in the context of the demand for tax havens use as shown in Figure 2, where the horizontal axis is the firm's use of tax havens, and the vertical axis is the cost the firm has to incur using tax havens. This cost at least comprises of the troubles from the government, the politicians, the tax authority, and the general public; some of them are truly hostile to tax havens, while some capitalize politically by picking on tax havens from time to time (Appendix A lists the specific troubles we have in mind). Whereas the news about Suharto's health problem increased people's expectation of his death, the ActionAid's report raises such a cost by raising investors' expectation that even more troubles will come. Both cases represent the increased likelihood of the sudden disappearance of x: the former represents the value of x decreases suddenly, while the latter respresents the cost of using x increases suddenly.

**Figure 2: Demand for tax havens**
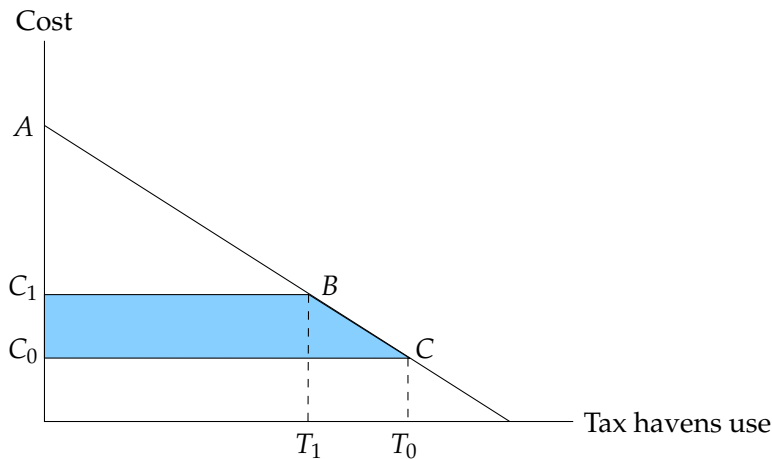


Suppose an almost impossible situation: the report triggers the cost to hike up to an incredible level that completely deter firms from using tax havens. In such a situation, our $X$ disappears suddenly. The $-0.87\%$ would represent the firm value attributed to tax havens. Nevertheless, ActionAid (2013) updated the list of tax haven affiliates of the FTSE 100 and found that substantial percentage of these firms' affiliates remain at tax havens. We calculate that the mean share of subsidiaries located in tax havens among the firms in our sample only dropped by about 0.2 percentage point. By rational expectation, we

may say that the report might have triggered the investors to expect that the firms will reduce their tax havens use by 0.2 percentage point, which contributed to roughly 0.87% of the reduction in firm value. As shown in Figure 2, if one is willing to extrapolate the demand curve linearly, then she may conclude that tax havens use contributes to about £31 billion in firm value (Area $AC_0C$).[3] We do not make a stand whether such a linear extrapolation is correct or wrong, but such a share seems to be disturbingly large. We believe it is reasonable to claim that tax havens should have contributed way more than 0.87% in firm value.

Which types of firms would tax havens contribute more to? We find that those firms with stronger corporate governance suffer a bigger loss. There is an extra reduction in CAR of about 0.602% when we compare a firm with its corporate governance standard at the third quartile versus one with its corporate governance standard at the first quartile.

We complement our empirical analysis with a model that helps organize our thoughts on the changes one might expect from the increase of the cost of using tax havens triggered by ActionAid's report. In particular, the model suggests an underlying reason for the bigger drop in CAR among those firms of stronger corporate governance. The model incorporates the fact that a firm's usage of tax havens is a deliberate choice of the firm in balancing the associated benefits and the costs in an attempt to maximize firm value. Corporate governance affects this balancing exercise. The firm value reflects the fact that managers would steal from the firm. Whether they can get away with it and the amount they steal depend on the the firm's corporate governance and the exposure to offshore tax havens. The model therefore relates firm value, managerial diversion, offshore tax havens, and the cost of using tax havens all within a value-maximizing framework.

## 2.   The Related Literature

Recent studies have shown that tax havens have a number of contributions to non-tax havens. Desai, Foley, and Hines (2006a,b) show that tax havens can reduce the cost of trading with high-tax jurisdictions and in turn, promote investment and economic activities there. For instance, using debt-financing from haven affiliates helps a firm lower its tax burden in trading with a high-tax jurisdiction. Rose and Spiegel (2007) show that if a country has a tax haven nearby, its banking sector is more competitive with greater financial depth. Some have claimed that tax havens reduce the average corporate tax rate among the OECD countries from roughly 47% to around 26% since 1983. Hong and Smart (2010) derive the theoretical conditions under which tax competition benefits competing

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[3]The calculations are shown in Appendix C.

countries. The literature, however, has not been giving estimations of the effect of tax havens on firms.

The literature lacks a consensus on whether profit-shifting transactions, not a small fraction of them include tax havens, reduces tax revenue among high-tax jurisdictions. Auerbach (2014) views that to the extent that shifting nominal profit across jurisdictions reduces firms' incentive to shift real activities across jurisdictions, restricting profit-shifting transactions can backfire and reduce tax revenue among high-tax jurisdictions. Dharmapala (2008) notes that the corporate tax revenues in major economies have been surprisingly stable over time, despite the anecdotal evidence suggesting extensive base erosion and income shifting among many large and well-known multinationals. In particular, he shows that in the U.S., there has been a robust growth of corporate tax revenues albeit substantial FDI outflows to tax havens. Furthermore, as pointed out in Dharmapala (2013), corporate tax revenue has always been a relatively small component of revenues for the governments of most major economies. For instance, both the U.K. and the U.S. currently have less than 10% of their tax revenues coming from corporate income tax.

Hines and Rice (1994) point out that tax havens might not reduce U.S. tax revenue. The U.S. foreign tax credits lead to little tax revenue from U.S. businesses' foreign operations that are in high-tax jurisdictions. Taxing tax haven profit therefore makes up a large portion of the tax revenue from U.S. businesses' foreign operations. To the extent that U.S. businesses shift profit from high-tax foreign jurisdictions to tax havens, their existence enhances U.S. tax collection. Hines (2010) offers a more comprehensive survey of the literature.

With various base erosion and profit shifting (BEPS) policies across the world, in which the OECD's have received the most attention, research has moved beyond simple descriptive statistics by carefully estimating the extent of BEPS. Using various estimation methods with both aggregated and firm-level data, the literature has also estimated that increasing the tax rate difference between the parent firm's country and the affiliate's country by 10% would increase the pretax income reported by the affiliate by 8% (Dharmapala, 2013). Dharmapala and Riedel (2013) measures the impact of arguably exogenous income shocks faced by the parent firms and find that a 10% of this surprise income would increase the profits reported by low-tax affiliates by 0.4% more than that of high-tax affiliates. Overall, Dharmapala (2013) concludes that around 2% to 4% of parents' income shifted is about the figure the literature has estimated.

ActionAid's report is also used as an exogenous event suitable by other studies. The U.K.'s Companies Act of 2006 requires firms to disclose the location and name of all their subsidiaries to the Companies House. Dyreng, Hoopes, and Wilde (2014) find

that ActionAid's report reveals that half of these FTSE 100 firms failed to fully follow this disclosure rule. The public pressure generated from ActionAid's report subsequently changed these firms' real behavior in the following ways: they began to disclose all their subsidiaries to the Companies House, and decrease their usage of tax havens relative to other FTSE 100 firms who, before the release of the report, were fully compliance with the disclosure rule. Interestingly, Dyreng, Hoopes, and Wilde (2014) estimate that these firms' effective tax rates also increase.

## 3. A Motivating Model

Our model incorporates the models in Desai, Foley, and Hines (2006a) and Desai, Dyck, and Zingales (2007). In a sequential-move game, a firm first decides the levels of investment in both tax havens and non-tax havens; the manager then decides the amount she would divert from the firm's investment. The equilibrium investment levels that maximize the firm value therefore take into account managerial diversion.

### 3.1. Model setup

In period 1, a firm decides the amounts of investment in non-tax havens and tax havens ($K$ and $K^t$, respectively). There is a common shadow cost represented by $\lambda$; different unit costs are given by $c$ and $c^t$, respectively. The notion $c^t$ is the cost of using tax havens. It includes both the direct cost of investing in tax havens, as well as the troubles that are associated with dealing with the government, the tax authority, the politicians, the general public, etc. Let $\tau(K^t)$ be the effective tax rate faced by the firm as a function of $K^t$. Assume that $\partial\tau(K^t)/\partial K^t < 0$ since one reason why they are called the tax havens is because they help firms avoid taxes (in both home and foreign countries).

The firm's revenue has two parts. The first part is $Q(K, K^t)$ is taxed, where $Q_1 > 0$, $Q_{11} < 0$, $Q_2 > 0$, and $Q_{22} < 0$. Assume also that $Q_{12} \geq 0$, meaning that the investment in non-tax havens will not lower the marginal product of the investment in tax havens, vice versa. The second part is the non-taxed part given by $Q^t(K^t) \geq 0$.[4] This second part corresponds to those businesses the firm takes in tax havens for which they are not taxed in non-tax havens. Whether these investments make the firm more profitable, however, depends on the extent of managerial diversion, denoted by $d$. The firm's profit is:

$$\pi = [1 - \tau(K^t)]Q(K, K^t) + Q^t(K^t) - \lambda(cK + c^tK^t) - d. \tag{1}$$

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[4]Under this set up, tax havens enlarge the business opportunity set when $\partial[Q(K, K^t) + Q^t(K^t)]/\partial K^t > 0$.

