Tax Avoidance through Cross-Border Mergers and Acquisitions*

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Abstract

We investigate 13,307 cross-border, tax-haven mergers and acquisitions (M&A) from 1990 to 2017, totaling $4.1 trillion in deal value, or about 30% of total cross-border M&A volume. $2.4 of the $4.1 trillion is beyond what is predicted based on a gravity model with economic fundamentals. Tax-haven M&A result in $31.6 billion in recurring annual tax avoidance. To illustrate the magnitude, for a US firm with no prior cross-border M&A history, buying an Irish firm worth 5% of its total assets would result in an expected decline in its effective tax rate of 3.56 percentage points. For identification, we use a change in US tax law in 2004. Following haven acquisitions, firms are more likely to relocate their headquarters to havens. Our results document that tax avoidance through havens is a significant determinant of cross-border M&A.

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1 Introduction

The intersection of tax havens and cross-border M&A is often considered a niche topic associated only with the so-called (M&A) inversions, such as the 130 M&A inversions in Col et al. (2020) or the 35 in Babkin et al. (2017). We overturn this conventional wisdom by documenting that there are 13,307 cross-border, tax-haven M&A (deals where the acquiror or target resides in a tax haven) from 1990 to 2017, totaling $4.1 trillion in deal value. This figure stands in contrast to the $10.2 trillion in non-haven, cross-border M&A deal value over the same time frame. We find that the abnormal cross-border, tax-haven M&A activity amounts to $2.4 trillion beyond what is predicted based on economic fundamentals. To more meaningfully interpret the results, we distinguish between the five large havens (Hong Kong, Ireland, the Netherlands, Singapore, and Switzerland) and the remaining small havens (e.g., Bermuda and the Cayman Islands),[1] and estimate the tax avoidance resulting from cross-border, haven M&A. The $1.0 trillion in small-haven M&A results in $8.6 billion in annual recurring tax avoidance, and the $3.1 trillion in large-haven M&A results in $23.0 billion in annual recurring tax avoidance. For comparison, the $10.2 trillion in non-haven, cross-border M&A results in $33.9 billion in annual recurring tax avoidance.

To quantify the extent to which cross-border M&A activity in havens is "abnormal," we estimate a gravity model using the methodology advocated in Silva and Tenreyro (2006). We thus follow Portes and Rey (2005) in using a gravity model to study a financial outcome variable. The unit of observation is an acquiror- and target-country pair in a given year, and the dependent variable is the logarithm of M&A deal value. Country pairs with a large (small) haven acquiror have 112% (508%) more deal value than predicted based on their economic fundamentals, and country pairs with a large (small) haven target have 66% (344%) more deal value. The corresponding total abnormal dollar values are $1,535.6 and

[1]The difference between the GDP of the fifth and sixth largest havens is $273 billion. This distinction is independent of a country's importance in our sample and its level of taxation. We define a country as a tax haven according to Dharmapala and Hines (2009), and then add the Netherlands given its importance as documented in more recent studies (Damgaard et al., 2019; Tørsløv et al., 2020).

$826.2 billion for large and small havens, respectively, resulting in a total of $2.4 trillion. Our methodology classifies 57.2% of cross-border M&A involving tax havens as abnormal, with ratios ranging from 29.7% for Switzerland to 97.3% for the British Virgin Islands.

We estimate the tax avoidance from haven purchases (deals with a haven target) using a firm-year panel. The dependent variable is the cash effective tax rate (ETR). Since the regression equation includes year and firm fixed effects, our estimates are identified by comparing the same firm over time. To isolate tax avoidance, we control for the mechanical effect on the acquiror's ETR that results from combining two entities with different tax rates. Haven purchases are associated with significant tax savings for the acquiror. For example, for a US firm with no prior cross-border M&A history during the sample period, buying an Irish firm worth 5% of its total assets would result in an expected decline in its cash ETR of 3.56 percentage points. Aggregating across all firms, cross-border, *haven* purchases result in $18.7 billion in annual tax avoidance. Cross-border, *non-haven* purchases also result in tax savings, since there is greater scope for tax avoidance in a more global firm. The aggregate annual tax avoidance from non-haven purchases is $33.9 billion. Asset building (deals with a haven acquiror and non-haven target) results in further tax avoidance of $12.9 billion per year. Therefore, tax-haven M&A results in $31.6 billion in annual tax avoidance, while the total annual tax avoidance from cross-border M&A is $65.5 billion.

We validate our tax avoidance estimates by correlating the projected tax savings from a deal with the stock market's response to that deal. Projected tax savings equivalent to a 1 percentage point drop in the acquiror's ETR are associated with a 0.20 percentage points higher cumulative announcement return in an M&A event study.

Next, we document that firms are more likely to relocate their headquarters following small- and large-haven acquisitions. For instance, for a firm with no prior cross-border M&A history in the sample period, buying a large-haven firm worth 5% of its total assets results in a 0.96 percentage point increase in the likelihood that it relocates its headquarters during the same time period. Relative to the unconditional relocation likelihood of 0.16%,

this represents an increase of 593%. Furthermore, the same large-haven deal increases the likelihood of relocating to a *tax haven* by 0.81 percentage points, which, relative to the unconditional haven relocation likelihood of 0.03%, represents a 2,501% increase. Since the measures of M&A accumulate all prior deals during the sample period, these increases in likelihood also apply to each future time period after the deal, provided the firm remains in its existing country of headquarters.

For identification, we exploit variation in the incentives for US firms to engage in haven purchases. Before 2004, if a US firm wanted to move its tax residence to a foreign country, it could do so without having any operations in that country. Since 2004, firms have had to demonstrate substantial operations in the country in which they seek incorporation or merge with a sufficiently large foreign company. This change made renouncing the US tax jurisdiction more difficult for US firms, since they would now have to acquire large or numerous foreign firms if they wanted to relocate via cross-border M&A. M&A activity with US firms as buyers and large-haven firms as targets increases after 2004, supporting our interpretation that cross-border M&A involving havens is pursued for tax avoidance motives.

A concern is that haven M&A might primarily involve shell companies. The mean deal value in a cross-border deal when the target is in a large (small) haven is $316 ($377) million, with a total of $1.7 trillion in haven purchases, implying that firms with real operations are acquired. However, one could still worry that these firms, while tax resident in a haven, have no real operations there. All of the results are robust to excluding acquirors and targets that are tax resident in a haven but not headquartered in a haven; total abnormal deal value falls from $2.4 to $2.1 trillion, and tax savings from haven M&A fall from $31.6 to $30.3 billion.

Relatedly, using data from Bennedsen and Zeume (2018), we control for firms' haven subsidiaries (including shell companies) when estimating the tax avoidance from haven purchases. While having a subsidiary in a haven significantly lowers a firm's cash ETR by 3.54 percentage points, our panel estimates of the tax savings from haven M&A are almost unaffected by the addition of this control variable. This finding not only shows that our

results are robust to controlling for haven subsidiaries (and thus also shell companies), but also supports our point that haven M&A generates tax savings over and above those that can be achieved by opening shell companies in havens.

A related concern is that intangible assets could be moved to havens and then sold in cross-border deals, inflating abnormal, haven M&A. This concern only applies to cross-border asset sales where the target is in a haven, and not to deals where an entire haven firm is sold. We manually check these deals and remove deals involving intangible assets from the sample. Total abnormal deal value falls from $2.4 to $2.2 trillion.

In addition, we argue that cross-border, haven M&A is primarily motivated by tax avoidance, and not other factors, such as legal and regulatory constraints. Concerns about the pursuit of anonymity and secrecy via tax havens are unfounded: tax avoidance is legal, so multinationals do not use havens for this purpose. Moreover, we would not have obtained the transaction-level data for this paper otherwise. Our results also cannot be explained by executives seeking worse corporate governance in havens. Furthermore, the results are robust to the inclusion of numerous controls, including capital account openness and bilateral tax treaties.

We contribute to four literatures. First, we contribute to the literature on tax havens (Hines and Rice, 1994; Desai et al., 2006; Alstadsæter et al., 2018). Our paper is the first to document that havens affect the actual ownership of assets on a large scale and not just the ownership of assets "on paper." Relatedly, Suárez Serrato (2019) studies the real effect on US firms of limiting profit shifting to Puerto Rico, while our paper has a global sample of firms and focuses on real investment in tax havens.

Second, we add to a nascent literature on abnormal capital flows associated with havens by documenting that havens have $2.4 trillion in abnormal M&A deal value. Coppola et al. (2021) restate the abnormally high portfolio investment positions of havens based on a "nationality" concept (which is different from tax residence). Bertaut et al. (2018) and Damgaard et al. (2019) also document large distortions in official statistics for capital flows.

Third, we contribute to the literature on tax avoidance by documenting that cross-border, haven M&A results in $31.6 billion in annual tax avoidance. Cross-border, non-haven M&A results in an additional $33.9 billion in annual tax avoidance. Huizinga and Voget (2009) investigate how taxes affect where the combined entity is headquartered after an M&A. Barrios et al. (2012) study how taxes influence in which country a firm's new foreign subsidiary is located. Voget (2011) analyzes how a firm's tax environment impacts its likelihood of being acquired.

Fourth, we add to the literature on the determinants of cross-border M&A (Rossi and Volpin, 2004; Di Giovanni, 2005; Erel et al., 2012; Ahern et al., 2015) by documenting that tax avoidance through havens is a significant determinant of cross-border M&A. With the exception of Di Giovanni (2005), the cross-border M&A literature ignores the M&A activity of small havens. Ignoring these transactions implies missing about 8% of the $14 trillion in total cross-border M&A deal value.

2 How can Tax-Haven M&A Result in Tax Avoidance?

Tax-haven M&A can enable tax avoidance in two distinct ways depending on whether the acquiror or the target is in a tax haven.

Asset Building. When the acquiror is in a tax haven, we refer to these deals as "asset building," since a firm in a tax haven has an incentive to acquire firms in non-havens to scale up its asset base exposed to the lower tax rate. See Appendix H.1 for examples of asset building deals. There are two reasons why the location of the firm's parent matters for tax purposes. First, the tax residence of the parent determines whether the firm is subject to controlled foreign corporation (CFC) rules, which constrain a firm's ability to shift profits. Second, the rate of double taxation on foreign profits varies across countries, including countries with territorial as well as worldwide systems of taxation. Voget (2011) finds empirical support that firms account for both of these factors in assessing the attractiveness of different parent locations. Since many tax havens do not have CFC rules

(PwC, 2017), having a tax-haven parent makes it easier to shift profits. Barrios et al. (2012) documents that parent country taxation affects the location decisions for subsidiaries. Moreover, since tax havens generally have territorial tax systems or worldwide tax systems with low corporate income tax rates, the rate of double taxation on foreign-sourced income is low. This makes tax havens an attractive place for a company's tax residence, and explains why non-haven firms can be worth more from a tax perspective as subsidiaries of tax-haven firms than as standalone companies.

The evidence in Voget (2011) and Barrios et al. (2012) implies that there are benefits to moving a firm's tax residence from a country with a territorial or worldwide system of taxation to a haven. There are numerous examples of firms relocating out of the US (which had a worldwide system of taxation prior to 2018), such as Actavis, which is described in the next paragraph. In addition, firms also choose to relocate their tax residence from countries with territorial systems of taxation to tax havens: Frontline moved from Sweden to Bermuda in 1997, Tyco International moved from Switzerland to Ireland in 2014, and Aptiv moved from the UK to Ireland in 2018.[2]

Haven purchases. In contrast, when the target is in a tax haven, we refer to these deals as "haven purchases." See Appendix H.2 for examples of haven purchases. Firms in non-havens have an incentive to buy tax-haven firms to establish a presence in a tax haven. This facilitates other tax-avoidance strategies, such as profit shifting (Huizinga et al., 2008; Dischinger and Riedel, 2011; Karkinsky and Riedel, 2012). Moreover, the scope for tax avoidance is higher for subsidiaries with real operations as opposed to mere shell companies, since this, for instance, facilitates the manipulation of transfer pricing if actual intra-firm trade is taking place between the haven and non-haven operations of a firm (Bartelsman and

[2]Frontline Ltd (2011): "Form 20-F for the fiscal year ended December 31, 2010," April 4, `https://www.sec.gov/Archives/edgar/data/0000913290/000091957411002596/d1184224_20-f.htm` (accessed June 10, 2021). Tyco International PLC (2015): "Form 10-K for the fiscal year ended September 25, 2015," November 13, `https://www.sec.gov/Archives/edgar/data/833444/000083344415000091/fy1510-k.htm` (accessed June 10, 2021). Aptiv PLC (2018): "Form 10-Q for the quarterly period ended March 31, 2018," May 2, `https://www.sec.gov/Archives/edgar/data/0001521332/000152133218000025/aptv331201810-q.htm` (accessed June 10, 2021).

Beetsma, 2003). Another strategy involves relocating the firm's tax residence to the haven. For example, in 2013, Actavis (a US company) acquired Warner Chilcott (an Irish company), which allowed Actavis to relocate its tax residence to Ireland. As a result, it anticipated a drop in its ETR from 28% to 17% following the acquisition.[3]

Firms resident in countries with worldwide systems of taxation and in countries with territorial tax systems have incentives to engage in haven purchases. Firms resident in countries with worldwide systems of taxation can use haven purchases to shift profits to low tax jurisdictions, pay low cash effective tax rates now, and park profits there to postpone paying the worldwide tax in their home country. In addition, as previously mentioned, firms in countries with worldwide systems of taxation and high tax rates can use M&A inversions, a subset of haven purchases, to permanently move their tax residence to a low-tax jurisdiction. Firms in a country with a territorial tax system have an incentive to engage in haven purchases so their profits occur in the jurisdictions with the lowest tax rates.

Comparision of Asset Building and Haven Purchases

With asset building deals, the newly acquired assets can benefit from the lower ETR of the new parent company–a potentially large reduction in the ETR that only applies to the newly acquired assets. In contrast, haven purchases allow the entire pre-M&A aquiring firm to benefit from a lower ETR through the establishment of a connection in a haven. While the reduction in the ETR is typically lower compared to asset building, the savings apply to the entire acquirer's pre-M&A assets (note that acquirors are generally much larger than targets).

An implication of the different incentives faced by firms in territorial and worldwide tax systems is that firms in worldwide systems have a greater incentive to shift their entire tax residence abroad, while firms in territorial systems have a greater incentive to do haven purchases that enable profit shifting only. This argument is in line with evidence by Markle (2016), who shows that firms in territorial tax systems engage in more income shifting than

[3]The Wall Street Journal (2013): "Actavis to Buy Warner Chilcott in $5 Billion Deal," May 20, `https://www.wsj.com/articles/SB10001424127887324102604578494731073630120` (accessed November 17, 2019).

firms in worldwide tax systems. Relatedly, Tørsløv et al. (2020) estimate that close to 40% of multinational profits are shifted to tax havens globally.