We assume that the manager can divert resources from both non-tax havens and tax havens subject to a cost. Specifically, the manager chooses $d$ to maximize her utility:

$$U = d - \frac{\gamma d^2}{2(\alpha K + K^t)}, \tag{2}$$

The second item is the cost. Stronger corporate governance corresponds to a higher $\gamma$. Under stronger corporate governance, it becomes harder for the manager to divert firm resources for personal benefits. Diverting resources is easier the larger is the firm's overall levels of investment. We take $\alpha \neq 1$, which accommodate the possibility that diverting resources from non-tax havens and tax havens entails different costs.

### 3.2. Subgame-perfect Nash equilibrium

In the sequential-move game, the firm chooses the $K$ and $K^t$ in the first stage and the manager chooses $d$ in the second stage. By backward induction, the manager chooses $d$ to maximize utility taking $K$ and $K^t$ as given. The first order condition gives

$$d^* = \frac{\alpha K + K^t}{\gamma}. \tag{3}$$

Substituting it into (1), the profit function of the firm becomes:

$$\pi = [1 - \tau(K^t)]Q(K, K^t) + Q^t(K^t) - \lambda(cK + c^t K^t) - \frac{\alpha K + K^t}{\gamma}. \tag{4}$$

Therefore, in the first stage, the firm chooses $K$ and $K^t$ to maximize (4). The first order conditions are:

$$K : [1 - \tau(K^t)]\frac{\partial Q(K, K^t)}{\partial K} = \lambda c + \frac{\alpha}{\gamma}, \tag{5}$$

$$K^t : [1 - \tau(K^t)]\frac{\partial Q(K, K^t)}{\partial K^t} - \frac{\partial \tau(K^t)}{\partial K^t}Q(K, K^t) + \frac{\partial Q^t(K^t)}{\partial K^t} = \lambda c^t + \frac{1}{\gamma}. \tag{6}$$

In the subgame-perfect Nash equilibrium, the firm's optimal investments in non-tax havens $K^*$ and tax havens $(K^t)^*$ are defined by (5) and (6), and the manager's optimal choice of diversion is $d^* = (\alpha K^* + (K^t)^*)/\gamma$.

We can derive the following results from the above model:

**Result 1**: *Firm value decreases with the cost of using tax havens: $\partial \pi^*/\partial c^t < 0$.*

This result follows directly from the Envelope Theorem. To the extent that the cost

of using tax havens increases after the release of the ActionAid report, this result implies that the market would react negatively to this event.

**Result 2**: *Investment in tax havens decreases with its cost: $\partial(K^t)^*/\partial c^t < 0$.*

This result comes from differentiating the two first order conditions in (5) and (6) with respect to $c$ and applying the Cramer's Rule to get:

$$\frac{\partial(K^t)^*}{\partial c^t} = \frac{\lambda \pi_{11}}{\pi_{11}\pi_{22} - \pi_{12}^2}, \tag{7}$$

where $\pi_{11}$ is the second derivative of $\pi$ with respect to $K$ and so on. By standard assumptions of maximization, $\pi_{11} < 0$ and $\pi_{11}\pi_{22} - \pi_{12}^2 > 0$. Therefore, $\partial(K^t)^*/\partial c^t < 0$; the firm's demand curve for tax havens is downward-sloping. ActionAid (2013) reports that indeed the firms slightly reduced their usage of tax havens. Dyreng, Hoopes, and Wilde (2014) also find that at least half of the FTSE100 firms reduced their usage of tax havens after ActionAid's (2011) report.

**Result 3**: *Investment in tax havens increases with the strength of corporate governance: $\partial(K^t)^*/\partial\gamma > 0$.*

This result can be obtained by differentiating the two first order conditions in (5) and (6) with respect to $\gamma$ and applying the Cramer's Rule:

$$\frac{\partial(K^t)^*}{\partial\gamma} = \frac{-\pi_{11}/\gamma^2 + \alpha\pi_{12}/\gamma^2}{\pi_{11}\pi_{22} - \pi_{12}^2}. \tag{8}$$

Since $\pi_{11} < 0$, $\pi_{12} = (1-\tau)\partial^2 Q/(\partial K \partial K^t) - (\partial\tau/\partial K^t)(\partial Q/\partial K) > 0$, and the denominator is positive, the above term is positive. Intuitively, when the firm has stronger corporate governance, it is harder for the manager to take advantage by diverting firm resources. Therefore, the firm will suffer a smaller loss due to managerial diversion and will optimally increase investment in tax havens.

**Result 4**: *A firm with stronger corporate governance has a larger drop in value when the cost of using tax havens increases: $\partial^2\pi^*/(\partial c^t \partial\gamma) < 0$.*

To see this result, we note that:

$$\frac{\partial^2\pi^*}{\partial c^t \partial\gamma} = \frac{\partial}{\partial\gamma}\left(\frac{\partial\pi^*}{\partial c^t}\right) = \frac{\partial}{\partial\gamma}\left(-\lambda(K^t)^*\right) = -\lambda\frac{\partial(K^t)^*}{\partial\gamma} < 0, \tag{9}$$

since $\partial(K^t)^*/\partial\gamma > 0$ by Result 3. Intuitively, the manager of a better governed firm has diverted less resources located in tax havens so that the firm can make better use of these investments to generate profit. Thus, the increase in the cost of using tax havens should have a greater impact on this firm relative to a worse governed firm.

While the above model only considers how corporate governance standards may affect the values of firms that have different degrees of tax haven uses, we note that the shape of the production function $Q(K, K^t)$ may also have played a role. To the extent that the functional form of the production function does not correlate with the firm's use of tax havens, our estimation of the differential effect of the event due to corporate governance standard would not be biased. However, other factors may also enter the production function and correlate with firms' use of tax havens. Obvious candidates would be the degree of corporate social responsibility as perceived by the investors and the firms' political connection to government officials. These two factors may directly affect the market's sentimental reaction to the firm's use of tax havens and thus firm value. In our empirical analysis, we also control for these two other factors.

## 4. Empirical Analysis

In this section, we report our event study results. The event date is October 11, 2011, the release date of ActionAid's report entitled "Addicted to tax havens." The event triggers a hike in the cost of using tax havens; in the model, such a hike means an increase in $c^t$. The profit function in the model corresponds to the firm value. We meter the drop in this value ($\Delta\pi$) by the CAR. In other words, rather than assuming that investors do *not* know about the firms' usage of tax havens, our approach views investors to have factored in whether or not the firms have made good use of tax havens.[5] The event does not bring any news about such a usage, but it is a news concerning firms facing a higher cost of using tax havens.

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[5]One might think that this take seems to be contradictory to Dyreng, Hoopes, and Wilde (2014), who find that half of the firms did not report all their subsidiaries to Companies House but subsequently did so after the report. Such an ex-ante non-compliance, however, does not mean that the investors could not infer firms' usage of tax havens accurately despite their lack of full disclosure. This is analogous to saying that even if the firms are not filing every bits of information relevant to its corporate governance, say, to the SEC, that does not mean that the capital market fails to price their corporate governance.

## 4.1. Estimation of abnormal returns

To single out the stock price reaction to the ActionAid report, we use a market model to remove the impact of other news that would affect all stocks in the U.K. market:

$$r_{it} = \alpha_i + \beta_i r_{mt} + \delta_0 E_t + \varepsilon_{it}, \tag{10}$$

where $r_{it}$ and $r_{mt}$ are the stock return for firm $i$ and the market return in period $t$ (both expressed in percentage points), respectively; $E_t$ is a dummy indicating the $[0, 1]$ event window (day 0 = October 11, 2011); $\varepsilon_{it}$ is the error.[6] To measure market returns, we use the average return value-weighted by market capitalizations among non-FTSE 100 U.K. firms.[7] The coefficient $\delta_0$ captures the average daily abnormal return around the event period due to the ActionAid report. Therefore, the CAR within the $[0, 1]$ event window is $2 \times \delta_0$.[8] Result 1 predicts that $\delta_0 < 0$.

Since $\varepsilon_{it}$ in (10) is likely to be correlated in the case of a common event day affecting our sampled firms, we follow Dube, Kaplan, and Naidu (2011) and estimate a panel regression of (10) with standard errors given by the maximum of robust standard errors, standard errors clustered by event date, and standard errors clustered by firms. The advantage of estimating abnormal return in a panel regression fashion instead of the traditional firm-by-firm market-model residual approach is the flexibility of adjusting for standard error when the events are clustered (Binder, 1985a,b; Smith, Bradley, and Jarrell, 1986).

To test our hypothesis that the negative market reaction is stronger in firms with stronger corporate governance, the baseline market model (10) is extended as follows:

$$r_{it} = \alpha_i + \beta_i r_{mt} + (\delta_0 + \delta_1 CG_i + \gamma Z_i) \times E_t + \varepsilon_{it}, \tag{11}$$

where $CG_i$ measures the corporate governance standard of the firm, and $Z_i$ contains other control variables, including log total assets, book leverage (both measured in 2010), social responsibility, and political connections.[9] The model's Result 4 predicts that $\delta_1 < 0$.

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[6]We also tried a more conventional 2-stage approach by first running firm-specific time-series market model to obtain each firm's cumulative abnormal returns ($CAR_i$) and regressing $CAR_i$ on the variables of interests. The regression results, not reported here, are similar.

[7]If the investors also expect that using tax havens creates more troubles not only to the FTSE100 firms but also to the non-FTSE100 firms listed in the U.K. market, then our estimate that uses the non-FTSE100 firms as a benchmark would underestimate the impact of tax havens on firm value. Doing so also makes it harder for us to find a significant impact.

[8]Similarly, when we use a $k$-day event window in the regression, then the CAR during this period is computed as $k \times \delta_0$.