3 Data

Tax Residence. Since we are interested in investigating tax avoidance, the appropriate measure of a firm's location is its tax residence. Tax residence is the "tax citizenship" of the global legal parent entity of a company, and it depends on the location of the firm's headquarters and incorporation. There are two challenges in accurately measuring tax residence. First, it is not reported in commercial databases, and firms typically do not disclose it in their annual reports or regulatory filings. Second, to determine a firm's tax residence when it is incorporated and headquartered in different countries, one needs to account for the unilateral tax laws in each country, as well as the bilateral treaties between countries that stipulate tie-breaking provisions in the event the unilateral application of each country's laws renders the firm a dual resident. We overcome these challenges by using the tax residence algorithm of Meier and Smith (2021), which takes a firm's incorporation and headquarters as inputs, and provides the firm's tax residence as the output based on the laws and bilateral tax treaties of 150 countries.

M&A Data. We obtain M&A data from SDC Platinum. The sample includes deals announced between 1990 and 2017 and subsequently completed. We exclude self-tenders, repurchases, recapitalizations, spin-offs, split-offs, equity issuances, and block purchases. As in Meier and Servaes (2019), we further exclude deals that involve a mutual company, government entity, or supranational organization (e.g., the World Bank). In addition, we exclude deals where the buyer or seller nation is listed as "Multi-National." This typically occurs when the acquiror or target company is listed as "Investor Group." We use the GDP price index from the Bureau of Economic Analysis to convert deal value to 2017 USD, and remove observations with missing deal value or deal value below $1 million. The sample includes deals where an entire firm is acquired, as well as deals where assets, a subsidiary,

or a division of another firm are acquired. Examples of the latter types include deals where a pharmaceutical company buys the generic drug division of another company, or where a retailer buys 100 stores from another retailer.[4] For acquisitions of entire firms, we further require that at least 50% of the target's shares are acquired as part of the transaction or as part of several transactions over the sample period. We exclude deals where the acquiror or target is in the utilities (SIC 4900-4999) or defense (SIC 3760-3769, 3795, and 3480-3489) industries, since many countries have nationality-based ownership restrictions for these industries. Lastly, we remove countries with less than $50 million in aggregate deal value on the acquiror or target side. The final dataset has 173,027 deals from 181 countries,[5] 52,175 of which are cross-border. Intra-country deals are included for comparison only, and are not included in any of the regressions.

For deals flagged as reverse acquisitions in SDC, we classify the acquiror as the target and the target as the acquiror. In this way, the acquiror is always the economic acquiror (the larger company), as opposed to the legal or accounting acquiror.[6]

Country-level Data. We use the CEPII GeoDist Database for country-pair data, which includes geographic distance, a same-country dummy, a previous colonial-relationship dummy, and a common official language dummy. GDP and GDP per capita are from the World Development Indicators (WDI) when available. Otherwise we use estimates from the United Nations (UN). We fill in these variables for additional countries using methods described in Appendix A.1. Since Ireland's GDP is highly volatile and does not reflect

[4]Unless otherwise stated, the acquiror refers to what SDC considers the acquiror's ultimate parent, and the target refers to the direct target. For example, if Disney Parks, Experiences and Products, a subsidiary of Disney and the owner of the Walt Disney World, purchased Universal Parks and Resorts, then Disney would be the acquiror and Universal Parks and Resorts the target. Had we instead considered the target to be the target's ultimate parent, then the target in this deal would be Comcast. Since Disney is not buying Comcast, but a subsidiary of a subsidiary (NBCUniversal) of Comcast, the appropriate target should be the direct target (Universal Parks and Resorts).

[5]We use the terms nation and country broadly to include both sovereign nations and dependent territories and regions. In short, if SDC considers a geographical entity a country, then we do as well.

[6]If the smaller company in an M&A transaction is listed as the acquiror, then SDC will mark the deal as a reverse acquisition. Reverse acquisitions typically occur when a firm wants the smaller company to be the parent of the combined firm. This is often the case when the smaller firm is in a tax-favored location. If a deal is considered a reverse acquisition in the SEC filings, then the combined firm's financial performance will be compared to that of the larger firm for periods preceding the acquisition.

domestic economic activity due to tax avoidance by US multinationals (Lane, 2017), we use GNI instead of GDP for Ireland (see Appendix A.2 for details). Lastly, we obtain international trade data from the UN, legal origin data used in La Porta et al. (2008) from La Porta's website, and data on corruption from the World Governance Indicators (WGI).

Tax Havens. We start with the list of tax havens from Dharmapala and Hines (2009), and then add the Netherlands given its importance as documented in more recent studies (Damgaard et al., 2019; Tørsløv et al., 2020). Next, we divide the tax havens into large and small havens, thereby approximating whether a haven has a quantitatively important amount of economic activity beyond its haven activities. When sorted by their GDP, the gap between the fifth and sixth largest haven is $273 billion. As such, we define the five largest (Hong Kong, Ireland, the Netherlands, Singapore, and Switzerland) as large havens and the remaining as small havens. Among the 181 countries included in the M&A dataset, the total GDP for the five large havens is $2,446 billion, and the total GDP for the 33 small havens is $435 billion as of 2017. The distinction between large and small havens is therefore independent of a country's importance in our sample and its level of taxation. Given these stark differences in economic activity among the tax havens, separating them in this way allows for a more meaningful interpretation of the results.

Firm-Level Data. Firm-level financial statement data is from Compustat North America (henceforth Compustat) and Compustat Global. Since identifying information in these databases is current, meaning that only the latest data is available and back-filled in all prior years, we obtain the historical firm name, nation of headquarters, and nation of incorporation for North American firms from the Names File of Compustat Snapshot (henceforth Snapshot). There is no global version of Snapshot, so we use the current identifying information from Compustat Global for firms without data in Snapshot. After running some initial analyses on this data, we noticed that for haven resident firms, and particularly for those that relocated during the sample period, the headquarters and incorporation listed in Compustat Global and Snapshot was sometimes wrong. To mitigate this issue, we hand-collect

incorporation and headquarters data for 114 firms. As a starting point, we checked the 83 firms that inverted as indicated in a Bloomberg inversion tracker.[7] We then checked additional firms to ensure the accuracy of the examples listed in Appendix H.1 and the results of the headquarters relocation analysis in Section 9.

A gvkey (the unique firm identifier in all Compustat databases) is assigned to as many acquirors and targets in SDC as possible in the following manner: first, we merge SDC with Compustat by cusip, then with Compustat Global by sedol. Next, we perform a name match, first with Snapshot, then with Compustat Global. After all perfect matches are made, we manually match names for deals over $1 billion with the highest matched score using the reclink command in Stata. Finally, we use data from Ewens et al. (2019) (which builds on the earlier mapping by Phillips and Zhdanov (2013)) to link the remaining unmatched deals. We keep only the "primary" instance of dual-listed firms. A firm is the "primary" dual-listed firm if it has a higher market capitalization, or, if the market capitalizations are similar, a longer history. Utilities (SIC 4900-4999) and defense (SIC 3760-3769, 3795, and 3480-3489) firms are excluded from all firm-level analyses. Additionally, we winsorize all firm-level variables at the 1% level.

4 Descriptive Statistics

We report the total deal value based on the location of the acquiror and target, and whether the deal is cross-border or intra-country in Table C1, Panel A.[8] If one considers intra-country M&A deal value as a proxy for the economic activity in a country, then one can standardize cross-border M&A deal value by dividing it by intra-country M&A deal value. The ratio of cross-border to intra-country M&A deal value when the acquiror is in a non-haven is 0.47. This ratio jumps to 3.17 and 12.65 if the acquiror is in a large haven or a small haven,

[7]Bloomberg (2017): "Tracking Tax Runaways," March 1, `https://www.bloomberg.com/graphics/tax-inversion-tracker/` (accessed May 14, 2019).

[8]Summing the cross-border deal value on the acquiror and target sides for large and small havens yields $4.4 trillion and thus will not match the total haven deal value of $4.1 trillion reported in the abstract. The discrepancy arises since summing the deal value in the acquiror and target columns double counts the $0.2 trillion in cross-border deal value where both the acquiror and target are in havens.

respectively. Similarly, the ratios when the target is in a non-haven, large haven, and small haven are 0.51, 2.18, and 6.74, respectively. Overall, tax havens appear to have unusually high cross-border M&A volume relative to their intra-country deal volume. To highlight the magnitude of this pattern in the summary statistics, we have plotted these ratios in Figure 1. This pattern also holds for the number of M&A deals (Table C1, Panel B).

In Panels C and D of Table C1, we report the mean and median M&A deal value. By construction, the values for the acquiror and target splits are identical for intra-country deals. Independent of the metric or the sample split used, cross-border deals are consistently larger than intra-country deals. The average cross-border deal on the acquiror side is $270 million for non-havens, $302 million for large havens, and $288 million for small havens.

5 Gravity Model

5.1 Empirical Strategy

As the summary statistics indicate, there seems to be considerably more cross-border M&A associated with havens than can be explained by the size of their economies. We follow Portes and Rey (2005) in using a gravity model to study a financial outcome variable. Specifically, we estimate the following model:

$$\ln(Y_{ij,t}) = \boldsymbol{\kappa_t} + \beta_1 SM_i + \beta_2 LG_i + \beta_3 SM_j + \beta_4 LG_j + \boldsymbol{\theta'} \boldsymbol{X_{ij,t}} + \epsilon_{ij,t}, \tag{1}$$

where i indexes the acquiror countries, j the target countries, t the year, and $i \neq j$. The variables are as follows:

- $Y_{ij,t}$: aggregate M&A deal value with the acquiror in country i and the target in country j in year t
- $\boldsymbol{\kappa_t}$: year fixed effects
- SM_k: dummy that equals 1 if country k is a small tax haven
- LG_k: dummy that equals 1 if country k is a large tax haven
- $\boldsymbol{X_{ij,t}}$: controls

Since gravity models are multiplicative, we take the log of all variables except dummies. The controls are chosen based on factors or proxies known to affect the volume of cross-border M&A (Ahern et al., 2015; Di Giovanni, 2005; Erel et al., 2012; Rossi and Volpin, 2004). However, we do not control for any tax-related variables, even though these are important in determining cross-border M&A (Belz et al., 2016; Feld et al., 2016; Arulampalam et al., 2019). This is because we want to capture all tax-related motivations to engage in cross-border M&A through our tax-haven dummies. These dummies will pick up factors related to observable as well as unobservable characteristics, such as the ability of a firm to negotiate a lower corporate income tax rate in the tax haven, as is done in countries like Ireland, where many US companies pay far below the 12.5% statutory corporate income tax rate.

The model is estimated using Poisson pseudo-maximum likelihood following Silva and Tenreyro (2006), avoiding the bias caused by estimating a log-linearized model with heteroskedastic errors. In addition, it provides a way to deal with the many zeros in the dependent variable, as most country pairs have no M&A volume in a given year. The variables of interest are the haven dummies. Since the payoffs to asset building increase linearly with the size of the firms acquired, haven firms have an incentive to continually scale up. Thus, we expect β_1 and β_2 to be positive. Moreover, given the tax benefits associated with haven purchases, a firm is more likely to be acquired if it is in a haven than if it is in a non-haven, all else equal. Therefore, havens should see more M&A deal value on the target side. This implies that β_3 and β_4 should be positive as well. Lastly, these estimates are conservative. Absent the abnormally high M&A volume associated with havens, the GDP of these countries would be lower. Since GDP and GDP per capita are some of the predictors of M&A flows, we underestimate the share of total M&A deal value associated with tax avoidance.

5.2 Results

Gravity Model. We present a baseline gravity model in Table 3. The results indicate a positive and statistically significant effect for the haven dummies in all three specifications. The coefficients are economically large. Small havens have 508%-2,117% more deal value

on the acquiror side than would be predicted based on economic, cultural, and geographic factors, and large havens have 112%-299% more.[9] The corresponding figures on the target side are 344%-1,257% for small havens and 66%-180% for large havens. The difference between the small- and large-haven coefficients is statistically significant at the 5% level for both the acquiror and target dummies in all specifications. In addition, the difference between the acquiror and target dummies is positive (although not statistically significant) in all specifications for both large and small havens. This difference likely reflects the fact that, while asset building savings increase linearly with the size of the acquired firms, the tax savings from haven purchases increase at a decreasing rate. The concave nature of the tax savings from haven purchases arises since significant savings can result from establishing a presence in a haven. However, once the firm has sufficient operations in a haven to shift profits or relocate its tax residence, the scope for further savings from haven purchases is lower. The control variables have the expected signs. Larger economies have significantly more M&A volume; a 1% increase in GDP for either the acquiror or target country results in about a 1% increase in M&A deal value. Countries that are geographically closer or share a common language have more M&A volume between them. In addition, countries with colonial ties tend to have more M&A deal value, as this likely proxies for similar cultures and legal systems. Lastly, richer countries, as indicated by GDP per capita, tend to have greater M&A deal value.

Aggregation: Method. Next, we estimate the dollar amount of M&A deal value in havens beyond what would be predicted had these countries not been havens. We refer to this as *abnormal deal value*, and estimate it for a particular country pair and year as follows:

$$\alpha_{ij,t} = Y_{ij,t} - e^{\widehat{\ln(Y_{ij,t})} - \beta_1 SM_i - \beta_2 LG_i - \beta_3 SM_j - \beta_4 LG_j}, \tag{2}$$

where all variables are as defined in equation 1. In addition, we require that at least one of the countries is a haven. Summing over all applicable country pairs and years, and using the

[9] Going from a non-haven to a haven acquiror is expected to increase the M&A deal value by $(e^{\beta} - 1) \times 100\%$, where β is either the small- or large-haven coefficient.

specification in column 3 of Table 3, we obtain a total abnormal deal value associated with havens of $2,362 billion. We disaggregate this total by haven using the following formula:

$$\sum_i \sum_j \sum_t \alpha_{ij,t} = \sum_{h \in H} \alpha_h, \tag{3}$$

where H is the set of all havens and α_h is the total abnormal deal value for haven h. We define α_h as follows:

$$\alpha_h = \sum_t \left(\sum_{i \notin H} \alpha_{ih,t} + \sum_{j \notin H} \alpha_{hj,t} + \frac{1}{2} \left(\sum_{i \in H} \alpha_{ih,t} + \sum_{j \in H} \alpha_{hj,t} \right) \right). \tag{4}$$

The total abnormal deal value for haven h includes all deals with a non-haven acquiror and h as the target (the first term of the sum). In addition, it includes the abnormal deal value of all deals with h as the acquiror and a non-haven target (second term). However, what should be done about cross-border deals with h on one side and another haven on the other?[10] We cannot take the sum, since this term would appear for both haven h and the other haven, which would result in double counting and invalidate equation 3. Thus, we adopt the simple and intuitive approach and take one half of the abnormal deal value associated with these deals (third and fourth terms). The proof of equation 3 is in Appendix B.