[9]Firms that are more socially responsible or more politically connected may be less affected by the event

We use the governance index (Gov41) from Aggarwal, Erel, Ferreira, and Matos (2011) to measure corporate governance standard. This index is based on 41 firm-level governance attributes covering four broad subcategories, including board of directors, auditing, anti-takeover provisions, and compensation and ownership. A higher Gov41 index indicates stronger corporate governance. For each firm, the corporate governance measure is taken as the average of the governance indexes between 2004 and 2008. To the extent that corporate governance standard evolves slowly over time, this average governance index should be a good proxy for the corporate governance standard of the sampled firms in 2011. The social responsibility measures come from ASSET4,[10] and the political connection measure is constructed à la Faccio (2006) and is a dummy variable equal to 1 if the firms' top executives (including Chairman and executive directors) are connected to MPs, ministers, or top government officials.[11] Details of these variables are in Appendix B.

### 4.2. Sample construction and preliminary analysis

In our empirical analysis, we focus on non-financial firms.[12] There are three major reasons. First, U.K. financial firms are closely affiliated with the City of London and they are all highly regulated too. Second, during and after the financial crisis, the U.K. government has nationalized a substantial amount of ownership from financial firms (Scott, 2009). The affiliation with the City of London, government ownership, and regulations specific to financial firms make it hard to predict the market reactions in response to the event. Third, financial firms have other special needs to use foreign subsidiaries that can differ from other types of businesses.

After merging different data sources, we are able to find data for 64 non-financial firms listed in ActionAid report. Their total market capitalization was about £61.2 billion,

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because customers may not boycott them or the government may not take actions against them even when they are found to use tax havens.

[10]ASSET4 was a private firm founded in 2003 and was acquired by Thomson Reuters in 2009. They started to collect annual data on firms' environmental, social, and governance performance since 2003. It covers a large sample of firms from major indices including FTSE 100. The research team of ASSET4 collects more than 750 data points for each firm from publicly available sources. Based on these data points, they construct scores in 18 different categories within 4 main "pillars," including Corporate Governance, Economic, Environmental, and Social. They then compute $z$-scores for these pillars every year to compare firms performance in the respective pillars among the firms in their database. This data set has been used by, for example, Ioannou and Serafeim (2012) and Cheng, Ioannou, and Serafeim (2014) to study international corporate governance and social responsibility issues.

[11]For example, we manually check the U.K. Parliament website (http://www.parliament.uk/) to identify whether the top executives are connected to MPs.

[12]In his empirical tax sheltering model for the U.S. firms, Lisowsky (2010) also focuses on non-financial firms only.

about 60.5% of the total market capitalization in the U.K. capital market.[13] Table 1 lists the names of these firms and the extent to which their subsidiaries are located in tax havens.

The summary statistics for the shares of subsidiaries in tax havens for sampled firms and other key variables are reported in Panel (A) of Table 2. The summary statistics show that the sampled firms use tax havens extensively. A mean share of subsidiaries located in tax havens of 23.5% means that a firm on average has 1 out of 4 of its subsidiaries located in tax havens. A maximum of 58.7% means that one firm has roughly 6 out of 10 subsidiaries located in tax havens.[14]

These firms also have different strengths of corporate governance and social responsibility standards. As for political connection, about 30% of the sampled firms are connected to MPs or other top officials through their senior executives.[15] Panel (B) of Table 2 shows the correlation matrix among the variables. The positive correlation between corporate governance ratings and share of subsidiaries in tax havens is consistent with one prediction of our model: that firms with better corporate governance have a higher investment in tax havens (Result 3), although this correlation is not significant. Those with higher social responsibility ratings and with political connections tend to have lower shares of tax haven use.

[Tables 1 and 2 are about here.]

To examine the return patterns around the event date, we plot the CARs from day $-1$ to day 10 in Figure 3. We observe that the average price drops on the day of the report, but a reversal occurs starting one week after the event day.[16] The initial price drop is canceled out by the later reversal after about 7 trading days.

[Figure 3 is about here.]

### 4.3. Main regression results

We estimate the models in (10) and (11) using data from 391 trading days (from day $-267$ to day 123). Table 3 shows the regression results; for brevity the firm-specific intercepts

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[13]Amihud (2002) and Amihud, Mendelson, and Pedersen (2005) point out that illiquidity appears to be one of the most important market frictions that influence asset prices. This problem, however, should not be a serious concern among the firms in our sample.

[14]Using AMADEUS to track down the locations of non-European affiliates of European firms, Dharmapala and Riedel (2013) find that a surprisingly large fraction of multinationals actually do not have tax haven affiliates. Specifically, they find that in their sample, "only 58% of the affiliates belong to multinational entities that include at least one affiliate in a non-European tax haven." In sharp contrast, all of the firms in our sample have tax haven affiliates.

[15]Faccio (2006) finds that, as of 2001, 46% of the top 50 firms in the U.K. have political connections.

[16]As we will report below, the CAR from day 0 to day 1 is $-0.870$ percentage points and is statistically significant.

and the coefficients of the market return are not reported.

Column (1) reports the results for (10) in which we interact $E_t$ (the dummy indicating the $[0, 1]$ event window) with a constant so that its coefficient is the average abnormal returns over the $[0, 1]$ event window. The coefficient is $-0.435$ and is statistically significant (at 5% level), which can be translated into a CAR of $-0.870$ ($= -0.435 \times 2$) percentage points. Consistent with Result 1, when the event triggers the investors to expect that firms will face a higher price tag of using tax havens, firm value drops significantly. Column (2) reports the results for (11). In this regression, we control for corporate governance standard and other covariates, including log of total assets (a proxy for firm size), book leverage (capital structure of the firm), and measures of social responsibility and political connections. Consistent with Result 4, the coefficient of the corporate governance measure is negative and statistically significant (at 10% level). However, the firms' social responsibility scores and political connections do not seem to have an impact on CAR. These results suggest that the market reacts negatively to the release of the ActionAid report, and the reaction is stronger for firms with better corporate governance standards.

[Table 3 is about here.]

In terms of economic significance, the 0.870 percentage points decline in CAR is equivalent to a drop of £532 million in market capitalization.[17] Besides, suppose that the corporate governance standard of a firm increases from the first quartile (0.561) to the third quartile (0.610), the estimate suggests an extra reduction of CAR 0.602 $[= 2 \times (-6.147) \times (0.610 - 0.561)]$ percentage points. This figure corresponds to about £368 million in terms of market capitalization. In other words, this amount can be interpreted as the additional agency cost of managerial rent diversion associated with the use of tax havens when we compare the CARs of two firms at the first and third quartiles of the corporate governance measures.

How much do these tax havens bring to the table? Using the information in the follow-up report by ActionAid (2013), we calculate that the mean share of subsidiaries located in tax havens among the firms in our sample only dropped by about 0.2 percentage point. In Appendix C, we conduct a simple extrapolation exercise under the assumption that the demand for tax havens use is linear. Based on our calculation, we estimate that the total firm value contributed by tax havens can be as much as £31 billion

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[17]Recall that the total market capitalization of the sampled firms was about £61.2 billion.

*4.4. Does the market react more strongly in firms that use more tax havens?*

Let us compare two firms within the sample: Tullow Oil and Whitbread. Tullow Oil has the largest share of subsidiaries located in tax havens (about 59%) while Whitbread has the smallest share (about 6%) among the sampled firms. If the event, the release of ActionAid's report, does have to do with the usage of tax havens, it would be reasonable to expect a bigger impact on Tullow Oil than on Whitbread. This is what we find: over the $[0, 1]$ event window, the CAR for Tullow Oil was $-7.27$ percentage points while that for Whitbread was 0.76 percentage points.

To analyze the differential market reactions more rigorously, we divide the sampled firms by the terciles of the shares of subsidiaries located in tax havens. In Figure 4, we show the return patterns around the event date for these three subsamples. The solid line shows the trend for the firms with low tax haven use, the dashed line shows the trend for the firms with medium tax haven use, and the dotted-dashed line shows the trend for the firms with high tax haven use. The negative market reaction within the $[0, 1]$ event window is the strongest for the last group of firms.

We also estimate models (10) and (11) separately for each of the three subsamples. The results are reported in Table 4. There is a negative but statistically insignificant average abnormal return for the firms with low tax haven use. For the firms with medium and high tax haven use, the average abnormal returns are both negative and statistically significant. Translating into CARs, the CAR for the medium tax haven use group is $-0.974$ percentage points whereas that for the high tax haven use group is $-1.374$ percentage points. As for the effect of corporate governance on CAR, we find that the coefficients of the corporate governance measures for low and medium tax haven use groups (in Columns (2) and (4)) are statistically insignificant. However, that for the high tax haven use group (Column (6)) is negative and statistically significant. These results suggest that the negative market reaction is indeed stronger in firms using more tax havens.

Are firms of stronger corporate governance experiencing bigger drop simply because they have relatively more to lose? If so, we should observe that market reacts negatively irrespective of the firm's use of tax havens. However, the results in Table 4 show that stronger corporate governance is significantly associated with a bigger drop only among firms that use relatively more tax havens, suggesting that our results are unlikely to be due to the possibility that firms of stronger corporate governance has a larger drop simply because they have more to lose.

[Figure 4 and Table 4 are about here.]

*4.5. Other robustness checks*

In this section, we report two other sets of robustness results. First, we estimate the models over alternative event windows close to the event day and investigate whether our documented results are driven by some other events around the event day. Panels (A) and (B) of Table 5 report the results for the models in (10) and (11), respectively. In each panel, Column (1) shows the baseline results for comparison; in Columns (2) and (3), we use a 5-day and 3-day event windows centered around the day 0; in Column (4), the event window is $[0, 5]$; Column (5) shows the results using the pre-event windows $[-2, -1]$; in Column (7), the event window is $[2, 5]$ which is *after* the event day. On the other hand, each row indicates a different sample: Row (i) uses all firms in the sample; Rows (ii) to (iv) include firms in low-, medium-, and high-tax havens use subsamples respectively.