Aggregation: Results. α_h for the top tax havens is reported in column 1 of Table 4. There is $699.2 billion in abnormal deal value for the Netherlands, $326.1 billion for Bermuda, $314.7 billion for Ireland, $248.3 billion for Switzerland, $166.3 billion for Luxembourg, $147.2 billion for Hong Kong, $126.3 billion for Singapore, and $122.5 billion for the Cayman Islands. The remaining small havens have lower abnormal deal values. The total abnormal deal values for small and large havens are $826.2 billion and $1,535.6 billion, respectively.

For comparison, column 2 of Table 4 reports the total cross-border M&A deal value for each haven. As with the abnormal deal value, the total cross-border deal value for haven h is equal to the total deal value when the acquiror is in h and the target is in a non-haven, plus the total deal value when the target is in h and the acquiror is in a non-haven, plus 1/2 of the

[10] $0.2 trillion of the $4.1 trillion in total cross-border, haven M&A deal value has a haven on both sides.

total deal value when one side of the deal is in h and the other is in another haven. Column 3 reports the ratio of abnormal deal value to total deal value. Our methodology classifies 57.2% of the cross-border M&A deal value involving havens as abnormal. This average masks important cross-sectional variation. Of the top havens listed in the table, the haven with the lowest share of abnormal deal value is Switzerland with 29.7%. The Netherlands, Ireland, and Luxembourg have shares of 57.4%, 63.0%, and 68.1%, respectively. Hong Kong and Singapore, have similar shares of 48.9% and 50.9%, respectively. The havens with the highest shares of abnormal deal value are the British Virgin Islands (97.3%), the Netherlands Antilles (97.0%), Bermuda (96.9%), and the Cayman Islands (96.2%). Thus, the ratio of a haven's abnormal to total M&A deal value is negatively correlated with its GDP.

To visualize this relationship, we compare the abnormal ratio to the log of GDP for the top havens in Figure 2. Aside from Guernsey and Jersey, the regression line fits the data well (the coefficient of ln(GDP) has a p-value of 0.02).

Gravity Model: Robustness. A second gravity model is presented in Table C2. The additional variables are available for fewer countries, resulting in a smaller sample. The same controls as in the last column of Table 3 are included, but the coefficients are omitted. The first specification includes a measure of control of corruption from WGI. It varies from -1.7 to 2.5, so we add 2 to the variable before taking the log. Having low levels of corruption and a UK legal system are important factors in attracting M&A flows. The addition of these variables does not significantly impact the haven dummies, which remain positive and significant. Lastly, the higher M&A volume through tax havens is not explained by trade.

Interpretation. The findings contribute to a nascent literature on "abnormally" high capital flows associated with havens by documenting that havens attract M&A deal value of $2.4 trillion beyond what is predicted based on their economic fundamentals. Additionally, this highlights that tax havens affect the actual ownership of assets on a large scale and not just the ownership of assets "on paper," as has been shown in studies examining havens and the ownership of financial assets (e.g., Johannesen and Zucman, 2014). Moreover, cross-

border, haven M&A makes up 25.5% of overall cross-border M&A by deal count and 28.9% by deal value. These numbers emphasize how important haven M&A is as a part of cross-border M&A. The literature on the determinants of cross-border M&A ignores the role of tax avoidance as a determinant of cross-border M&A and the role of tax havens in cross-border M&A more broadly. Furthermore, with the exception of Di Giovanni (2005), this literature removes small havens such as Bermuda and the Cayman Islands from its samples, which results in missing deal value that amounts to $1.1 trillion[11] or about 8% of total cross-border M&A over our sample period. One of our goals is to redress this imbalance in coverage.

6 Tax Avoidance

We measure a firm's cash effective tax rate by taking the ratio of a firm's cash taxes paid and pre-tax income. This measure accounts for income earned and taxes paid by subsidiaries around the world as well as the global legal parent. Our tax avoidance estimates are reductions in the cash effective tax rates at the global legal parent level.

6.1 Haven Purchases

6.1.1 Empirical Strategy

Next, we quantify the tax avoidance associated with haven purchases, whereby a firm buys another firm resident in a haven. After the completion of a haven purchase, an acquiror has a greater opportunity to avoid taxes, as discussed in Section 2. To test the hypothesis that haven purchases result in lower future tax rates, we estimate the following model:

$$ETR_{i,t} = \boldsymbol{\kappa_t} + \boldsymbol{\delta_i} + \beta_1 \ln(SM_{i,t-2}) + \beta_2 \ln(LG_{i,t-2}) + \beta_3 \ln(ANY_{i,t-2}) + \lambda Z_{i,t-2} + \boldsymbol{\theta' X_{i,t-2}} + \epsilon_{i,t}, \tag{5}$$

where i indexes firms and t indexes years. The variables are defined as follows:

[11] This is the total deal value where a small haven is on one side of the deal. This differs from the $1.0 trillion figure mentioned in the first paragraph of the introduction, which captures deals that result in tax avoidance attributable to small havens (small-haven asset building deals and small-haven purchases). The discrepancy arises due to the $86.3 billion in deals involving a small-haven acquiror and a large-haven target.

- $ETR_{i,t}$: cash ETR: taxes paid from years $t-1$ to t divided by pre-tax income from years to $t-1$ to t
- $\boldsymbol{\kappa_t}$: year fixed effects
- $\boldsymbol{\delta_i}$: firm fixed effects
- $SM_{i,t}$ = (Net Small Haven M&A Value)/TA(i,t)
- $LG_{i,t}$ = (Net Large Haven M&A Value)/TA(i,t)
- $NON_{i,t}$ = (Net Non Haven M&A Value)/TA(i,t)
- $ANY_{i,t} = SM_{i,t} + LG_{i,t} + NON_{i,t}$
- $Z_{i,t}$: cumulative mechanical effect on firm i's cash ETR from M&A completed up to time t
- $\boldsymbol{X_{i,t}}$: firm controls

The variables of interest are the measures of prior M&A activity. "Sm Haven" means that $SM_{i,t}$ only accumulates M&A deals where the target is in a small tax haven. $LG_{i,t}$ (tracks deals with large-haven targets) and $NON_{i,t}$ (tracks deals with non-haven targets) are similarly defined. "Net" refers to the variable taking the cumulative M&A deal value where firm i is the acquiror's ultimate parent minus the cumulative deal value where firm i is the target's ultimate parent. We replace this difference with 0 if it is negative for the small-haven, large-haven, and non-haven variables.[12] We use net instead of gross cumulative M&A deal value since the ability to avoid taxes is related to the stock of tax-haven operations rather than the volume of tax-haven acquisitions. Specifically, if firm A buys assets in Ireland and then sells them to firm B, only firm B can expect tax savings as a result. The increase in the stock of M&A deal value for firm A is netted out after selling the assets to firm B. We scale this quantity by total assets, which, along with M&A deal value, is inflation adjusted to 2017 US dollars. By dividing M&A deal value by total assets, we are better able to measure the importance of a given deal to a firm. For instance, the impact of a $1 billion haven

[12] A negative value for the small-haven ratio, for instance, implies that the firm has sold more small-haven assets than it has acquired. The percentages of firm-years with negative small-haven, large-haven, and non-haven ratios are 0.27%, 1.17%, and 5.68%, respectively.

purchase for a $10 billion company is substantial, as this could allow the firm to shift a significant amount of profits to the haven under the guise of typical intra-firm transactions. However, the ability of a $1 billion haven purchase to result in tax avoidance is more limited if the company is worth hundreds of billions of dollars. The t reflects the fact that deals are accumulated based on completion dates from 1990 up to and including time t. Lastly, we take the log of this ratio (we add 1 to the ratio, which is measured in percentage points, prior to taking the log to ensure that this measure is defined) since the ability to use cross-border M&A to lower taxes is concave in the ratio. For instance, going from 0% to 5% in the ratio of small-haven cumulative deal value to total assets could allow a firm to shift a substantial amount of profits to the tax haven. However, going from 40% to 45% would likely have a much smaller incremental impact.

In addition to the above model with the continuous measures of prior M&A activity, we run a second specification with dummies that take on the value 1 if the corresponding continuous measures are positive. Although the dummies do not have several of the aforementioned advantages of the continuous measures, they allow for an easy interpretation of the tax avoidance from cross-border, haven M&A.

In addition, we control for the mechanical effect that M&A have on a firm's tax rate. For example, if a firm with $4 million in pre-tax income and a 25% ETR buys a firm with $1 million in pre-tax income and a 20% ETR, then the predicted ETR of the combined firm would be 24%, all else equal. Thus, this deal would result in a 1 percentage point mechanical drop in the acquiror's ETR. One can similarly calculate the mechanical ETR effect from selling assets. For details on this variable, see Appendix C. Lastly, we include the following standard controls in all the haven purchases regressions: book assets, book leverage, profitability, and cash over total assets. Since the regression equation includes year and firm fixed effects, our estimates are identified by comparing the same firm over time.

One could be concerned that the opening of subsidiaries in havens results in tax savings, and that this activity is correlated with haven M&A. To address this concern, we use data

from Bennedsen and Zeume (2018) on firms' tax-haven subsidiaries. Controlling for a firm's haven subsidiaries could attenuate the prior haven M&A coefficients, since a haven M&A will likely result in a haven subsidiary. To account for this, the haven subsidiary dummy is lagged by only one period in the regression, while the haven M&A variables are lagged by two periods. Thus, we can interpret the haven subsidiary dummy as the effect of having a haven subsidiary holding constant prior M&A.

The model is estimated using OLS with a global firm sample. We use completion dates for M&A transactions instead of announcement dates as in the gravity model, since any change in taxes paid will not occur until after the deal is completed. Following the literature, we drop observations with non-positive pre-tax income and further winsorize the ETR to ensure that it is between 0 and 1 (Dyreng et al., 2008; Klassen and Laplante, 2012; Dyreng et al., 2019). In addition, to mitigate the volatility inherent in annual measures of the cash ETR, we measure it over two years (Hanlon and Heitzman, 2010). To overcome the serial correlation induced by overlapping time periods, we cluster the standard errors at the firm level.

6.1.2 Regression Results

First, we discuss the results for the continuous measures of past M&A activity in Panel A of Table 5. Both measures of haven purchases are negative and statistically significant at the 5% level in the baseline specification of column 1. Interestingly, the coefficient of $ANY_{i,t}$ is also negative and statistically significant, implying that "non-haven purchases" also result in tax avoidance. An investigation of the role non-haven M&A plays in facilitating tax avoidance is a task for future research. The tax savings likely arise since there is greater scope for tax avoidance in a firm with a more complex, global organization, given that affiliates in various non-havens are exposed to different tax rates and tax codes (Desai et al., 2004).

The results indicate that if the ratio of net M&A deal value, where the target is in a non-haven, over total assets increases from 1 to 6, then the acquiror can expect its cash ETR to fall by 1.56 percentage points. This is equivalent to the expected reduction in taxes

that would occur if a firm with no prior cross-border M&A history (at least back to 1990) bought a firm in a non-haven worth 5% of its total assets.[13] Acquisitions of haven targets result in additional tax avoidance. If a company with no cross-border M&A history made a small-haven (large-haven) purchase worth 5% of its total assets, then its cash ETR would be 2.36 (2.00) percentage points lower than if the target were located in a non-haven. That is, for a firm with no cross-border M&A history, buying a small-haven (large-haven) company worth 5% of its total assets results in a cash ETR drop of 3.91 (3.56) percentage points. The estimated reductions in the cash ETR are economically large, both in absolute terms and relative to the mean and median cash ETRs of 25.2% and 21.6%, respectively.

The specification in column 2 includes the haven subsidiary dummy, which is negative and significant, indicating that having a haven subsidiary is associated with a cash ETR that is 3.54 percentage points lower. The inclusion of this variable does not meaningfully change the M&A coefficients.

Using dummies for past M&A activity as in Panel B of Table 5 yields similar conclusions. All three measures of prior M&A activity are negative and statistically significant at the 1% level in the baseline specification of column 1. The dummies are capturing whether a firm has a positive value for each measure of cross-border (haven) M&A, so a firm can only capture each reduction in the cash ETR once. For a firm with no prior cross-border M&A deals, buying a non-haven firm in a cross-border M&A results in a 1.94 percentage point expected decline in the firm's cash ETR. Had this firm instead bought a small-haven (large-haven) target, then there would be an additional reduction of 3.70 (respectively, 2.72) percentage points in its cash ETR. Thus, in this case, the total savings from buying a small-haven (respectively, large-haven) firm is 5.64 (respectively, 4.66) percentage points. As with the specification using the continuous measures of prior M&A, the haven subsidiary dummy (column 2) is negative and significant, and does not significantly impact the haven M&A

[13]Since we add 1 to the ratio of M&A deal value to total assets prior to taking the log, a firm with no prior M&A activity would have a ratio of 1. Buying a firm worth 5% of its book assets would increase the ratio to 6. Therefore, $-0.87 \times (ln(6) - ln(1)) \approx 1.56\%$.

coefficients in the dummy specification.

The fact that having a haven subsidiary significantly lowers a firm's cash ETR, while not meaningfully changing our estimates of the tax savings from haven purchases, supports our point that haven M&A generates tax savings over and above those that can be achieved by opening shell companies in havens.

6.1.3 Aggregate Tax Avoidance

We aggregate the annual tax avoidance from haven purchases using the following formula:

$$\text{Aggregate Annual Tax Avoidance} = \sum_{i \in \Omega} P_{i,T+2} \times \frac{\Delta\tau_{i,T+2}}{100} \tag{6}$$

where i indexes firms, Ω is the set of all publicly-listed firms with non-negative pre-tax income in year T that are alive as of 2018 or went private between 1990 and 2018, and T is the most recent year in which financials are reported in Compustat or Compustat Global, but no later than 2018. The variables are defined as follows:

- $P_{i,T}$: pre-tax income for firm i in year T, adjusted to 2017 dollars using the earnings growth from Robert Shiller's website (2020)
- $\Delta\tau_{i,T}$: change in cash ETR from haven purchases for firm i in year T

Since we do not observe financials for firms in year $T+2$, we proxy for pre-tax income in year $T+2$ using the value from year T. By measuring aggregate savings at $T+2$, we utilize the full sample of completed M&A deals up to time T. We define a firm as alive if book assets are not missing in 2018. A firm went private between 1990-2018 if the reason for deletion in Compustat is given as "Now a private company." Our goal with this sample selection is to aggregate all firms that exist as stand-alone entities as of 2018. In addition, we only include the tax savings of a firm if it has non-negative pre-tax income. Using the notation from equation 5, $\Delta\tau_{i,T+2}$ can be expressed as follows:

$$\Delta\tau_{i,T+2} = ETR_{i,T+2}\left(SM_{i,T}, LG_{i,T}, ANY_{i,T}, Z_{i,T}, \boldsymbol{X_{i,T}}\right) - ETR_{i,T+2}\left(0, 0, 0, Z_{i,T}, \boldsymbol{X_{i,T}}\right). \tag{7}$$

Thus, $\Delta\tau_{i,T+2}$ represents the difference in the cash ETR between the case where the firm has its current level of prior M&A activity and the counterfactual case where all three measures of prior M&A activity are 0. We can write this as

$$\Delta\tau_{i,T+2} = \beta_1 \ln(SM_{i,T}) + \beta_2 \ln(LG_{i,T}) + \beta_3 \ln(ANY_{i,T}). \tag{8}$$

Replacing the coefficients with estimates from column 1 of Table 5, Panel A yields

$$\Delta\tau_{i,T+2} = -1.32 \times \ln(SM_{i,T}) - 1.12 \times \ln(LG_{i,T}) - 0.87 \times \ln(ANY_{i,T}). \tag{9}$$

Substituting this in equation 6 yields aggregate annual tax avoidance of $52.6 billion. This represents the total annual tax avoidance from cross-border M&A that accrues to acquiring firms, consisting of $33.9 billion in tax avoidance from non-haven purchases and $18.7 billion in tax avoidance from haven purchases. The savings from haven purchases can be further disaggregated into $14.0 billion in tax avoidance from small-haven purchases and $4.7 billion in tax avoidance from large-haven purchases.[14] For a step-by-step calculation of these savings for several firms, see Appendix E.1.