Panel (A) shows that there seem to be negative and significant average abnormal returns over a 3-day event windows centered around day 0 ($[-1, 1]$) for all the sampled firms as well as the medium and high tax haven use subsamples. When we further extend the event window to ($[-2, 2]$), we still obtain negative average abnormal returns but they are no longer statistically significant. On the other hand, when we consider a longer event window $[0, 5]$, we do not find any significant negative market reaction. Also, we do not find negative market reactions before and after the event. In Panel (B), we conduct a similar exercise. Each cell in the panel represents the coefficient of the corporate governance measure in model (10). Overall, the patterns identified in the baseline $[0, 1]$ event window are generally not observed in other event windows, especially before and after the event.

[Table 5 is about here.]

Next, we perform a placebo test by using matched French and German firms. This test is to address the concern is that the sampled firms are subject to other shocks common to both FTSE100 and non-FTSE100 firms, but our estimation may fail to capture them. We first construct a matched sample of firms listed in French CAC and German DAX with similar log total assets (*LTA*), book leverage (*BLEV*), and corporate governance score

(*CG*).[18] The CARs of these matched firms are shown in Figure 5.[19] For comparison purpose, the CARs of the sampled U.K. firms are also shown. We can see that the CARs of the matched firms also drop between day $-1$ and day 0 but they basically increase between day 0 and day 5 and revert a bit between day 5 and day 6. In Table 6, we show the regression results of the models in (10) and (11) for the matched firms. We can see that the average abnormal returns in the $[0, 1]$ window, reported in Column (1), is positive but not statistically significant. Besides, the coefficient of the corporate governance measure in Column (2) is also not statistically significant. Overall, these results from the placebo test suggest that the responses of the sampled U.K. firms are not present in other comparable firms.

[Figure 5 and Table 6 are about here.]

# 5. Conclusion

We exploit the release of a report by ActionAid, an NGO in the U.K., on the use of tax havens by FTSE 100 firms on October 11, 2011 to investigate whether tax havens are a treasure of firms. We argue that, against the overall political background around the time, the timely release of ActionAid's report substantially raised the cost of using tax havens by the U.K. firms. Our event study indicates that the market reacts negatively to the release of the report, more so for firms with stronger corporate governance standards. These effects are stronger among firms with more extensive use of tax havens. Based on our empirical results, if one is willing to assume a linear demand for tax havens use, she may conclude that tax havens use contributes to about £31 billion in firm value.

The U.K. government spent about £917 million to tackle tax avoidance, evasion, and fraud in 2010 (HMRC, 2012), perhaps a substantial fraction of it concerned tax havens. How much reduction in tax havens use would result? How much would the shareholders of the firms suffer? Our study helps address the second question, while the follow-up report by ActionAid in 2013 seems to suggest that the reduction of tax havens use may

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[18]Specifically, for each firm $i$ in the U.K. sample, we search for another firm $j$ (without replacement) in the sample of German and French firms so that the following expression is minimized:

$$\sqrt{\left(\frac{LTA_k - LTA_i}{9.287}\right)^2 + \left(\frac{BLEV_k - BLEV_i}{0.581}\right)^2 + \left(\frac{CG_k - CG_i}{0.579}\right)^2},$$

where the denominators are the means of the respective matching variables. We then form a value-weighted portfolio using the previous month market capitalization for all unselected firms. Finally, we re-estimate the baseline regression models using October 11, 2011 as the "event date."

[19]Note, however, that the political connection dummy is excluded from the placebo regressions.

have been small. Another much harder question to address is how much more tax revenue the U.K. government can get back after spending £917 million. We believe more works have to be done to address it.

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**Figure 3: Cumulative Abnormal Returns Around the Event Date (Day 0 = October 11, 2011) for All Sampled Firms**
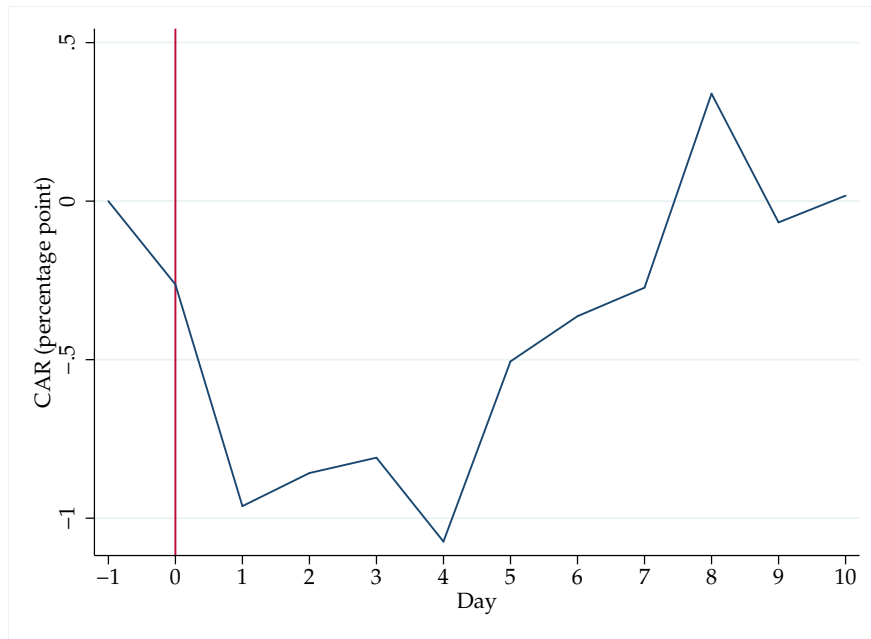


**Figure 4: Cumulative Abnormal Returns Around the Event Date (Day 0 = October 11, 2011) by Terciles of Tax Haven Use**
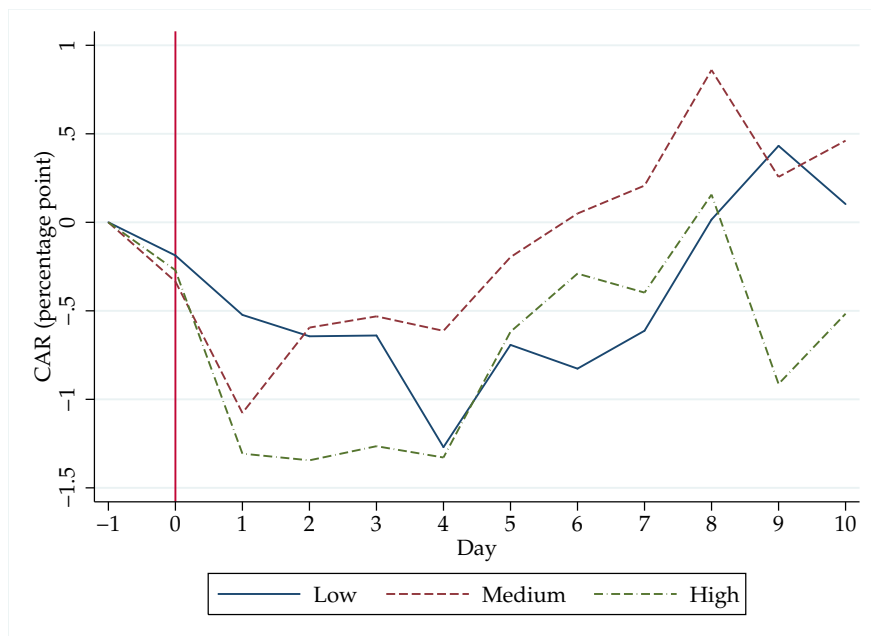
**Table 1: List of the 64 Sampled Firms**

| Company name | No. of subsidiaries in tax havens | Total no. of subsidiaries | % | Company name | No. of subsidiaries in tax havens | Total no. of subsidiaries | % |
|---|---|---|---|---|---|---|---|
| Aggreko | 15 | 56 | 26.79 | Lonmin | 9 | 62 | 14.52 |
| AMEC | 28 | 123 | 22.76 | Marks and Spencer group | 25 | 131 | 19.08 |
| Anglo American | 122 | 833 | 14.65 | National Grid | 98 | 309 | 31.72 |
| Antofagasta | 17 | 73 | 23.29 | Next | 7 | 46 | 15.22 |
| Arm Holdings | 7 | 26 | 26.92 | Pearson | 83 | 411 | 20.19 |
| Associated British Foods | 71 | 453 | 15.67 | Reckitt Benckiser Group | 63 | 211 | 29.86 |
| Astrazeneca | 51 | 255 | 20.00 | Rexam | 60 | 306 | 19.61 |
| Autonomy Corporation | 16 | 77 | 20.78 | Rio Tinto | 143 | 799 | 17.90 |
| BAE Systems | 83 | 509 | 16.31 | Rolls-Royce Group | 62 | 323 | 19.20 |
| BG Group | 62 | 300 | 20.67 | Royal Dutch Shell | 455 | 1276 | 35.66 |
| BHP Billiton | 139 | 452 | 30.75 | Sabmiller | 108 | 367 | 29.43 |
| BP | 537 | 1568 | 34.25 | Scottish and Southern Energy | 59 | 247 | 23.89 |
| British American Tobacco | 201 | 731 | 27.50 | Serco Group | 20 | 118 | 16.95 |
| British Sky Broadcasting Group | 12 | 110 | 10.91 | Severn Trent | 16 | 100 | 16.00 |
| BT group | 150 | 572 | 26.22 | Shire | 48 | 102 | 47.06 |
| Burberry Group | 25 | 93 | 26.88 | Smith & Nephew | 38 | 160 | 23.75 |
| Cairn Energy | 19 | 80 | 23.75 | Smiths Group | 53 | 261 | 20.31 |
| Carnival | 19 | 85 | 22.35 | Tate & Lyle | 27 | 120 | 22.50 |
| Compass Group | 105 | 597 | 17.59 | Tesco | 102 | 575 | 17.74 |
| Diageo | 136 | 430 | 31.63 | The Capita Group | 53 | 359 | 14.76 |
| Experian | 10 | 20 | 50.00 | The Sage Group | 43 | 180 | 23.89 |
| GKN | 24 | 221 | 10.86 | The Weir Group | 25 | 194 | 12.89 |
| Glaxosmithkline | 84 | 420 | 20.00 | Tullow Oil | 44 | 75 | 58.67 |
| IMI | 45 | 268 | 16.79 | Unilever | 181 | 696 | 26.01 |
| Imperial Tobacco Group | 74 | 388 | 19.07 | United Utilities Group | 21 | 106 | 19.81 |
| Intercontinental Hotels Group | 80 | 254 | 31.50 | Vedanta Resources | 30 | 62 | 48.39 |
| International Power | 171 | 488 | 35.04 | Vodafone Group | 95 | 387 | 24.55 |
| Intertek Group | 35 | 203 | 17.24 | Whitbread | 16 | 250 | 6.40 |
| J Sainsbury | 14 | 89 | 15.73 | WM Morrison Supermarkets | 10 | 85 | 11.76 |
| John Wood Group | 8 | 30 | 26.67 | Wolseley | 17 | 41 | 41.46 |
| Johnson Matthey | 27 | 107 | 25.23 | WPP | 611 | 2686 | 22.75 |
| Kingfisher | 20 | 187 | 10.70 | Xstrata | 55 | 378 | 14.55 |