6.2 Asset Building

6.2.1 Aggregate Tax Avoidance

We compute the aggregate annual tax avoidance from asset building using this formula:

$$\text{Aggregate Annual Tax Avoidance} = \sum_{k \in K} P_{k,t(k)} \times \Delta\tau_{h(k)} \tag{10}$$

where k indexes M&A deals, K is the set of all cross-border deals with a haven acquiror and non-haven target, and $t(k)$ is the year in which deal k was completed. The variables are defined as follows:

- $P_{k,t(k)}$: pre-tax income for the target in year $t(k) - 1$ for deal k. If missing, a coun-

[14] Disaggregating the aggregate savings by the location of the target requires us to specify the order of M&A if multiple deals with different target classifications occur in the same firm-year. In such cases, we assume that haven purchases come before non-haven purchases, and large-haven purchases come before small-haven purchases.

try/industry average ratio of pre-tax income to market capitalization in year $t(k)$ is obtained, and this is multiplied by the deal value to obtain an estimate of the target's pre-tax income. The target's pre-tax income is adjusted to 2017 dollars using the earnings growth from Robert Shiller's website (2020).[15]

- $\Delta\tau_{h(k)}$: target tax rate change, where $h(k) \in \{SM, LG\}$ denotes the acquiror location

The details for how $P_{k,t(k)}$ is calculated when it is missing are described in Appendix D. Tax avoidance from asset building arises from the target paying a lower tax rate on average as a subsidiary of the acquiror than as a stand-alone company. It is empirically difficult to measure the drop in cash ETR for the target, since we do not observe its financials after the acquisition. In addition, the target is private in the vast majority of cases, so we also do not observe financials before the acquisition. As such, we estimate $\Delta\tau_{h(k)}$ by using the tax rate reduction corresponding to a prior haven purchase using coefficients from column 1 of Table 5, Panel B. This is a conservative estimate of the drop in taxes that the target experiences now that it is part of a company that is tax resident in a haven. This is because not all companies that buy tax-haven firms actually move their tax residence to the haven, which yields the largest reduction in the ETR. Most firms that engage in tax-haven M&A "only" achieve tax avoidance through profit shifting. This assumption yields two possible values for $\Delta\tau_{h(k)}$ depending on the location of the acquiror, as given below

$$\Delta\tau_{h(k)} = \begin{cases} -5.64\%, \text{ if } h(k) = SM \\ -4.66\%, \text{ if } h(k) = LG. \end{cases} \tag{11}$$

The aggregate annual tax avoidance from asset building deals is $12.9 billion, consisting of $3.9 billion from small-haven asset building deals, and $9.0 billion from large-haven asset building deals. For a step-by-step calculation of the asset building savings for several deals, see Appendix E.2.

[15]Out of the 7,321 asset building deals, there are 27 in which the measure of the target's pre-tax income is greater than the deal value (before the earnings adjustment). For these cases, we set the target's pre-tax income to be equal to the deal value.

6.3 Discussion of Tax Avoidance Results

Cross-border, haven purchases result in $18.7 billion in annual tax avoidance, and cross-border, non-haven purchases result in $33.9 billion in annual tax avoidance. In addition, asset building deals result in $12.9 billion in tax avoidance per year. Thus, haven M&A results in $31.6 billion in annual tax avoidance, while the total annual tax avoidance from cross-border M&A is $65.5 billion. This represents an important contribution to our understanding of the extent to which cross-border M&A results in tax avoidance. Estimates of total worldwide corporate income tax avoidance vary from $212 billion (Tørsløv et al., 2020) to $600 billion (Crivelli et al., 2015).

We clarify a potential source of confusion related to the gravity model and tax avoidance results. In the gravity model, havens have $2.4 trillion in M&A deal value beyond what is predicted based on economic fundamentals. In the estimation of the tax avoidance from cross-border, haven M&A, we estimate the tax avoidance from all cross-border, haven M&A, and not just the portion deemed "abnormal." On average, all cross-border, haven M&A result in tax avoidance. Moreover, while we can estimate the aggregate amount of "abnormal" M&A volume by country, we cannot pinpoint which individual M&A transactions are "normal" and "abnormal." If havens were non-havens instead, the tax savings for firms would decrease,[16] while these countries' cross-border M&A volumes would be expected to fall by the amount of the abnormal M&A volume.

7 Validation of Tax Savings

7.1 Haven Purchases: M&A Event Study

7.1.1 Empirical Strategy

In this section, we assess the validity of our tax savings estimates by comparing the relationship between the projected tax savings associated with a deal and the stock market's

[16] They would not disappear completely, since cross-border, non-haven M&A results in tax savings, too.

response to that deal. If our projected tax savings are valid, and these savings are not competed away during the bidding process, then we should see that the larger the projected tax savings, the greater the stock market's reaction to the deal's announcement. We implement this with an M&A event study using the following specification:

$$CAR_{j,t} = \boldsymbol{\kappa_t} + \boldsymbol{\delta_j} + \beta_1 \tau_{j,t} + \boldsymbol{\theta'} \boldsymbol{X_{j,t}} + \epsilon_{j,t}, \tag{12}$$

where j indexes deals and t indexes days. The variables are defined as follows:

- $CAR_{j,t}$: market-adjusted cumulative abnormal return of the acquiror in deal j from $t-1$ to $t+1$
- $\boldsymbol{\kappa_t}$: year fixed effects
- $\boldsymbol{\delta_j}$: 3-digit SIC fixed effects based on the acquiror in deal j
- $\tau_{j,t}$: projected tax savings from deal j announced at time t
- $\boldsymbol{X_{j,t}}$: controls

The model is estimated using OLS with a global sample of firms. If a deal is announced during a non-trading day, we move the date forward to the nearest trading day. We drop 3,469 observations where the acquiror is involved in another deal on the same day (as a buyer or seller) to isolate the market's reaction to the deal in which we are interested. The $CAR_{j,t}$ for each date is obtained from "U.S. Daily Event Study" (for CRSP firms) and "International Event Study (Compustat Global)" from WRDS. International Event Study has data on 38 countries. We require that all three event-window days are non-missing.

The tax savings associated with a deal are defined as the difference between the estimated cumulative tax savings at time t for the acquiror in deal j, and the estimated cumulative tax savings at time t had deal j not occurred. The tax savings are estimated using the continuous measures of prior M&A activity introduced in Section 6.1. Since all dates involve buyside deals only, $\tau_{j,t}$ is non-negative (an M&A for the acquiror cannot result in an expected tax increase). Since our measures of prior M&A value are bounded below at 0, some deals will

involve tax savings of \$0.[17] We drop 1,533 such deals. Lastly, we include standard controls in the M&A event study regression (see Meier and Servaes, 2019), and winsorize all variables at the 1% level on both sides of the distribution. The controls are listed in Table 6.

7.1.2 Regression Results

The first column of Table 6 reports the results without any controls but with industry and year fixed effects. The coefficient on the tax savings variable is positive and significant, indicating that the greater the expected tax savings, the higher the CAR. Column 2 adds standard M&A control variables (Meier and Servaes, 2019), which reduces the magnitude of the tax savings coefficient. Nevertheless, tax savings remain positively associated with the CAR. A 1 percentage point increase in tax savings (equivalent to a 1 percentage point drop in the acquiror's ETR) is associated with a CAR that is 0.20 percentage points higher. This result gives us confidence in our interpretation of the tax avoidance from cross-border M&A.

7.2 Asset Building

The idea behind this subsection is to investigate whether asset builders have lower tax rates than the firms they acquire, and whether these tax rates remain stable or decrease after asset building deals. Such evidence would support our hypothesis that asset building results in tax savings due to the increase in the asset base subject to lower tax rates.

7.2.1 Empirical Strategy

The tax savings from asset building arise due to the lower taxes paid by the target upon being acquired by a haven firm. What are the tax implications for the acquiror? According to the haven purchases results, on average, non-haven purchases result in tax savings for the acquiror. However, perhaps this is not true for asset building deals in particular. One might

[17] To illustrate how this can occur, suppose the variable Net Total M&A Value/TA$(i,t) = 0$, since the only deal firm i has made since 1990 involved the sale of assets worth \$100 million. If this firm then buys a non-haven firm worth \$10 million, then the net M&A deal value is still negative, so we still have Net Total M&A Value/TA$(i,t) = 0$, implying that the estimated tax savings from the \$10 million acquisition is \$0.

be concerned that the acquiror's tax rate actually increases due to the acquisition of a target that pays a higher tax rate. We test the tax implications of the acquiror in asset building deals by adding an asset building variable to equation 5.

$$ETR_{i,t} = \boldsymbol{\kappa_t} + \boldsymbol{\delta_i} + \beta_1 \ln(AB_{i,t-2}) + \beta_2 \ln(SM_{i,t-2}) + \beta_3 \ln(LG_{i,t-2}) + \beta_4 \ln(ANY_{i,t-2}) + \lambda Z_{i,t-2} + \boldsymbol{\theta' X_{i,t-2}} + \epsilon_{i,t}. \quad (13)$$

We define $AB_{i,t}$ as follows:

$$AB_{i,t} = (\text{Asset Building M\&A Value/TA})(i,t). \quad (14)$$

"Asset Building" indicates that this variable only accumulates deals when the acquiror is a haven resident and the target is a non-haven resident. Similar to $SM_{i,t}$, $LG_{i,t}$, and $ANY_{i,t}$, this variable accumulates deals completed up to and including time t. However, unlike these measures, which consider net M&A deal value, $AB_{i,t}$ only accumulates deals where firm i is the acquiror. We also run a dummy version of the above specification, where all four M&A variables take on the value 1 if the corresponding continuous measures are positive.

7.2.2 Regression Results and Validation of Asset Building Tax Savings

The results using both the continuous (panel A) and dummy (panel B) specifications are reported in Table C5. In both specifications, the asset building variable has a negative point estimate that is not statistically significant. There is thus no evidence that asset building deals result in an increase in the acquiror's tax rate.

We also examine some summary statistics to get a greater understanding of the tax rates of asset building firms. Define an "asset builder" as a firm that is currently resident in a haven that bought at least one non-haven firm while resident in a haven (that is, they were the acquiror in at least one asset building deal). Define the comparison group of non-haven firms as those currently resident in a non-haven that have never been an acquiror in an asset building deal. The median (mean) cash ETR is 17.1% (21.9%) for asset builders and 21.7%

(25.2%) for non-haven firms. Furthermore, about 10% of asset building deals involve a public standalone target. For these firms, the median (mean) cash ETR is 23.1% (26.3%) overall and 21.9% (28.3%) using the most recently reported data.

In conclusion, asset builders have lower tax rates than their targets, and these tax rates do not increase after asset building deals. This supports our hypothesis that asset building results in tax savings due to the increase in the asset base subject to lower tax rates.

8 Identification and Robustness

The findings so far suggest that cross-border M&A involving havens is primarily pursued for tax avoidance purposes. Next, we entertain alternative explanations. However, the number of possible alternative explanations for our results is limited, since such explanations would have to explain why, for instance, Bermuda and the United States have seen cross-border M&A deal value of $188.8 billion from 1990 to 2017 for reasons other than tax avoidance, which seems unlikely. Nevertheless, we take multiple approaches to address remaining concerns that cross-border M&A involving havens is motivated by other economic forces. We also provide evidence that the results in this paper survive a battery of robustness tests.

8.1 US Tax Law Change in 2004

To address alternative explanations, we use a change in US tax law that occurred as part of the American Jobs Creation Act (AJCA) of 2004. Prior to 2004, a US firm could undertake a "naked" inversion whereby it reincorporates in a foreign jurisdiction without having any significant operations there. Since 2004, a firm can move its incorporation outside of the US if (1) it has "substantial operations" in the country in which it seeks incorporation, or (2) in the case of a merger with a foreign firm, the US shareholders make up less than 80% of the combined firm (Marples and Gravelle, 2014). Initially, the IRS did not provide a precise definition of "substantial operations." However, a 2006 regulation defined the substantial operations threshold: this threshold is met if the firm has 10% of its employees, tangible assets, and sales in the foreign country in which it seeks incorporation (VanderWolk, 2010).

Despite initial uncertainty surrounding the meaning of "substantial operations," it is clear that, post 2004, "The act effectively ended shifts to tax havens where no real business activity took place" (Marples and Gravelle, 2014). The existence of these thresholds made inversions more difficult for US firms, since they now have to acquire larger or additional foreign firms if they want to invert as a result of cross-border M&A. Only large havens are likely to have a sufficient pool of such firms, so we predict that M&A volume with a US acquiror and a large-haven target will increase after the law change. The prediction for small havens, with their much smaller economies, is unclear. On the one hand, it could be that the few large firms in small havens are acquired by US firms, which would imply a positive effect for small havens. On the other hand, it could be that small-haven firms are not sufficiently large or numerous for US firms to pass the threshold, resulting in a decline in M&A volume for small havens due to a substitution effect at their expense in favor of large havens. We test the hypothesis using a triple differences-in-differences research design, as shown below:

$$\ln(Y_{ij,t}) = \boldsymbol{\kappa_t} + \beta_1 US_i \times LG_j \times Y04_t + \beta_2 US_i \times SM_j \times Y04_t + \boldsymbol{\delta'} \boldsymbol{D_{ij,t}} + \boldsymbol{\theta'} \boldsymbol{X_{ij,t}} + \epsilon_{ij,t}, \quad (15)$$

where i indexes the acquiror countries, j the target countries, t the years, and $i \neq j$. The variables are defined as follows:

- $Y_{ij,t}$: aggregate M&A deal value with the acquiror in country i and the target in country j in year t
- $\boldsymbol{\kappa_t}$: year fixed effect
- US_i: dummy that equals 1 if country i is the United States
- LG_j: dummy that equals 1 if country j is a large tax haven
- SM_j: dummy that equals 1 if country j is a small tax haven
- $Y04_t$: dummy that equals 1 if $t \geq 2004$
- $\boldsymbol{D_{ij,t}}$: all other main effects and double interactions involving US_i, LG_j, SM_j, and $Y04_t$ (except $LG_j \times SM_j$)
- $\boldsymbol{X_{ij,t}}$: time-varying controls

As in Section 5.1, we estimate the model using Poisson pseudo-maximum likelihood. The hypothesis implies that the triple interaction with the large-haven dummy is positive. We have no clear prediction for the sign of the small-haven triple interaction. Since the law was made effective on October 22, 2004, we define years in our data as beginning on October 22. That way, the $Y04_t$ dummy takes on the value 1 when the law is in effect.