Source: ActionAid (2011).

## Table 2: Summary Statistics and Correlation Matrix

### Panel (A): Summary Statistics

| Variable | Mean | S.D. | Min. | 1st Quartile | Median | 3rd Quartile | Max. |
|---|---|---|---|---|---|---|---|
| % of subsidiaries in tax havens | 0.235 | 0.100 | 0.064 | 0.169 | 0.216 | 0.269 | 0.587 |
| Corporate governance | 0.579 | 0.051 | 0.439 | 0.561 | 0.585 | 0.610 | 0.707 |
| Social responsibility | 0.847 | 0.105 | 0.449 | 0.814 | 0.868 | 0.919 | 0.972 |
| Political connection | 0.313 | 0.467 | 0.000 | 0.000 | 0.000 | 1.000 | 1.000 |
| Log total assets | 9.287 | 1.383 | 6.989 | 8.091 | 9.129 | 10.300 | 12.684 |
| Book leverage | 0.581 | 0.168 | 0.175 | 0.431 | 0.583 | 0.682 | 0.917 |

### Panel (B): Correlation Matrix

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| (1) % of subsidiaries in tax havens | 1.000 | | | | | |
| (2) Corporate governance | 0.035 (0.783) | 1.000 | | | | |
| (3) Social responsibility | −0.096 (0.452) | 0.175 (0.166) | 1.000 | | | |
| (4) Political connection | −0.219 (0.082) | 0.055 (0.665) | 0.092 (0.471) | 1.000 | | |
| (5) Log total assets | 0.171 (0.178) | 0.234 (0.063) | 0.262 (0.037) | 0.158 (0.214) | 1.000 | |
| (6) Book leverage | −0.018 (0.891) | 0.288 (0.021) | 0.227 (0.072) | 0.036 (0.775) | 0.024 (0.850) | 1.000 |

Note: $p$-values are in parentheses.

## Table 3: Market Reactions: Main Regression Results

|  | (1) | (2) |
|---|---|---|
| Average abnormal return | $-0.435^{**}$ | 2.715 |
|  | (0.184) | (1.927) |
| Corporate governance |  | $-6.147^{*}$ |
|  |  | (3.186) |
| Log total assets |  | 0.017 |
|  |  | (0.075) |
| Book leverage |  | 0.909 |
|  |  | (0.707) |
| Social responsibility |  | $-0.549$ |
|  |  | (1.188) |
| Political connections |  | 0.077 |
|  |  | (0.241) |
| Observations | 24860 | 24860 |
| Number of Firms | 64 | 64 |
| Number of Days | 391 | 391 |
| $R^2$ | 0.423 | 0.423 |

Note: Column (1) shows the coefficient of $\delta_0$ from the following regression: $r_{it} = \alpha_i + \beta_i r_{mt} + \delta_0 E_t + \varepsilon_{it}$ and Column (2) shows the coefficients of $\delta_0$, $\delta_1$, and $\gamma$ from the following regression: $r_{it} = \alpha_i + \beta_i r_{mt} + (\delta_0 + \delta_1 CG_i + \gamma Z_i) \times E_t + \varepsilon_{it}$, where $r_{it}$ and $r_{mt}$ are the stock return for firm $i$ and the market return in period $t$ (both expressed in percentage points), $E_t$ is a dummy indicating the event window $[0, 1]$ (day $0 =$ October 11, 2011), $CG_i$ is the corporate governance measure, and $Z_i$ includes log total assets, book leverage, social responsibility, and political connection measures, and $\varepsilon_{it}$ is the error term. The sample period spans from day $-267$ to day 123. Standard errors are given by the maximum of robust standard errors, standard errors clustered on event date, and standard errors clustered on firms. $^{*}$: significance at 10% level; $^{**}$: significance at 5% level; $^{***}$: significance at 1% level.

## Table 4: Market Reactions: Differential Effects

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| Sample: | Low TH | | Medium TH | | High TH | |
| Average abnormal return | −0.146 | 3.943 | −0.487** | 4.730* | −0.687*** | 3.112 |
| | (0.194) | (5.006) | (0.189) | (2.519) | (0.243) | (2.983) |
| Corporate governance | | −1.314 | | −10.369 | | −14.061** |
| | | (4.560) | | (6.845) | | (6.545) |
| Log total assets | | −0.076 | | 0.088 | | 0.142 |
| | | (0.160) | | (0.133) | | (0.124) |
| Book leverage | | 0.733 | | 1.581 | | 1.175 |
| | | (1.749) | | (1.564) | | (1.801) |
| Social responsibility | | −3.467 | | −1.529 | | 2.484 |
| | | (2.507) | | (1.441) | | (1.866) |
| Political connections | | −0.371 | | 0.292 | | −0.420 |
| | | (0.412) | | (0.392) | | (0.597) |
| Observations | 8580 | 8580 | 8090 | 8090 | 8190 | 8190 |
| Number of Firms | 22 | 22 | 21 | 21 | 21 | 21 |
| Number of Days | 391 | 391 | 391 | 391 | 391 | 391 |
| $R^2$ | 0.505 | 0.505 | 0.321 | 0.321 | 0.458 | 0.458 |

Note: This table reports the market reactions for three sub-samples of firms based on low, medium, and high use of tax havens (THs). Columns (1), (3), and (5) show the coefficient of $\delta_0$ from the following regression: $r_{it} = \alpha_i + \beta_i r_{mt} + \delta_0 E_t + \varepsilon_{it}$ and Columns (2), (4), and (6) show the coefficients of $\delta_0$, $\delta_1$, and $\gamma$ from the following regression: $r_{it} = \alpha_i + \beta_i r_{mt} + (\delta_0 + \delta_1 CG_i + \gamma Z_i) \times E_t + \varepsilon_{it}$, where $r_{it}$ and $r_{mt}$ are the stock return for firm $i$ and the market return in period $t$ (both expressed in percentage points), $E_t$ is a dummy indicating the event window $[0, 1]$ (day 0 = October 11, 2011), $CG_i$ is the corporate governance measure, and $Z_i$ includes log total assets, book leverage, social responsibility, and political connection measures, and $\varepsilon_{it}$ is the error term. The sample period spans from day $-267$ to day 123. Standard errors are given by the maximum of robust standard errors, standard errors clustered on event date, and standard errors clustered on firms. *: significance at 10% level; **: significance at 5% level; ***: significance at 1% level.

## Table 5: Robustness Checks: Alternative Event Windows

### Panel (A): Coefficient of average abnormal return

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| Event window: | $[0,1]$ | $[-2,2]$ | $[-1,1]$ | $[0,5]$ | $[-2,-1]$ | $[2,5]$ |
| (i) All firms | $-0.435^{**}$ | $-0.182$ | $-0.321^{**}$ | $-0.070$ | $-0.067$ | $0.114$ |
| | $(0.184)$ | $(0.123)$ | $(0.157)$ | $(0.157)$ | $(0.112)$ | $(0.148)$ |
| (ii) Low TH subsample | $-0.146$ | $-0.151$ | $-0.174$ | $-0.077$ | $-0.167$ | $-0.042$ |
| | $(0.194)$ | $(0.124)$ | $(0.142)$ | $(0.151)$ | $(0.187)$ | $(0.213)$ |
| (iii) Medium TH subsample | $-0.487^{**}$ | $-0.172$ | $-0.359^{**}$ | $-0.017$ | $-0.177$ | $0.219$ |
| | $(0.189)$ | $(0.176)$ | $(0.161)$ | $(0.168)$ | $(0.171)$ | $(0.187)$ |
| (iv) High TH subsample | $-0.687^{***}$ | $-0.226$ | $-0.436^{*}$ | $-0.115$ | $0.148$ | $0.172$ |
| | $(0.243)$ | $(0.199)$ | $(0.263)$ | $(0.212)$ | $(0.234)$ | $(0.158)$ |

Note: Each cell shows the coefficient of the average abnormal return, i.e., $\delta_0$ from the following regression: $r_{it} = \alpha_i + \beta_i r_{mt} + \delta_0 E_t + \varepsilon_{it}$, where $r_{it}$ and $r_{mt}$ are the stock return for firm $i$ and the market return in period $t$ (both expressed in percentage points), $E_t$ is a dummy indicating an event window (day $0$ = October 11, 2011), and $\varepsilon_{it}$ is the error term. The sample period spans from day $-267$ to day $123$. Standard errors are given by the maximum of robust standard errors, standard errors clustered on event date, and standard errors clustered on firms. $^{*}$: significance at 10% level; $^{**}$: significance at 5% level; $^{***}$: significance at 1% level.

### Panel (B): Coefficient of corporate governance

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| Event window: | $[0,1]$ | $[-2,2]$ | $[-1,1]$ | $[0,5]$ | $[-2,-1]$ | $[2,5]$ |
| (i) All firms | $-6.147^{*}$ | $-2.071$ | $-3.336$ | $-0.668$ | $-2.517$ | $2.086$ |
| | $(3.186)$ | $(2.819)$ | $(3.012)$ | $(2.162)$ | $(3.441)$ | $(2.585)$ |
| (ii) Low TH subsample | $-1.314$ | $-3.222$ | $0.371$ | $-1.152$ | $-2.329$ | $-1.062$ |
| | $(4.560)$ | $(3.112)$ | $(3.644)$ | $(3.144)$ | $(4.848)$ | $(4.127)$ |
| (iii) Medium TH subsample | $-10.369$ | $0.615$ | $-5.264$ | $0.514$ | $-3.329$ | $5.969$ |
| | $(6.845)$ | $(7.730)$ | $(6.191)$ | $(6.251)$ | $(5.937)$ | $(7.351)$ |
| (iv) High TH subsample | $-14.061^{**}$ | $-4.066$ | $-8.857^{*}$ | $-2.099$ | $-1.522$ | $3.918$ |
| | $(6.545)$ | $(4.858)$ | $(4.543)$ | $(4.518)$ | $(8.658)$ | $(5.286)$ |

Note: Each cell shows the coefficient of the corporate governance measure, i.e., $\delta_1$ from the following regression: $r_{it} = \alpha_i + \beta_i r_{mt} + (\delta_0 + \delta_1 CG_i + \gamma Z_i) \times E_t + \varepsilon_{it}$, where $r_{it}$ and $r_{mt}$ are the stock return for firm $i$ and the market return in period $t$ (both expressed in percentage points), $E_t$ is a dummy indicating an event window (day $0$ = October 11, 2011), $CG_i$ is the corporate governance measure, and $Z_i$ includes log total assets, book leverage, social responsibility, and political connection measures, and $\varepsilon_{it}$ is the error term. The sample period spans from day $-267$ to day $123$. Standard errors are given by the maximum of robust standard errors, standard errors clustered on event date, and standard errors clustered on firms. $^{*}$: significance at 10% level; $^{**}$: significance at 5% level; $^{***}$: significance at 1% level.

**Figure 5: Cumulative Abnormal Returns Around the Event Date (Day 0 = October 11, 2011): Sampled U.K. Firms versus Matched French/German Firms**
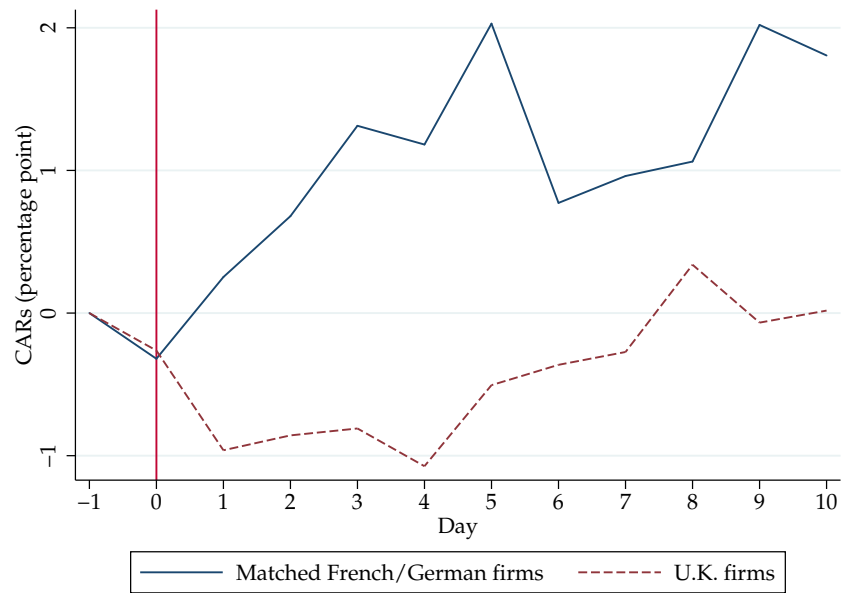
## Table 6: Market Reactions: Placebo Test

|  | (1) | (2) |
|---|---|---|
| Average abnormal return | 0.100 | $-0.140$ |
|  | (0.289) | (1.195) |
| Corporate governance |  | $-0.066$ |
|  |  | (3.161) |
| Log total assets |  | 0.004 |
|  |  | (0.121) |
| Book leverage |  | 0.432 |
|  |  | (1.004) |
| Social responsibility |  | $-0.000$ |
|  |  | (0.007) |
| Observations | 24062 | 24062 |
| Number of Firms | 63 | 63 |
| Number of Days | 391 | 391 |
| $R^2$ | 0.445 | 0.491 |

Note: This table reports the placebo test results for a sample of matched firms listed in French CAC and German DAX. Column (1) shows the coefficient of $\delta_0$ from the following regression: $r_{it} = \alpha_i + \beta_i r_{mt} + \delta_0 E_t + \varepsilon_{it}$ and Column (2) shows the coefficients of $\delta_0$, $\delta_1$, and $\gamma$ from the following regression: $r_{it} = \alpha_i + \beta_i r_{mt} + (\delta_0 + \delta_1 CG_i + \gamma Z_i) \times E_t + \varepsilon_{it}$, where $r_{it}$ and $r_{mt}$ are the stock return for firm $i$ and the market return in period $t$ (both expressed in percentage points), $E_t$ is a dummy indicating the event window $[0,1]$ (day 0 = October 11, 2011), $CG_i$ is the corporate governance measure, and $Z_i$ includes log total assets, book leverage, and social responsibility, and $\varepsilon_{it}$ is the error term. The sample period spans from day $-267$ to day 123. Standard errors are given by the maximum of robust standard errors, standard errors clustered on event date, and standard errors clustered on firms. *: significance at 10% level; **: significance at 5% level; ***: significance at 1% level.

# Appendix

## A. The Event and the Political Background

*A.1.   What is the event?*

ActionAid, an NGO in the U.K., released a report entitled "Addicted to Tax Havens" at the midnight of October 11, 2011 (our event date). This report listed the names and countries of all subsidiaries (over 30,000) owned by the FTSE 100 firms (as of July 26, 2011). ActionAid used three sources to compile the data, namely publicly-available company reports, inquiry from individual companies (those that did not disclose their subsidiaries in their reports), and company information specialist Duedil.[20]   Based on the list of tax havens (replicated in Table A) compiled by the Government Accountability Office of the U.S. Congress (with the addition of U.S. State of Delaware and the Netherlands),[21]   ActionAid identified 8,492 subsidiaries located in tax havens, around one fourth of the total number of subsidiaries.

**Table A: List of Tax Havens in the ActionAid Report**

| | | |
|---|---|---|
| Andorra | Guernsey | Monaco |
| Anguilla | Hong Kong | Netherlands |
| Antigua and Barbuda | Ireland | Netherlands Antilles |
| Aruba | Isle of Man | Panama |
| Bahamas | Jersey | Saint Kitts and Nevis |
| Bahrain | Jordan | Saint Lucia |
| Barbados | Latvia | Samoa |
| Bermuda | Lebanon | Seychelles |
| British Virgin Islands | Liberia | Singapore |
| Cayman Islands | Liechtenstein | Switzerland |
| Cook Islands | Luxembourg | U.S. (Delaware) |
| Costa Rica | Macao | U.S. Virgin Islands |
| Cyprus | Maldives | Vanuatu |
| Gibraltar | Malta | |
| Grenada | Mauritius | |

Almost all major U.K. media, including BBC, *The Independent*, *The Telegraph*, and *The Guardian*, covered this report on the same date.[22]   In the morning of the same day, 6 MPs sponsored an early day motion (EDM) submitted for debate in the U.K. House

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[20]The data set is downloadable at: https://docs.google.com/spreadsheet/ccc?key=0AjR-5aT01TRYdGJqRmZVLW9FX2Vqam0ySE1CZ0wyUkE.

[21]See p.12 of United States Government Accountability Office, "International Taxation: Large U.S. Corporations and Federal Contractors with Subsidiaries in Jurisdictions Listed as Tax Havens or Financial Privacy Jurisdictions," December 2008.

[22]See the news reports by BBC entitled "Tax havens:   Is the tide turning?"   at http://www.bbc.co.uk/news/magazine-15239196,   by *The Independent* entitled "British firms attacked for routine use of tax havens" at http://www.independent.co.uk/news/business/news/british-firms-attacked-for-routine-use-of--tax-havens-2368753.html, by *The Telegraph* entitled "Banks heav-

of Commons. A total of 32 MPs signed the EDM. On the next day, October 12, 2011, 6 other MPs sponsored another EDM, signed by 36 MPs. Both EDMs urge the tax authority, HMRC, to act quickly to address the seemingly serious tax avoidance activities carried out by the largest U.K. firms. The argument is that such practices undermine the ability of the British government to raise taxes, while the U.K. austerity program was affecting the people and the government.[23]

*A.2. Why would the event move the market?*

We view the release of the ActionAid report as a significant event. To the extent that the success of a report depends on its impact on the society, ActionAid had the incentive to release the report at the "right" time. We provide the political background around the time the ActionAid released its report. Some of the key events are summarized in Table B below.