The results are reported in column 1 of Table 7. The large-haven triple interaction is positive and significant, confirming our hypothesis. The small-haven triple interaction is insignificant. This result documents that a tax-law change in how easy it is for US firms to use cross-border, tax-haven M&A to invert out of the US results in a change in deal value consistent with tax avoidance motives driving cross-border, tax-haven M&A.

The AJCA also granted US firms access to a temporarily lower tax on repatriated earnings. Specifically, firms could access the lower tax rate "for either the taxpayer's last taxable year which begins before October 22, 2004, or the taxpayer's first taxable year which begins during the one-year period beginning on October 22, 2004."[18] Thus, firms could potentially repatriate earnings at the reduced rate up to and including October 20, 2006. Given that foreign cash holdings can influence cross-border M&A (Edwards et al., 2016; Hanlon et al., 2015), we rerun the model excluding years 2004 and 2005 to rule out any impact the repatriation holiday might have. Since each year begins on October 22, we compare the post period beginning on October 22, 2006 to the pre-period ending on October 21, 2004. As indicated in column 2 of Table 7, the results are robust to the exclusion of these years.

8.2 Additional Alternative Explanations and Robustness Tests

The Role of Shell Companies. A concern is that the majority of haven targets in M&A are shell companies. Since firms can easily set up shell companies themselves, it seems unlikely that they would spend nearly $1.7 trillion acquiring haven firms if they could obtain the same benefits by setting up a shell company. The mean deal value in a cross-border

[18] U.S. Department of the Treasury (2005): "Domestic Reinvestment Plans and other Guidance under Section 965," January 13 `https://www.treasury.gov/press-center/press-releases/Documents/repatriationnoticen200510.pdf` (accessed November 13, 2020).

deal when the target is in a large (small) haven is $316 million ($377 million), so these cannot be small shell companies on average. For asset deals, the location of the target is the location reported in SDC, which is defined as the location of business activities. Asset deals with a haven target thus involve the acquisition of real haven operations. In the case of M&A transactions where the target is a standalone, haven-resident firm, one could still be concerned that the actual operations of the target might be shell-like, since it could be incorporated but not headquartered in a haven. (We are making the implicit assumption that a firm being headquartered in a haven is not a shell company.) Relatedly, one could be concerned that firms become tax resident in havens without having any real operations, such as their corporate headquarters, in the haven. They then make cross-border acquisitions, which would inflate the abnormal deal value associated with havens.

To address these concerns, we rerun all of the results by dropping acquirors and targets that are tax resident in a haven but not headquartered in a haven. The results are robust to this exclusion; total abnormal deal value falls from $2.4 to $2.1 trillion, and tax savings from haven M&A fall from $31.6 to $30.3 billion.

Intangible Assets in Tax Havens. One could be concerned that firms move intangible assets, such as intellectual property, to havens and then, potentially at a later point, sell them to other firms in cross-border deals. This would inflate abnormal deal value in havens without any associated real investment or real activity in havens. This concern only applies to asset deals and not transactions where an entire firm is sold. There are 2,343 cross-border asset deals[19] worth $582.6 billion where the target is in a haven, compared to $1.1 trillion where an entire haven resident firm is sold. We manually look through the largest of these asset deals and classify 343 deals worth $438.0 billion as not having an intangible target, and 7 deals worth $9.3 billion as having an intangible target. The remaining 1,993 deals worth $135.3 billion we either did not look into (1,965 deals), or, due to a lack of information, could

[19]A deal is an asset deal if the target is not a standalone firm and there is no sellside PE involvement. A target is a standalone firm if it has the same cusip or the same sedol as its ultimate parent. A deal has sellside PE involvement if the seller is a private equity, venture capital, leveraged buyout, or infrastructure fund. In other words, asset deals are those where the target is selling something that is not itself in a strategic deal.

not determine whether the target was an intangible asset (28 deals). To be conservative, we assume that all of these unclassified asset deals involve an intangible target, and rerun the results excluding such deals along with the 7 deals with a verified intangible target. The results are robust to this exclusion–total abnormal deal value falls from $2.4 to $2.2 trillion, and tax avoidance from haven M&A increases from $31.6 to $32.0 billion.

Tax Avoidance Motive. A question that might arise is whether we can speak to the tax avoidance motive of haven M&A more directly. One problem with this is that companies usually do not highlight that their haven M&A transactions are tax driven. If companies would highlight this, it would increase the risk of unfavorable news coverage and a backlash by politicians, regulators, and tax authorities, which could result in a less favorable tax environment.[20] As such, companies engaging in haven M&A have an incentive to highlight non-tax motives in their press releases and corporate communication around haven M&A.

A related concern is whether we misclassify many of the cross-border M&A in havens such as Switzerland as being tax motivated. There are several arguments against this. First, we are not arguing that all tax-haven M&A are tax driven–only that 57.2% are. Moreover, the percentage of abnormal deal value relative to total deal value across havens seems in line with the economic fundamentals of these countries, with values ranging from 29.7% in Switzerland to 97.3% in the British Virgin Islands. While we can estimate a haven's aggregate share of abnormal, cross-border M&A, we cannot pinpoint whether an individual transaction is "abnormal" or not. However, even if some transactions have a strategic rationale, such as asset building acquisitions of US firms by pharmaceutical companies in Switzerland, many

[20]Hoopes et al. (2018) show that a policy change in Australia that led to public disclosure of information on corporate income tax returns led to a backlash against companies by consumers and policy makers. Dyreng et al. (2016) find that public pressure can affect corporate tax behavior and tax expenses. Bozanic et al. (2017) show that the US Internal Revenue Service uses publicly available information about company's taxes for its enforcement actions. Another high-profile example is the attempted $160 billion takeover of Allergan, an Irish company, by Pfizer, a US firm, which would have allowed Pfizer to invert to Ireland. This deal triggered policy changes aimed specifically at preventing this transaction (and similar ones) from occurring. Reuters (2016): "Obama's inversion curbs kill Pfizer's $160 billion Allergan deal," April 5 `https://www.reuters.com/article/us-allergan-m-a-pfizer/obamas-inversion-curbs-kill-pfizers-160-billion-allergan-deal-idUSKCN0X21NV` (accessed August 15, 2021).

of these deals might not occur if the tax environment in havens was less beneficial. Lastly, of the $2.4 trillion in abnormal cross-border M&A associated with havens, about one third of this is associated with small havens such as Bermuda and the Cayman Islands, for which any other explanation other than tax avoidance seems unlikely.

Tax Cuts and Jobs Act of 2017. Another concern could be that the US Tax Cuts and Jobs Act of 2017 might have rendered our paper into one on "economic history" if the results that we document vanish after this tax cut. Several pieces of evidence speak against this concern. First, of the $4.1 trillion in haven M&A, $1.7 trillion (40%) involves the United States on one side of the deal, so even if the US results would completely disappear, 60% of the haven M&A deal value would still be valid. Second, the cash effective tax rates of US multinationals in tax havens is substantially lower than even the new statutory US corporate tax rate of 21%. For example, the effective tax rate of US multinationals in Ireland is 4% (Tørsløv et al., 2020). Thus, very strong incentives for US multinationals to shift profits out of the US tax jurisdiction remain in place. Third, in line with the prior point, Garcia-Bernardo et al. (2021) document that the fraction of US multinationals' profits shifted out of the US has remained stable when comparing the immediate years before and after the 2017 US corporate tax reform. Therefore, it seems unlikely to assume that the 40% of total haven M&A deal value involving the US has completely vanished. Nevertheless, the dollar amount of tax savings for US firms could fall (without any change in M&A volumes) given the lower statutory corporate tax rate.

Further Alternative Explanations. We address additional alternative explanations and robustness tests in Appendix F.

9 Haven M&A and the Relocation of Headquarters

9.1 Empirical Strategy

We have demonstrated that haven purchases have significant financial effects by reducing taxes paid in non-haven countries. In this section, we examine whether haven purchases also

have non-financial effects on firms' operations. In particular, we test whether firms are more likely to move their headquarters after acquiring haven firms or assets. To implement this, we estimate the following specification:

$$HQ_{i,t} = \boldsymbol{\kappa_t} + \boldsymbol{\delta_i} + \beta_1 \ln(SM_{i,t}) + \beta_2 \ln(LG_{i,t}) + \beta_3 \ln(ANY_{i,t}) + \boldsymbol{\theta' X_{i,t}} + \epsilon_{i,t}, \qquad (16)$$

We define $HQ_{i,t}$ as a dummy that equals 100 if firm i moved its headquarters at time t and 0 otherwise. We also run a second specification where $HQ_{i,t}$ only equals 100 if firm i moved its headquarters to a *haven* at time t and 0 otherwise. All other variables are as defined in equation 5. We measure all variables contemporaneously.[21]

Since we only have historical data on headquarters and incorporation for firms in Compustat North America,[22] we limit the sample to firms that are currently headquartered in the US or Canada ($HQ_{i,t} = 0$) and those that moved from the US or Canada ($HQ_{i,t} = 1$) at time t. There are 316 headquarters relocations out of the US or Canada, 63 of which involve a haven destination country.

9.2 Results

The results are reported in Table 8. In columns 1 and 2, we test whether cross-border M&A increase the likelihood of relocating out of the US or Canada to any country, while in columns 3 and 4, we test whether cross-border M&A increase the likelihood of relocating out of the US or Canada to a haven. Odd-numbered columns are the main specifications, which use the continuous measures of M&A from equation 16. In the even-numbered models, we run the same specifications but with dummies that equal 1 if the corresponding continuous measures are positive. In column 1, the coefficients on the measures of small- and large-haven

[21] There are some cases where M&A deals occurred in the same year that a firm moved its headquarters. For most of these cases, there's only a single deal, which occurred as part of or prior to the headquarters relocation. For the cases where the deal or a majority of the deal value (in the case of multiple deals) occurred after the relocation, we replace the M&A variable with its value in $t-1$. In doing so, future M&A deals will have no affect on the regression coefficients, which will pick up the effect of current and prior M&A deals on the likelihood of relocating. Without these data adjustments, the results are about the same for the large-haven coefficient and stronger for the small-haven coefficient.

[22] This is from Snapshot (which covers Compustat North America) and our hand-collected data on headquarters and incorporation for selected firms, the majority of which are also in Compustat North America.

purchases are positive and statistically significant. The effects can be interpreted as follows: if a US or Canadian firm with no prior cross-border M&A history (back to 1990) bought a firm in a small (large) haven worth 5% of its total assets at time t, then the probability that it relocates its headquarters increases by 0.88 (0.96) percentage points at time t. Relative to the unconditional likelihood of relocating at time t of 0.16%, this represents an increase in relocation likelihood of 546% for the small-haven deal and 593% for the large-haven deal. Since the measures of M&A accumulate all prior deals back to 1990, this increase in relocation likelihood also applies to each time period $\tau \geq t$, provided the firm remains in the US or Canada. For example, if the firm purchased a small- (large-) haven company worth 5% of its assets in 1990, then there would be a 0.88 (0.96) percentage point increase in relocation likelihood in 1990. If they do not relocate in 1990, then this increase in likelihood applies to 1991, and if they do not relocate in 1991, then this applies to 1992, and so on.

In column 2 of Table 8, the results indicate that for a US or Canadian firm with no prior cross-border M&A history (back to 1990), buying a small- (large-) haven firm in a cross-border deal increases the likelihood of relocating its headquarters by 1.39 (0.73) percentage points for each $\tau \geq t$, which, relative to the unconditional likelihood of relocating, constitutes a 857% (448%) increase in relocation likelihood.

In column 3, the coefficients on the measures of prior small- and large-haven purchases are positive, statistically significant, and similar to those in column 1 on an absolute basis. Specifically, if a US or Canadian firm with no prior cross-border M&A history (back to 1990) bought a firm in a small (large) haven worth 5% of its total assets at time t, then the probability that it relocates its headquarters to a haven increases by 0.73 (0.81) percentage points for each $\tau \geq t$. This represents a 2,251% (2,501%) increase in haven relocation likelihood for the small- (large-) haven deal relative to the unconditional likelihood of 0.03%. In column 4 the coefficients on the haven dummy variables are positive, statistically significant, and somewhat smaller on an absolute basis relative to those in column 2. However, relative to the lower likelihood of relocating to a haven versus to any country, the effects are much larger.

In particular, for a US or Canadian firm with no prior cross-border M&A history (back to 1990), buying a small- (large-) haven firm in a cross-border deal increases the likelihood of relocating its headquarters to a haven by 1.01 (0.57) percentage points for each $\tau \geq t$, a 3,138% (1,767%) increase in haven relocation likelihood relative to the unconditional probability. Thus, haven purchases increase the likelihood that a firm relocates its headquarters in general, and to havens in particular.

There is some evidence that non-haven purchases increase the likelihood of a headquarters relocation. The coefficients in columns 1 and 2 are positive and statistically significant, but much smaller than for the measures of haven purchases. If a US or Canadian firm with no prior cross-border M&A history (back to 1990) bought a firm in a non-haven worth 5% of its total assets at time t, then the probability that it relocates its headquarters increases by 0.13 percentage points for each $\tau \geq t$, an 81% increase relative to the unconditional likelihood of 0.16%. Not surprisingly, non-haven purchases have no significant effect on the likelihood of relocating to a haven (see columns 3 and 4).

10 Conclusion

From 1990-2017, firms spent $4.1 trillion on 13,307 cross-border, tax-haven M&A, generating $31.6 billion in annual tax savings. Using a gravity model research design, we classify 57.2%, or $2.4 trillion of this deal value as abnormal, or beyond what is predicted based on the economic fundamentals of these havens. 35% of this abnormal deal value and 27% of the tax savings from haven M&A involve small havens such as Bermuda or the Cayman Islands. Given these magnitudes, it is surprising that prior research on cross-border M&A generally omits M&A involving small havens from their samples. The driver of both large- and small-haven M&A is the more significant tax savings that can be achieved through the acquisition of real assets in havens, as opposed to the smaller tax savings that can be realized through the opening of shell companies in havens. In an event study analysis around the announcement of an acquisition, higher projected tax savings are associated with higher cumulative abnormal

returns for the acquiror, validating our estimates. Haven M&A also have non-financial effects: firms that acquire haven firms or assets are significantly more likely to relocate their headquarters to havens. For identification, we use a 2004 US tax-law change, and find resultant variations in haven M&A flows consistent with tax avoidance motives.