**Table B: Major Events Surrounding the Event Date**

| Date | Event |
| --- | --- |
| 2001 to 2011 | Increasing government budget deficit in the U.K. |
| 2010 | Austerity programs in the U.K. |
| 2010 | Various anti-austerity protests in the U.K., Greece, and Spain |
| June 2010 | Scandal of the British Permanent Secretary for Tax at HMRC |
| March 23, 2011 | U.K. Treasury's report on "Tackling Tax Avoidance" |
| September 17, 2011 | Occupy Wall Street in the U.S. |
| October 11, 2011 (Event date) | ActionAid report; Scandal of Goldman Sachs |
| October 11 and 12, 2011 | 12 Members of Parliament sponsored two early day motions, each signed by more than 30 MPs, urging HMRC to tackle tax avoidance by big corporations with reference to the ActionAid report |
| October 15, 2011 | Occupy London |
| October 26, 2011 | OECD's report on "The Era of Bank Secrecy is Over" |

One may argue that if there has been a series of events leading to the investors to expect that the firms' cost of using tax havens have been elevating, the report would not add much to such an expectation. If this logic follows, it would work against us by making it harder for us to find any significant effects in our event study.

**Budget deficit in the U.K.** Figure A shows that the U.K. budget deficit had been increasing: The fiscal budget had been in the red since 2001, with increasing net public

iest users of low-tax territories" at http://www.telegraph.co.uk/finance/newsbysector/banksandfinance/8818974/Banks-heaviest-users-of-low-tax-territories.html, and *The Guardian* entitled "Quarter of FTSE 100 subsidiaries located in tax havens" at http://www.guardian.co.uk/business/2011/oct/11/ftse-100-subsidiaries-tax-havens.

[23]Details of the motions can be found at http://www.parliament.uk/edm/2010-12/2242 and http://www.parliament.uk/edm/2010-12/2232

borrowing year after year; the net debt as a percentage of the U.K GDP (including financial interventions) reached 151% in 2008, and levelled off at 156.4% in 2009, 150.9% in 2010, and 144.9% in 2011.[24] In an attempt to address this issue, in 2010, the Conservative and Liberal Democrat coalition government initiated an extensive austerity program involving a series of substantial reductions in public spending.

**Figure A: U.K. Fiscal Budget**
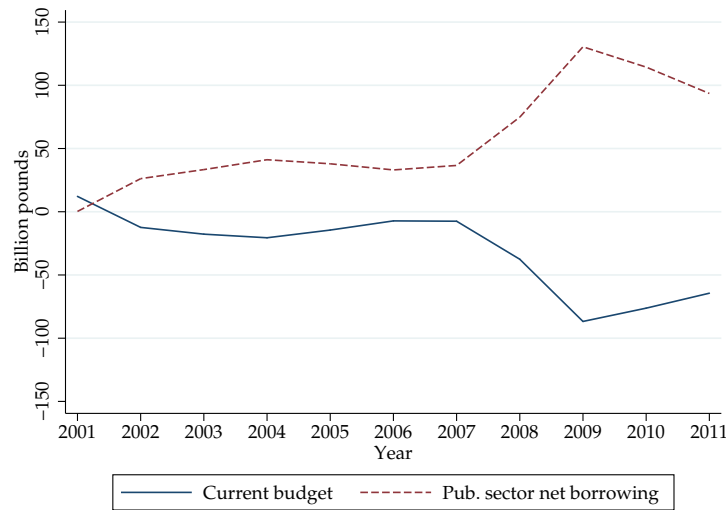


(a) Current budget and public sector net borrowing, including financial intervention
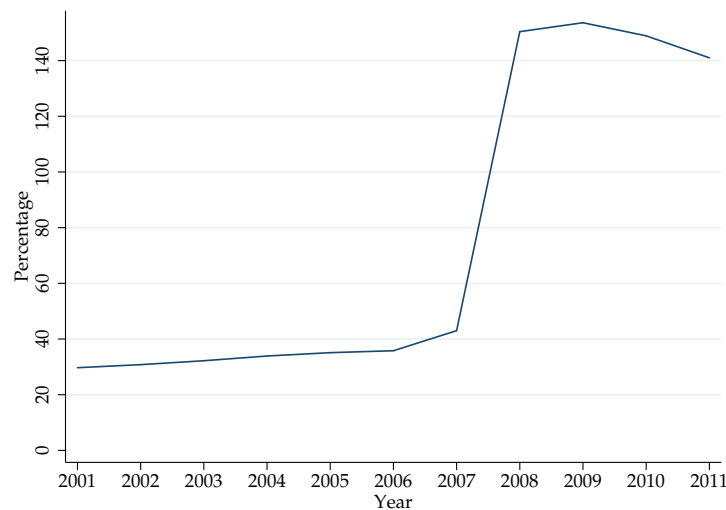


(b) National debt as a percentage of GDP, including financial intervention

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[24]Data come from *The Guardian* Data at http://www.guardian.co.uk/data.

**Public hatred toward tax-avoiding firms**   The public hatred towards large corporations that avoid tax, either legally or illegally, peaked during that period, which triggered large scale protests in the U.K. and elsewhere. In 2010, various anti-austerity protests occurred in Greece and Spain. In the U.K., tuition hike and education expenses cut were common subjects in the news around the time. On November 10, 2010, a series of student protests against many austerity plans of the British government was launched. These protests in Europe were antecedents for the "Occupy Wall Street" protest in the U.S., which started on September 17, 2011, about a month prior to the the release of the ActionAid report.

Four days after the ActionAid report was released, the "Occupy London" protest started on October 15, 2011. It was a high-profile protest and demonstration against economic inequality. On the same day, *The Economist* published an article entitled "Tax Havens - Trouble Island: Public Anger and Shareholder Unease Threaten Tax Havens' Tranquility," which described the heavy use of tax havens among large corporations.[25] Occupy London peaked in October and November 2011. Behind many of the related protests centered around London was an organization called U.K. Uncut, which organized protests aiming at exposing the irony of the austerity programs while large corporations were avoiding tax. Their Facebook account and website detailed their actions and contained the associated photo/video galleries and many other statements they made on the government and the large corporations.[26]

**Tax scandals of HMRC**   The U.K. tax authority, HMRC, was suspected to have an unusual incentive to take noticeable actions at the time. HMRC has been plagued with external public hatred toward corporate tax avoidance and internal scandals. The ActionAid report was released amid various tax scandals about Dave Hartnett. In 2010, Dave Hartnett, the then Permanent Secretary for Tax at HMRC, was named by the Bureau of Investigative Journalism, a research group at City University London, as the most "wined and dined" civil servant in Britain.[27] He was reported to have been treated to corporate hospitality 107 times over a period of three years. Companies that entertained him included Goldman Sachs, JP Morgan, Ernst & Young, KPMG, PriceWaterhouse Coopers, and Deloitte. Around the time the ActionAid report was released, he was alleged to have been involved in two major events related to tax avoidance: the so-called "sweetheart" deals between HMRC and Vodafone, one of the FTSE 100 firms, and another deal with Goldman Sachs.[28]

According to a news article by *The Telegraph*, "Goldman Sachs, among other companies, used off-shore companies to pay directors and bonuses in dividends rather than

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[25]See http://www.economist.com/node/21532264.

[26]For example, on October 13, 2011, the U.K. Uncut launched a Big Rip Off Day Action. Exactly 3 years before that day, on October 13, 2008, the British government was forced to step in and take control of Royal Bank of Scotland (one of the FTSE 100 firms). U.K. Uncut claimed, "While the government forces painful 'austerity' cuts on us, the banksters' greed continues. RBS bankers paid themselves 950 million in bonuses this year!" (See http://www.ukuncut.org.uk/actions/697.)

[27]See the "Top Ten: Civil Servants" announced by the Bureau of Investigative Journalism at http://www.thebureauinvestigates.com/2010/06/16/top-ten-civil-servants/.

[28]See, for example, the news article by *The Telegraph* entitled "The taxman's corporate controversies" on October 12, 2011 at http://www.telegraph.co.uk/finance/newsbysector/industry/8822500/The-taxmans-corporate-controversies.html.

income. In 2005, HMRC showed the schemes were illegal but Goldman refused to settle. By 2010, according to a public judgment, the unpaid bill was £40m - £10m in interest. Recent reports claim Goldman has now settled with HMRC but did not pay the interest bill. HMRC said in a statement it "does not do 'sweetheart' deals."[29]

**U.K. government's plan to tackle tax avoidance**   In March 2011, the U.K. Treasury published a report entitled "Tackling Tax Avoidance."[30] The report states that the U.K. government is committed to tackling the issue. It also outlines in detail the roles played by HMRC.[31] Continual efforts have been made by the U.K. Treasury and HMRC as shown in the General Anti-Abuse Rule, which "could deter and counter tax avoidance, whilst providing certainty, retaining a tax regime that is attractive to businesses, and minimizing costs for businesses and HMRC."[32]

Since 2009, the HMRC has been issuing an annual report entitled "Measuring Tax Gaps." The report calculated, among other figures, the gap between the collected tax and the amount HMRC expects to collect from large corporations. The 2011 report was released on September 21, 2011. In particular, the percentage tax gap (defined as the tax gap as a proportion of the theoretical liability) for corporation tax increased from 10.3% in 2008-2009 to 11.7% in 2009-2010 (HMRC, 2011, p.6).

Lesley Strathie, the then head of HMRC, was very ill in 2011. She eventually stepped down as the chief executive from HMRC on November 9, 2011 and died on January 14, 2012. A reasonable assumption is that the ActionAid report was released at a time when people expected a new chief executive of HMRC would soon replace Lesley Strathie, and the new head might take more proactive actions to tackle tax avoidance.

**Potential boycotts by consumers**   Consumers are also likely to take actions by boycotting these firms. For example, an ethical consumer movement group in the U.K. called Ethical Consumer maintains a "boycott list," consisting of firms that are considered operating in an unethical manner, including tax avoidance. BP, an oil company in our sam-

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[29]See the news article entitled "Goldman Sachs 'escaped paying 20m National Insurance bill in HMRC deal'" on October 11, 2011 at http://www.telegraph.co.uk/finance/newsbysector/banksandfinance/8821083/Goldman-Sachs-escaped-paying-20m-National-Insurance-bill-in-HMRC-deal.html.

[30]See http://www.hm-treasury.gov.uk/2011budget_taxavoidance.htm.

[31]At the international level, various organizations are also involved in tackling tax avoidance. For example, since the 1990s, the Organisation for Economic Co-operation and Development (OECD) has been trying to urge tax havens to sign information exchange treaties, with an aim to eradicate bank secrecy that facilitate the tax avoidance activities of individuals and corporations. A turning point came in April 2009. As Johannesen and Zucman (2014) describe, "The OECD specified that each tax haven should conclude at least 12 treaties to be in compliance and drew up a list of 42 non-compliant havens. The G20 threatened to impose economic sanctions on non-compliant havens. In just five days, all havens committed to signing 12 treaties and the G20 declared the era of bank secrecy over (G20, 2009)." On October 26, 2011, the same month the ActionAid report was released, the OECD released a report entitled "The Era of Bank Secrecy is Over: The G20/OECD Process is Delivering Results." (See the report at http://www.oecd.org/tax/exchange-of-tax-information/48996146.pdf.) Meanwhile in the U.S., the Foreign Account Tax Compliance Act was enacted in 2010, specifically tackling non-compliance by U.S. taxpayers using foreign accounts.

[32]See http://www.hm-treasury.gov.uk/tax_avoidance_gaar.htm.

ple, is also among the firms in their boycott list.[33] Besides, according to a BBC report in 2012, U.K. Uncut protested against Starbucks for tax avoidance and boycotted the company. The company only reported taxable profit once in 15 years in the U.K. In response to public criticisms, Starbucks agreed to pay "a significant amount of tax during 2013 and 2014 regardless of whether the company is profitable during these years."[34] Apart from consumer groups and organizations, individual consumers may also boycott these tax-avoiding firms.[35] Therefore, when the ActionAid report revealed the tax avoidance activities of the FTSE firms, consumers may boycott these firms, resulting in a loss of reputation.

Against the above background, we argue that the release of the ActionAid report would trigger the investors to expect a variety of possible reactions of the government and the public toward these firms. In contrast, a specific bill or an act may not have done so for three reasons. First, any bill or act can be lobbied, especially its details (Zingales, 2004).[36] Second, its effectiveness depends on the enforcement. Third, the lengthy drafting and passing of any bill makes the exact day 0 of the "event" debatable.

*A.3.    Why would corporate governance matter in the U.K. context?*

Desai and Dharmapala (2009) find that in the U.S., corporate governance affects the relation between firm value and its tax avoidance activities. At least one real business practice used among the U.K. firms shows that corporate governance matters in the U.K. too.

HMRC had investigated a dubious business strategy called offshore employment benefit trusts (EBTs). In the past, companies were allowed to use EBTs to pay top corporate executives their bonuses. EBTs, together with haven affiliates, can help tunnel funds to the managers and save them from paying taxes. However, this obscure practice also involves layers of transactions. In the end, it is hard for outsiders and shareholders to evaluate whether a firm is paying a reasonable amount of money to the managers via EBTs. The many clever ways of avoiding taxes using EBTs made HMRC rule EBTs as illegal in 2005.[37] There is, of course, no guarantee that apart from EBTs, there are no other business practices managers can use with the help of offshore tax havens to divert resources.

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[33]See http://www.ethicalconsumer.org/boycotts/boycottslist.aspx.

[34]See the report entitled "UK Uncut protests over Starbucks 'tax avoidance'" on December 8, 2012 at http://www.bbc.co.uk/news/uk-20650945.

[35]For example, in a news report by BBC, a consumer in the U.K. responded to the tax-avoiding activities of Google, Starbucks, and Amazon by uninstalling the Google browser, not buying coffee from Starbucks, and not using Amazon to do online shopping. See the report entitled "Google, Amazon, Starbucks: The rise of 'tax shaming'" on May 21, 2013 at http://www.bbc.co.uk/news/magazine-20560359.

[36]Firms may also actively lobby and sneak in small details in a bill that would be hard to be observed, a concern raised in Zingales (2012, p. 189), "any but the simplest proposal would be massaged so heavily in Congress that the outcome would be ineffective or worse than the status quo. In writing legislation, the devil is invariably in the details. The details here are just too subtle to become a public political issue. Lobbyists gain a tremendous advantage by understanding and maneuvering the details in legislation to the advantage of their clients."

[37]HMRC indeed had taken other actions as well to combat tax avoidance. The following two reports show the actions they have taken: http://cdn.hm-treasury.gov.uk/2011budget_taxavoidance.pdf and http://www.hmrc.gov.uk/large-businesses/prog-approach.htm.

Using tax havens and obscure layered transactions allows firms to compensate and therefore motivate the management without a substantial tax burden. However, if these practices are not subject to enough checks and balances (e.g., by good corporate governance measures), the resulting managerial diversion can reduce the firm value contributed by the use of tax havens.

# B.  Variable definition

The definitions of the key variables used in the empirical analysis are as follows.

**Table C: Variable definition**

| Variable | Definition | Source |
|---|---|---|
| Corporate governance | The measure is based on 41 firm-level governance attributes covering four broad subcategories:<br><br>1. Board (24 attributes): They capture the aspects of the board of directors such as board independence, composition of committees, size, transparency, and how the board conducts its work.<br><br>2. Audit (three attributes): They include questions on the independence of the audit committee and the role of auditors.<br><br>3. Anti-takeover provisions (six attributes): They are drawn from the firms charter and by-laws and refer to dual-class structure, role of shareholders, poison pills, and blank check preferred.<br><br>4. Compensation and ownership (eight attributes): They deal with executive and director compensation on issues related to options, stock ownership and loans, and how compensation is set and monitored. | Gov41 index from Aggarwal, Erel, Ferreira, and Matos (2011) |
| Social responsibility | It measures a company's capacity to generate trust and loyalty with its workforce, customers and society, through its use of best management practices. It is a reflection of the company's reputation and health of its license to operate, which are key factors in determining its ability to generate long term shareholder value | Score on the Social Responsibility pillar from ASSET4 |
| Political connection | A dummy equal to 1 if the firms' top executives (including Chairman and executive directors) are connected to Members of Parliament, ministers, or top government officials. | BvD Orbis (for top executives names) |
| Log total assets | Total assets in natural logarithm. | Compustat Global |
| Book leverage | Total liabilities divided by total assets. | Compustat Global |

# C.  Total firm value contributed by tax havens: An extrapolation

Suppose a firm's demand for tax havens can be represented by the linear demand curve in Figure B. $C_0$ and $T_0$ ($C_1$ and $T_1$) are the cost of using tax havens and the share of subsidiaries located in tax havens respectively right before (after) the release of ActionAid's report on October 11, 2011. The total firm value contributed by tax havens may be estimated by the area $AC_0C$, which is the firm's total willingness to use tax havens.

**Figure B: Demand for tax havens**
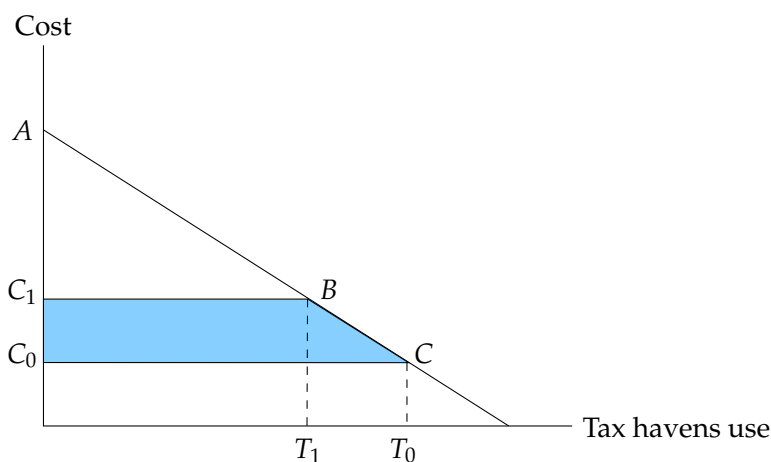


Let $A_1$ denote the area $AC_1B$ and $A_0$ denote the area $AC_0C$. Then by simple geometry, we have:

$$\frac{A_1}{A_0} = \frac{T_1^2}{T_0^2}.$$

ActionAid (2011) reports that $T_0 = 0.235$ (for the firms in our sample); we use ActionAid's (2013) follow-up report to approximate $T_1$, which is about 0.233. Our event study suggests that the shaded region, $BC_1C_0C$, corresponds to the reduction of £532 million in firm value. Therefore, $A_0 = A_1 + 532$. Substituting these numbers into the above equation, we obtain $A_1 \approx 30856$. Thus, the area of $AC_0C$ is about £31388 million or £31 billion.