The results in this paper are highly relevant for policy makers, such as the recent OECD-led pact that aims to increase the effective tax rates paid by large multinationals.[23]

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Table 1: Variable Definitions - Country and Country-Pair Level

This table defines country and country-pair level variables. See Section 3 for a complete list of sources. Country-level variables defined for the acquiror have an analogous definition for the target. Dollar figures are in 2017 USD.

Country-Pair-Level

Variable	Definition
$\mathbb{1}$(Colonial Relation)	Dummy that equals 1 if the acquiror and target countries have a past colonial relationship.
$\mathbb{1}$(Common Language)	Dummy that equals 1 if the acquiror and target countries have the same official language.
Distance	Geographic distance between each country's most populous city.
ln(M&A Value)	Aggregate M&A value at the country-pair level.
$\mathbb{1}$(Same Country)	Dummy that equals 1 if the acquiror and target countries were formerly part of the same country.

Country-Level

Variable	Definition
Control of Corruption	Measure of a country's control of corruption from the WGI.
GDP	GDP.
GDPPC	GDP per capita.
Exports	Real goods and services exports from country i to country j.
Imports	Real goods and services imports from country j to country i.
$\mathbb{1}$(UK Legal Origin)	Dummy that equals 1 if a country has a UK legal origin.
$\mathbb{1}$(Lg Haven Acquiror)	Dummy that equals 1 if the acquiror is in a large tax haven.
$\mathbb{1}$(Sm Haven Acquiror)	Dummy that equals 1 if the acquiror is in a small tax haven.
$\mathbb{1}$(US Acquiror)	Dummy that equals 1 if the acquiror is in the United States.
$\mathbb{1}$(Yr$\geq$ 2004)	Dummy that equals 1 if the year is 2004 or later.

Table 2: Variable Definitions - Firm Level

This table presents firm-level variable definitions. Accounting variables are from Compustat North America and Compustat Global and are winsorized at the 1% level on both sides. *Cash ETR* is further winsorized to ensure that it is between 0 and 1. M&A data is from SDC Platinum. Variables defined for small havens have analogous definitions for large havens and non-havens. M&A dollar figures are inflation-adjusted to 2017.

Non-M&A Variables

Variable	Definition
Cash ETR(i,t)	Taxes paid from t-1 to t divided by pre-tax income from t-1 to t.
Cash/TA(i,t)	Cash divided by total book assets at time t.
Haven Subsidiary(i,t)	Dummy that equals 1 if firm i has a subisidary in a tax haven in year t using data from Bennedsen and Zeume (2018).
Leverage(i,t)	Total liabilities over total book assets at time t.
Mechanical ETR Effect(i,t)	Mechanical effect of M&A on a firm's Cash ETR.
Profitability(i,t)	EBITDA divided by total book assets at time t.
Size(i,t)	ln(total book assets) at time t.

Measures of M&A Volume

Variable	Definition
Net Sm Haven M&A Value/TA(i,t)	Considering only the sample of cross-border deals that occured at any point up to and including time t where the target is in a small haven: cumulative value of deals where firm i is the acquiror's ultimate parent minus the cumulative value of deals where firm i is the target's ultimate parent, all over inflation-adjusted total book assets. Replaced with 0 if negative.
Net Total M&A Value/TA(i,t)	Sum of Net Sm Haven M&A Value/TA (i,t), Net Lg Haven M&A Value/TA (i,t), and Net Non-Haven M&A Value/TA (i,t).
$\mathbb{1}$(Net Sm Haven M&A Value > 0)(i,t)	Dummy that equals 1 if *Net Sm Haven M&A Value* > 0 and 0 otherwise.
$\mathbb{1}$(Net Total M&A Value > 0)(i,t)	Dummy that equals 1 if *Net Total M&A Value* > 0 and 0 otherwise.

Table 3: Gravity Model with Baseline Controls

This table documents the effect of tax havens on cross-border M&A deal value. Poisson pseudo-maximum likelihood estimation is used on this country-pair-year-level panel. All variables are measured contemporaneously and are defined in Table 1. *Year FE* refers to year fixed effects. Standard errors are double clustered at the acquiror and target country level, and reported in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% levels.

	Dep Var: ln(M&A Value)		
	(1)	(2)	(3)
𝟙(Sm Haven Acquiror)	3.10***	2.88***	1.80***
	(0.31)	(0.37)	(0.31)
𝟙(Lg Haven Acquiror)	1.36***	1.38***	0.75***
	(0.29)	(0.29)	(0.22)
𝟙(Sm Haven Target)	2.61***	2.35***	1.49***
	(0.52)	(0.47)	(0.46)
𝟙(Lg Haven Target)	1.01***	1.03***	0.51**
	(0.13)	(0.21)	(0.22)
ln(Acquiror GDP)	1.15***	1.11***	0.92***
	(0.03)	(0.03)	(0.03)
ln(Target GDP)	1.20***	1.15***	0.99***
	(0.09)	(0.07)	(0.06)
ln(Distance)	-0.61***	-0.54***	-0.39***
	(0.03)	(0.08)	(0.08)
𝟙(Same Country)		-0.17	0.38
		(0.25)	(0.31)
𝟙(Common Language)		0.99***	0.89***
		(0.19)	(0.19)
𝟙(Colonial Relation)		0.73***	0.54***
		(0.13)	(0.14)
ln(Acquiror GDPPC)			0.69***
			(0.11)
ln(Target GDPPC)			0.52***
			(0.11)
Year FE	Yes	Yes	Yes
Two-way SEs	Yes	Yes	Yes
N	794,710	794,710	794,710
Pseudo R^2	0.710	0.738	0.759
Dep Var Mean	4.49	4.49	4.49

Table 4: Abnormal M&A Deal Value in Tax Havens

This table compares abnormal to actual deal value in tax havens. *Abnormal Deal Value* equals *Total Deal Value* minus the predicted M&A deal value had the country not been a tax haven using estimates from column 3 of Table 3. *Total Deal Value* is the total cross-border M&A deal value associated with the tax haven. For details on how *Abnormal Deal Value* and *Total Deal Value* are disaggregated by country, see Section 5.2. The Netherlands Antilles includes Curaçao and Sint Maarten after it was dissolved in 2010. Dollar figures are in billions of 2017 USD.

	Abnormal Deal Value	Total Deal Value	Abnormal/Total
Netherlands	699.2	1,217.4	57.4
Bermuda	326.1	336.4	96.9
Ireland	314.7	499.6	63.0
Switzerland	248.3	835.2	29.7
Luxembourg	166.3	244.2	68.1
Hong Kong	147.2	301.2	48.9
Singapore	126.3	248.2	50.9
Cayman Islands	122.5	127.3	96.2
Netherlands Antilles	44.6	46.0	97.0
British Virgin Islands	36.0	37.0	97.3
Guernsey	29.9	48.0	62.3
Panama	28.1	33.5	83.9
Cyprus	26.5	34.5	76.8
Bahrain	24.1	30.7	78.4
Bahamas	12.3	22.0	55.8
All Other Tax Havens	9.8	68.7	14.3
Total	2,362	4,130	57.2

Table 5: Tax Avoidance from Haven Purchases

This table documents the tax avoidance from haven purchases using two different measures of prior M&A activity and OLS panel regressions at the firm-year level. All variables are defined in Table 2. *Firm Controls* refers to cash/TA, leverage, mechanical ETR effect, profitability, and size, all of which are lagged two periods. *Year and Firm FE* refers to year and firm fixed effects. Standard errors are clustered at the firm level and reported in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% levels.

Panel A: Continuous Measure of Prior M&A Activity

	Dep Var: Cash ETR(i,t)	
	(1)	(2)
ln(Net Sm Haven M&A Value/TA)(i,t-2)	-1.32**	-1.27*
	(0.64)	(0.65)
ln(Net Lg Haven M&A Value/TA)(i,t-2)	-1.12***	-1.10***
	(0.35)	(0.35)
ln(Net Total M&A Value/TA)(i,t-2)	-0.87***	-0.86***
	(0.16)	(0.16)
Haven Subsidiary(i,t-1)		-3.54***
		(1.15)
Firm Controls	Yes	Yes
Year and Firm FE	Yes	Yes
Clustering	Firm	Firm
N	239,044	239,044
Adjusted R^2	0.362	0.362
Dep Var Mean	25.20	25.20

Panel B: Dummy for Prior M&A Activity

	Dep Var: Cash ETR(i,t)	
	(1)	(2)
$\mathbb{1}$(Net Sm Haven M&A Value > 0)(i,t-2)	-3.70***	-3.60***
	(1.28)	(1.29)
$\mathbb{1}$(Net Lg Haven M&A Value > 0)(i,t-2)	-2.72***	-2.68***
	(0.70)	(0.70)
$\mathbb{1}$(Net Total M&A Value > 0)(i,t-2)	-1.94***	-1.92***
	(0.37)	(0.37)
Haven Subsidiary(i,t-1)		-3.54***
		(1.16)
Firm Controls	Yes	Yes
Year and Firm FE	Yes	Yes
Clustering	Firm	Firm
N	239,044	239,044
Adjusted R^2	0.362	0.362
Dep Var Mean	25.20	25.20

Table 6: Validation of Tax Savings using an Event Study

This table documents the relationship between the projected tax savings and the market's response to a deal using OLS regressions. The dependent variable is the market-adjusted cumulative abnormal return from 1 day before the deal announcement to 1 day after. We control for the acquiror's log of market capitalization, Tobin's Q, market leverage, and profitability; the log of deal value; whether the deal involves the sale of assets or units, a public or private standalone target (as opposed to a subsidiary of a public or private firm), and/or a tender offer; whether it is hostile and/or contested (more than 1 bidder); whether the method of payment is equity only or cash only (as opposed to some mixture of the two); and whether the acquiror and target are in related industries (based on 3-digit SIC). All variables are measured contemporaneously and winsorized at the 1% level on both sides. *Year FE* refers to year fixed effects. *Industry FE* refers to fixed effects based on the acquiror's 3-digit SIC. *Country FE* refers to fixed effects based on the tax residence of the acquiror. Standard errors are clustered at the 3-digit SIC of the target and reported in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% levels.

	Dep Var: CAR	
	(1)	(2)
Tax Savings	0.49***	0.20***
	(0.05)	(0.05)
Controls	No	Yes
Year FE	Yes	Yes
Industry FE	Yes	Yes
Country FE	Yes	Yes
N	18,153	18,153
Adjusted R^2	0.027	0.040

Table 7: Identification Using 2004 US Tax Law Change

This table tests whether US firms acquired more large-haven firms in response to a US tax-law change implemented on 10/22/2004 that made inversions more difficult. Poisson pseudo-maximum likelihood estimation is used on this country-pair-year-level panel. The first column is the main specification. The second column tests the robustness of the first by excluding the years 2004-2005, since the United States implemented a repatriation tax holiday in 2004 that was effective during this time. All variables are measured contemporaneously and are defined in Table 1. *Dummies and Interactions* refers to all other combinations of main effects and interactions of the dummies shown in the table, consistent with a triple differences-in-differences research design. *Time-Varying Controls* includes GDP and GDP per capita. *Year FE* refers to year fixed-effects. For the purposes of this regression, calendar years have been replaced with "fiscal" years that begin on October 22 of each year. Standard errors are double clustered at the acquiror and target country level, and reported in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% levels.

	Dep Var: ln(M&A Value)	
	(1)	(2)
$\mathbb{1}$(US Acquiror)×$\mathbb{1}$(Lg Haven Target)×$\mathbb{1}$(Yr≥ 2004)	0.69***	0.72**
	(0.22)	(0.28)
$\mathbb{1}$(US Acquiror)×$\mathbb{1}$(Sm Haven Target)×$\mathbb{1}$(Yr≥ 2004)	-0.19	-0.17
	(0.44)	(0.41)
Sample	All	Excl. 2004/05
Dummies and Interactions	Yes	Yes
Time-Varying Controls	Yes	Yes
Year FE	Yes	Yes
Two-way SEs	Yes	Yes
N	765,984	708,192
Pseudo R^2	0.708	0.710
Dep Var Mean	4.48	4.46

Table 8: Haven Purchases and HQ Relocations

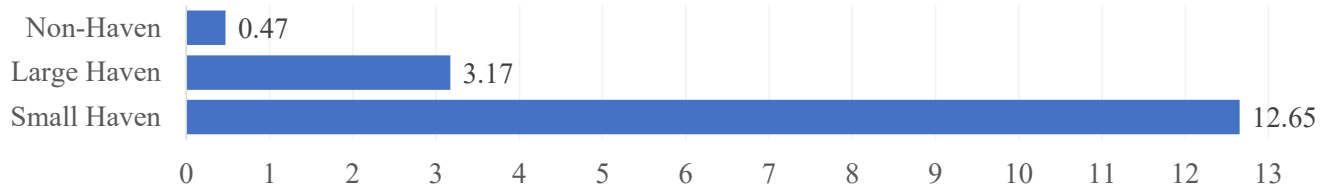
This table tests whether firms that conduct haven purchases are more likely to relocate their headquarters using two different measures of prior M&A activity and OLS panel regressions at the firm-year level. In columns 1 and 2, the dependent variable equals 100 if firm i moved its headquarters to any country at time t from the US or Canada. In columns 3 and 4, the dependent variable equals 100 if firm i moved its headquarters to a tax haven at time t from the US or Canada. Both variables are 0 if the firm is currently headquartered in the US or Canada. All variables are measured contemporaneously. *Firm Controls* refers to the following variables which are defined in Table 2: cash/TA, leverage, profitability, and size. *Year and Firm FE* refers to year and firm fixed effects. Standard errors are clustered at the firm level and reported in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% levels.

	Moved HQ(i,t)		Moved HQ to Haven(i,t)	
	(1)	(2)	(3)	(4)
ln(Net Sm Haven M&A Value/TA)(i,t)	0.42*		0.40*	
	(0.24)		(0.22)	
ln(Net Lg Haven M&A Value/TA)(i,t)	0.46***		0.44***	
	(0.16)		(0.15)	
ln(Net Total M&A Value/TA)(i,t)	0.07***		0.01	
	(0.03)		(0.01)	
$\mathbb{1}$(Net Sm Haven M&A Value >0)(i,t)		1.29**		0.97*
		(0.59)		(0.50)
$\mathbb{1}$(Net Lg Haven M&A Value >0)(i,t)		0.63***		0.52***
		(0.21)		(0.17)
$\mathbb{1}$(Net Total M&A Value >0)(i,t)		0.10*		0.05
		(0.06)		(0.04)
Firm Controls	Yes	Yes	Yes	Yes
Year and Firm FE	Yes	Yes	Yes	Yes
Clustering	Firm	Firm	Firm	Firm
N	194,892	194,892	194,762	194,762
Adjusted R^2	0.105	0.104	0.070	0.068
Dep Var Mean	0.16	0.16	0.03	0.03

Figure 1: Ratio of Cross-Border to Intra-Country M&A Deal Value

These figures plots the ratio of cross-border to intra-country M&A deal value.

Panel A: Based on Acquiror Location



Panel B: Based on Target Location

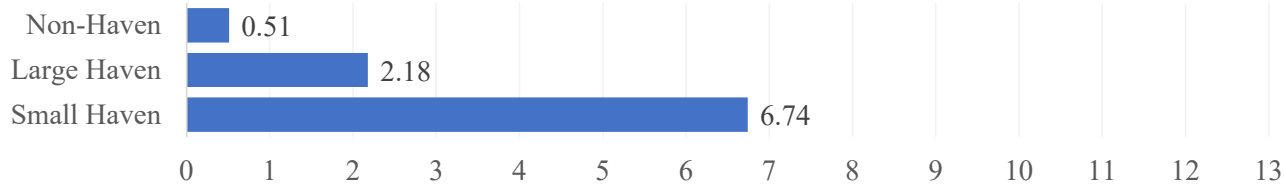
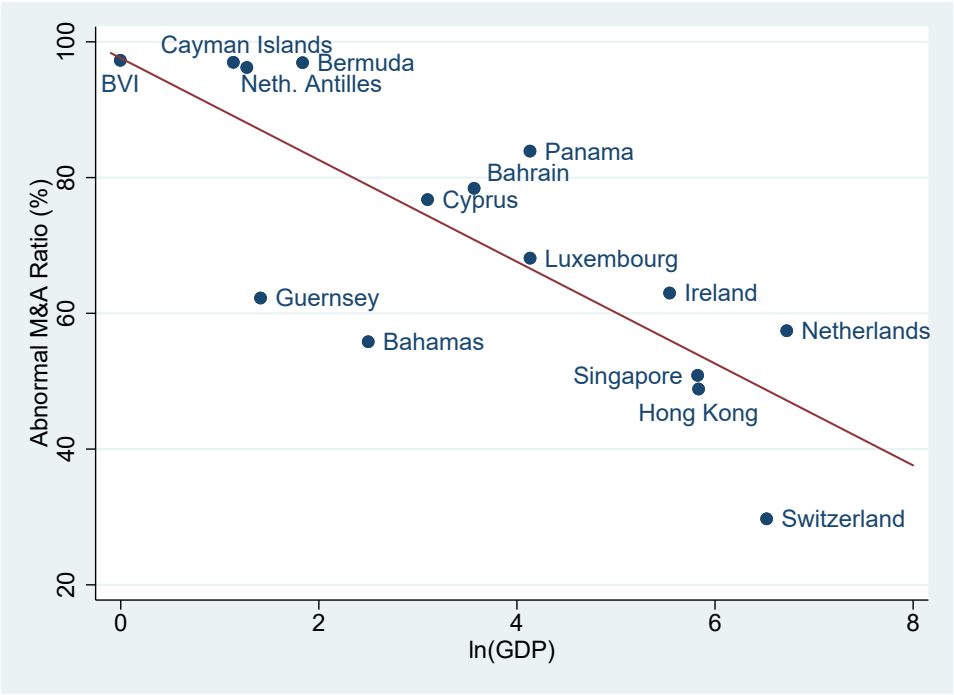


Figure 2: Abnormal to Total M&A Deal Value vs GDP

This figure compares the ratio of abnormal to total M&A deal value with ln(GDP) (in billions) for the havens listed in Table 4. *BVI* refers to the British Virgin Islands.



For Online Publication

Internet Appendix to

"Tax Avoidance through Cross-Border Mergers and Acquisitions"

A Country-Level Data Notes

A.1 Accounting for Missing Data

Gibraltar. We obtain GDP and GDP per capita from the government's website. Since Gibraltar's fiscal year ends on June 30, we denote GDP for the year ending June 30 as actually ending 6 months later, on December 31. The data is available from 2005-2017. Since the Gibraltar Pound is pegged 1-1 with the British Pound, we convert it to US dollars using the GBR-to-USD exchange rate as of June 30 each year.[24]

Guernsey and Jersey. We obtain GDP data from three sources. First, the WDI provides GDP and GDP per capita for the Channel Islands, without separately listing Guernsey and Jersey, from 1998-2007. Second, we obtain data for Jersey from the government of Jersey's website.[25] We use Gross Value Added as a proxy for GDP since it covers more years and is very similar to GDP for the years when both are available. For Guernsey, we obtain GDP data from its government's website.[26] Since the data from both sources is in 2018 units of local currency, we convert this to US Dollars using the GBR-to-USD exchange rate on December 31, 2018. We are left with Guernsey GDP and GDP per capita data from 2009-2018, Jersey GDP data from 1998-2018, and Jersey GDP per capita data from 2000-2018. Next, we fill in missing Jersey population data from 1998-1999, and Guernsey GDP and population data from 1998-2007 using the WDI Channel Islands data. Using data from 2009-2018, we take the average share of Channel Islands GDP and population for Jersey and

[24]Statistics Office, HM Government of Gibraltar (2017): "Abstract of Statistics 2016," `https://www.gibraltar.gov.gi/uploads/statistics/2019/Reports/AbstractofStatistics2016wholereport.pdf` (accessed August 11, 2020).

[25]Government of Jersey (2019): "National Accounts: GVA and GDP," October 2 `https://opendata.gov.je/dataset/national-accounts` (accessed August 11, 2020).

[26]States of Guernsey (2019): "Guernsey Annual GVA and GDP Bulletin," August 15 `https://gov.gg/CHttpHandler.ashx?id=120674&p=0` (accessed August 11, 2020).

Guernsey. We then use these shares to disaggregate the Channel Islands data into data for Jersey and Guernsey.

Since Jersey and Guernsey are not in the CEPII GeoDist Database, we gather the necessary data from additional sources. First, we need the bilateral geographic distance between the most populous cities in Jersey and Guernsey, and those for the remaining countries. We use the distances between the UK and all other countries as an approximation since London is relatively close to the most populous cities of Jersey and Guernsey. We manually fill in the distance between Jersey and Guernsey, which is 43.3 km. Next, we need the official language(s) of each of these countries. Based on information from Encyclopædia Britannica, the official language of Guernsey is English,[27] and the official languages of Jersey are English and French.[28] Based on the definition of the same country dummy, Jersey and Guernsey were never part of another country. Lastly, the colonial relation dummy should equal 1 only when Jersey or Guernsey are paired with the UK.

Luxembourg. The capital account openness measure (KAOPEN) used in Table C3 from Chinn and Ito (2006) is missing for Luxembourg. We replace the missing Luxembourg values with those of Belgium given their longstanding economic union.[29] Since KAOPEN is similarly high across all founding EU countries, we would have obtained similar results if we had instead used the values from France, Germany, or the Netherlands for Luxembourg.

A.2 Ireland

Ireland's GDP is highly volatile and does not reflect domestic economic activity due to tax avoidance by US multinationals, particularly high-tech companies such as Alphabet or Apple (Lane, 2017). For instance, due to a one-off internal reorganization of Apple's tax avoidance operations, Ireland's GDP grew by more than a quarter in 2015. As a result, the Irish Central Bank and the Central Statistics Office Ireland developed alternative macroeconomic indicators to GDP to more accurately measure the development of the Irish economy. We use GNI instead of GDP for Ireland, since Ireland's GNI is less affected by the aforementioned tax avoidance techniques of US firms.

[27]Encyclopædia Britannica (2020): "Guernsey," August 12 `https://www.britannica.com/place/Guernsey-island-and-bailiwick-Channel-Islands-English-Channel` (accessed August 12, 2020).

[28]Encyclopædia Britannica (2020): "Jersey," August 12 `https://www.britannica.com/place/Jersey-island-Channel-Islands-English-Channel` (accessed August 12, 2020).

[29]Encyclopædia Britannica (2020): "The Benelux Economic Union," October 9 `https://www.britannica.com/topic/international-trade/The-Benelux-Economic-Union` (accessed October 9, 2020).

B Proof of Abnormal Deal Value Disaggregation

Define H as the set of all havens. Since we define $\alpha_{ij,t}$ for all country pairs where at least one side is in a haven, we can express the sum as

$$\sum_i \sum_j \sum_t \alpha_{ij,t} = \sum_{i \notin H} \sum_{j \in H} \sum_t \alpha_{ij,t} + \sum_{i \in H} \sum_{j \notin H} \sum_t \alpha_{ij,t} + \sum_{i \in H} \sum_{j \in H} \sum_t \alpha_{ij,t}. \tag{17}$$

Rearranging the order of summation and breaking up the final term into two parts yields

$$\sum_i \sum_j \sum_t \alpha_{ij,t} = \sum_t \left(\sum_{i \notin H} \sum_{j \in H} \alpha_{ij,t} + \sum_{i \in H} \sum_{j \notin H} \alpha_{ij,t} + \frac{1}{2} \left(\sum_{i \in H} \sum_{j \in H} \alpha_{ij,t} + \sum_{i \in H} \sum_{j \in H} \alpha_{ij,t} \right) \right). \tag{18}$$

Changing the index labels, rearranging the order of summation, and substituting for α_h completes the proof.

$$\begin{aligned}
\sum_i \sum_j \sum_t \alpha_{ij,t} &= \sum_t \left(\sum_{i \notin H} \sum_{h \in H} \alpha_{ih,t} + \sum_{h \in H} \sum_{j \notin H} \alpha_{hj,t} + \frac{1}{2} \left(\sum_{i \in H} \sum_{h \in H} \alpha_{ih,t} + \sum_{h \in H} \sum_{j \in H} \alpha_{hj,t} \right) \right) \\
&= \sum_h \sum_t \left(\sum_{i \notin H} \alpha_{ih,t} + \sum_{j \notin H} \alpha_{hj,t} + \frac{1}{2} \left(\sum_{i \in H} \alpha_{ih,t} + \sum_{j \in H} \alpha_{hj,t} \right) \right) \\
&= \sum_h \alpha_h
\end{aligned}$$

C Mechanical ETR Effect from M&A

In the haven purchases regressions, we assess whether haven purchases result in lower future tax rates as a result of tax avoidance facilitated by the deals. To ensure that we are capturing tax avoidance and not the mechanical effect from combining entities with different tax rates, we construct a variable measuring this mechanical effect and include it as a control. For example, if a firm with \$4 million in pre-tax income and a 25% ETR buys a firm with \$1 million in pre-tax income and a 20% ETR, then the predicted ETR of the combined firm would be 24%, all else equal. Thus, this deal would result in 1 percentage point mechanical drop in the firm's ETR.

Denote the total amount of taxes paid from year $t-2$ to year $t-1$ attributable to all targets acquired by firm i in year t as $txpd^B_{i,t-1}$, where the superscript B denotes the "buyside" financials relative to firm i. Similarly, let the total amount of taxes paid from year $t-2$ to year $t-1$ attributable to all subsidiaries/assets sold by firm i in year t be denoted as $txpd^S_{i,t-1}$, where the superscript S denotes the "sellside" financials relative to firm i. Define the total buyside (sellside) pre-tax income from year $t-2$ to year $t-1$ analogously as

$pi^B_{i,t-1}$ ($pi^S_{i,t-1}$). We measure the inputs of the cash ETR over two years to be consistent with the measurement of the dependent variable in the haven purchases regressions. Firm i's financials are denoted without any superscript. This implies that firm i's ETR in year t would be as follows, holding all else constant:

$$\frac{txpd_{i,t-1} + txpd^B_{i,t-1} - txpd^S_{i,t-1}}{pi_{i,t-1} + pi^B_{i,t-1} - pi^S_{i,t-1}}. \tag{19}$$

This "all else constant" statement implies that, had the firm not been part of any M&A transactions in year t, its cash ETR in year t would be the same as in year $t-1$. Thus, the mechanical effect on the firm's ETR from M&A deals in year t can be written as

$$z_{i,t} = \frac{txpd_{i,t-1} + txpd^B_{i,t-1} - txpd^S_{i,t-1}}{pi_{i,t-1} + pi^B_{i,t-1} - pi^S_{i,t-1}} - \frac{txpd_{i,t-1}}{pi_{i,t-1}}. \tag{20}$$

Intuitively, selling assets with high tax rates or buying assets with low tax rates mechanically reduces the overall firm's ETR, and would result in $z_{i,t} < 0$. Conversely, selling assets with low tax rates or buying assets with high tax rates mechanically increases the firm's ETR, and would result in $z_{i,t} > 0$. If the firm is not part of any M&A deals during year t, then $z_{i,t} = 0$. Since we are interested in the cumulative mechanical effect of prior M&A, we include the following variable as a control in the haven purchases regressions:

$$Z_{i,t} = \sum_{s=1992}^{t} z_{i,s}. \tag{21}$$

Estimating the inputs $z_{i,t}$ requires some assumptions since only a minority of buyside targets are standalone public firms. On the sellside, we only look at non-standalone targets, since if the firm sold itself there would be no need to track the effect that this has on the firm's ETR, as it would cease to exist as a standalone firm. First, let us state how buyside financials are determined for deals involving a standalone target for firm i in year t. We explain the order of replacement for taxes paid. The procedure for pre-tax income is the same.

1. Taxes paid of the target in year $t-1$

2. Market capitalization-weighted-average of taxes paid at time $t-1$ divided by market capitalization at time t of firms in the same country and industry as the target. This average is then multiplied by the deal value.

3. Market capitalization-weighted-average of taxes paid at time $t-1$ divided by market capitalization at time t of firms in the same industry as the target. This average is

then multiplied by the deal value.

That is, we try the first method, and, if that is missing, then we try the second method, and so on. Each average requires at least 10 observations. Moreover, within each step involving an industry average, we first define the industry using the first 4 digits of the SIC code, and then by the first 3 digits, and so on, down to the first digit.

In cases (on the buyside or sellside), when the target is not a standalone firm, steps 2 and 3 are the same as when the target is a standalone firm. Step 1 becomes

1. If the target is in the same industry (3-digit SIC) as the target's parent, then use the taxes paid of the target's parent in year $t-1$ divided by the target's parent's market capitalization in year t. This ratio is then multiplied by the deal value.

Next, after determining the buyside financials appropriate for each deal, we sum over all deals in year t to arrive at $txpd^B_{i,t-1}$. Likewise, summing taxes paid over all sellside deals in year t yields $txpd^S_{i,t-1}$. To minimize the effect of outliers, we winsorize $z_{i,t}$ at the 1% level on both sides of the distribution, consistent with our treatment of other firm-level variables involving financial statement data in the haven purchases regressions. Lastly, to ensure that the mechanical effects make sense, we make the following assumptions:

1. The ETR of firm i cannot be predicted (based on the mechanical effect of M&A) to fall below 0% in year t if it was positive in year $t-1$.

2. The ETR of firm i cannot be predicted (based on the mechanical effect of M&A) to increase above 100% in year t if it was below 100% in year $t-1$.

3. The mechanical effect cannot be negative in year t if the ETR of firm i was non-positive in year $t-1$. In this case, $z_{i,t}$ is set to 0.

4. The mechanical effect cannot be positive in year t if the ETR of firm i was at or above 100% in year $t-1$. In this case, $z_{i,t}$ is set to 0.

D Calculation of Pre-Tax Income

In this appendix, we will explain how $P_{k,t(k)}$, the target's pre-tax income, is calculated for the purposes of aggregate tax avoidance from asset building in cases where the firm-year measure is missing. We first calculate the average ratio of pre-tax income to market capitalization in the following order:

1. Market capitalization-weighted-average by the country and industry of the target in year $t(k)$ for deal k

2. Market capitalization-weighted-average by the country and industry of the acquiror in year $t(k)$ for deal k

3. Market capitalization-weighted-average by the industry of the target in year $t(k)$ for deal k

That is, we try the first method, and, if that is missing, we try the second method, and so on. Each average requires at least 10 observations. Moreover, within each step involving an industry average, we first define the industry based on the first 4 digits of the SIC code, then by the first 3 digits, and so on, down to the first digit. Once we obtain this figure, we multiply it by the deal value for deal k to arrive at $P_{k,t(k)}$.

E Tax Savings Examples

E.1 Haven Purchases

E.1.1 Phillips-Van Heusen Corp

Phillips-Van Heusen (PVH) Corp, a US tax-resident, was involved in four M&A during the sample period. It sold one of its brands in 1999 for \$101.8 million, and then made two non-haven acquisitions in 2001 and 2007 for \$23.8 million and \$44.9 million, respectively. It then made one haven purchase in 2010, acquiring Tommy Hilfiger, a Hong Kong resident, for \$3,597.5 million. Since the net amount of non-haven M&A is negative (23.8+44.9-101.8<0), $NON_{i,T} = 0$. Moreover, PVH did not have any small-haven M&A deals, so only $LG_{i,T}$ and $ANY_{i,T}$ are positive. Next, the inflation adjusted total assets for PVH in 2018 is \$11,817.7 million. Substituting these values into equation 9 yields

$$\begin{aligned}\Delta\tau_{i,T+2} &= -(1.12 + 0.87) \times \ln\left(100 \times \frac{3,597.5}{11,817.7} + 1\right) \\ &= -6.85.\end{aligned}$$

Thus, the total savings from cross-border M&A for PVH is 6.85%. This is also represents the savings from haven purchases. To get the amount of dollar tax savings, we need PVH's inflation-adjusted pre-tax income from 2018. This figure is \$501.7 million. Thus, the tax avoidance from haven purchases for PVH is

$$\begin{aligned}P_{i,T+2} \times \frac{\Delta\tau_{i,T+2}}{100} &= 501.7 \times \left(-\frac{6.85}{100}\right) \\ &= -34.3.\end{aligned}$$

This represents tax avoidance of $34.3 million.

E.1.2 Eaton Corp PLC

Between 1990 and 2018, Eaton was involved in 14 M&A deals worth $15,925.7 million on a net basis. One of these deals worth $12,498.4 was a large-haven purchase. There were no deals involving a small-haven. Eaton's inflation adjusted assets in 2018 were $30,393.9. Substituting these values into equation 9 yields

$$\begin{aligned}\Delta\tau_{i,T+2} &= -1.12 \times \ln\left(100 \times \frac{12,498.4}{30,393.9} + 1\right) - 0.87 \times \ln\left(100 \times \frac{15,925.7}{30,393.9} + 1\right) \\ &= -7.63.\end{aligned}$$

Thus, the total savings from cross-border M&A for Eaton is 7.63%. Given that the inflation-adjusted pre-tax income was $2,011.9 in 2018, the total dollar savings from haven and non-haven purchases is

$$\begin{aligned}P_{i,T+2} \times \frac{\Delta\tau_{i,T+2}}{100} &= 2,011.9 \times \left(-\frac{7.63}{100}\right) \\ &= -153.6,\end{aligned}$$

which represents a savings of $153.6 million. Breaking the savings up into haven and non-haven savings requires more work. Importantly, since the natural log is nonlinear, the order in which the deals enter $\ln(ANY_{i,T})$ matters. We account for order down to the year level. Specifically, the haven and non-haven components of $\ln(ANY_{i,T})$ are broken down as follows in general, where the sum of LG_t and SM_t is denoted as H_t:

$$\begin{aligned}\ln(ANY_t) &= \sum_{s=1}^{t} [\ln(ANY_s) - \ln(ANY_{s-1})] + \ln(ANY_0) \\ &= \sum_{s=1}^{t} [\ln(ANY_s) - \ln(ANY_{s-1}) + \ln(\Delta H_s + ANY_{s-1}) - \ln(\Delta H_s + ANY_{s-1})] \\ &+ \ln(ANY_0) + \ln(H_0) - \ln(H_0) \\ &= \sum_{s=1}^{t} [\ln(\Delta H_s + ANY_{s-1}) - \ln(ANY_{s-1})] + \ln(H_0) \\ &+ \sum_{s=1}^{t} [\ln(ANY_s) - \ln(\Delta H_s + ANY_{s-1})] + \ln(ANY_0) - \ln(H_0) \\ &= \eta_t + \mu_t,\end{aligned}$$

where η_t and μ_t are the haven and non-haven components of $\ln(ANY_{i,T})$, respectively.

$$\eta_t = \sum_{s=1}^{t} [\ln(\Delta H_s + ANY_{s-1}) - \ln(ANY_{s-1})] + \ln(H_0) \tag{22}$$

$$\mu_t = \sum_{s=1}^{t} [\ln(ANY_s) - \ln(\Delta H_s + ANY_{s-1})] + \ln(ANY_0) - \ln(H_0) \tag{23}$$

We can thus break down equation 9 as follows:

$$\Delta\tau_{i,T+2} = -1.32 \times \ln(SM_{i,T}) - 1.12 \times \ln(LG_{i,T}) - 0.87 \times \eta_T - 0.87 \times \mu_T. \tag{24}$$

For Eaton, η_t is 0 from 1990-2011, as they had no haven M&A deals during this time. The first haven M&A deal occurred in 2012, when they purchased a large-haven firm for \$12.5 billion. This caused η_{2012} to equal 0.97. It then increased slightly over the years as Eaton's assets decreased. Finally, in 2018, $\eta_{2018} = 1.15$. As for μ_t, it was 0 from 1990-2006. Eaton was a net seller during this time. Then, in 2007, it increased to 1.12 following a \$539.5 million non-haven purchase. In 2008, it increased to 3.02 following a \$3.4 billion non-haven purchase. Following an increase in Eaton's assets, along with a \$285 million asset sale in 2014, μ_t fell to 2.80 in 2014. It then increased slightly due to a decrease in Eaton's assets, ending the sample period with a value of 2.83. Thus, the percentage point savings from haven purchases is given by:

$$-1.12 \times \ln\left(100 \times \frac{12,498.4}{30,393.9} + 1\right) - 0.87 \times 1.15 = -5.18,$$

and the percentage point savings from non-haven M&A are given by:

$$-0.87 \times 2.83 = -2.45.$$

Multiplying these figures by Eaton's pre-tax income of \$2,011.9 million yields dollar savings from haven and non-haven purchases of \$104.2 million and \$49.4 million, respectively.

E.2 Asset Building

E.2.1 Actavis PLC acquires Allergan Inc

In 2015, Actavis, an Ireland tax resident, acquired Allergan, a US tax resident, for \$68,445.4 million. Allergan had pre-tax income of \$1,989.3 million in 2014. Compounding this to 2017 at the rate of earnings growth results in $P_{k,t(k)} = 2,202.4$. Lastly, since Actavis was resident in a large haven, $\Delta\tau_{h(k)} = -4.66\%$. Thus, the asset building savings associated with this deal is

$$P_{k,t(k)} \times \Delta\tau_{h(k)} = 2,202.4 \times \left(-\frac{4.66}{100}\right)$$
$$= -102.6,$$

which represents a savings of $102.6 million.

E.2.2 Wilmar International Ltd acquires PPB Oil Palms

In 2007, Wilmar International, a tax resident of Singapore, acquired PPB Oil Palms, a tax resident of Malaysia, for $1,124.6 million. Since PPB Oil Palms is not in Compustat, we obtain a country-industry average measure of its pre-tax income. PPB Oil Palms is in the vegetable oil mills industry, with an SIC of 2076. There are no comparable firms in Malaysia with this SIC, so we try using only the first three digits of the SIC. There are 31 firms with SICs from 2070-2079 in Malaysia. These firms are broadly classified as engaged in the production of fats and oils. The average ratio of pre-tax income to market cap, weighted by market cap, is 8.67%. Multiplying this by the deal value yields $0.0867 \times 1,124.6 = 97.5$. Compounding this using the rate of earnings growth yields $P_{k,t(k)} = 127.0$. Lastly, since Wilmar is a large-haven resident, $\Delta\tau_{h(k)} = -4.66\%$. Thus, the asset building savings associated with this deal is

$$P_{k,t(k)} \times \Delta\tau_{h(k)} = 127.0 \times \left(-\frac{4.66}{100}\right)$$
$$= -5.9,$$

which represents a savings of $5.9 million.

F Further Alternative Explanations and Robustness Tests

Secrecy and Anonymity Offered by Havens. Alternative explanations for our results with regards to the pursuit of anonymity and secrecy via havens are not applicable. While many might consider tax avoidance unethical, and companies might not be following the spirit of tax laws, firms are following the letter of the law, making tax avoidance legal. Hiding assets with the help of the anonymity provided by havens only applies to the illegal practices of tax evasion, which are beyond the scope of this paper. Moreover, if multinationals engaging in cross-border, haven M&A were using the secrecy of havens for illegal purposes,

we would not have been able to obtain the transaction-level data documented in this paper.

Corporate Governance. One could be concerned that executives use haven M&A to enjoy the "quiet life," undisturbed by shareholders (Bertrand and Mullainathan, 2003), by exploiting the generally worse shareholder protection laws in havens compared to those of major economies such as the US or the UK. This is implausible. First, if executives wanted to enjoy a "quiet life" through bad corporate governance that shields them from demanding shareholders, there are easier ways to do so, such as adopting staggered boards or poison pills, rather than engaging in cross-border, haven M&A (Gompers et al., 2003; Bebchuk and Cohen, 2003). Second, cross-border M&A involving havens such as Bermuda or Ireland implies the opposite of the "quiet life" hypothesis, since executives have to manage a more complex corporate organization and have to spend a substantial amount of time interacting with tax lawyers and accountants to implement and operate these corporate structures.

Legal and Regulatory Constraints. M&A could also be structured through havens as intermediaries to avoid legal and regulatory constraints such as capital controls. For instance, this might be the case for M&A between firms in Hong Kong and mainland China (which are coded by SDC and us as cross-border). To address this, we rerun our main gravity-model specification and restrict the sample such that the acquiror or target is in an economically open non-haven or both sides of the deal are in a haven. Open non-haven countries include the United States, Canada, and non-haven countries in Western Europe, since these countries have liberalized and opened their economies to a much greater extent than many other parts of the world. The results reported in column 1 of Table C3 indicate that our results are robust to this alternative story.

Additional Control Variables and Samples. We run robustness tests for the gravity model controlling for capital account openness (Chinn and Ito, 2006), double tax treaties and exchange of information agreements from the Exchange of Information Database (2019), bilateral investment treaties (Bian et al., 2021), and economic integration agreements (Kellogg Institute for International Studies, 2019). Tables C3 and C4 indicate that our results are robust to these controls. If we exclude firms in the banking industry (based on the Fama-French 48 definition) from the sample, abnormal deal value falls from \$2.4 to \$2.1 trillion, and aggregate tax avoidance from cross-border M&A increases from \$65.5 to \$67.0 billion.

Alternative Clustering. We double cluster standard errors in all gravity models at both the acquirer- and target-country-level since this generally results in the largest and thus most conservative standard errors. To document robustness, we replicate column 2 of Table C2 using country-pair clustering and report the results in column 3 of Table C4. The haven coefficients remain statistically significant.

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G Additional Results

Table C1: M&A Summary Statistics

This table reports M&A summary statistics based on the location of the acquiror/target and whether the deal is cross-border or intra-country.

Panel A: Total Deal Value (Billions of 2017 USD)

	Acquiror	Target	
Cross-Border	\$11,687	\$12,639	
Intra-Country	\$24,614	\$24,614	Non-Haven
Ratio	0.47	0.51	
Cross-Border	\$1,924	\$1,322	
Intra-Country	\$607	\$607	Large Haven
Ratio	3.17	2.18	
Cross-Border	\$749	\$399	
Intra-Country	\$59	\$59	Small Haven
Ratio	12.65	6.74	

Table C1: M&A Summary Statistics (Continued)

Panel B: Number of Deals

	Acquiror	Target	
Cross-Border	43,209	46,939	
Intra-Country	116,584	116,584	Non-Haven
Ratio	0.37	0.40	
Cross-Border	6,370	4,179	
Intra-Country	4,036	4,036	Large Haven
Ratio	1.58	1.04	
Cross-Border	2,596	1,057	
Intra-Country	232	232	Small Haven
Ratio	11.19	4.56	

Panel C: Mean Deal Value (Millions of 2017 USD)

	Acquiror	Target	
Cross-Border	$270	$269	Non-Haven
Intra-Country	$211	$211	
Cross-Border	$302	$316	Large Haven
Intra-Country	$150	$150	
Cross-Border	$288	$377	Small Haven
Intra-Country	$255	$255	

Panel D: Median Deal Value (Millions of 2017 USD)

	Acquiror	Target	
Cross-Border	$31	$32	Non-Haven
Intra-Country	$22	$22	
Cross-Border	$35	$31	Large Haven
Intra-Country	$17	$17	
Cross-Border	$41	$52	Small Haven
Intra-Country	$31	$31	

Table C2: Gravity Model with Additional Controls

This is the second of two tables documenting the effect of tax havens on cross-border M&A deal value. Relative to Table 3, this table uses a larger set of control variables with more limited country coverage. Poisson pseudo-maximum likelihood estimation is used on this country-pair-year-level panel. All variables are measured contemporaneously and are defined in Table 1. *Year FE* refers to year fixed effects. Baseline Controls refers to the control variables used in Table 3. Standard errors are double clustered at the acquiror and target country level, and reported in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% levels.

	Dep Var: ln(M&A Value)		
	(1)	(2)	(3)
𝟙(Sm Haven Acquiror)	2.25***	2.09***	2.12***
	(0.26)	(0.29)	(0.30)
𝟙(Lg Haven Acquiror)	0.68***	0.73***	0.73***
	(0.19)	(0.26)	(0.26)
𝟙(Sm Haven Target)	1.70***	1.45***	1.45***
	(0.47)	(0.37)	(0.35)
𝟙(Lg Haven Target)	0.43***	0.47***	0.46**
	(0.15)	(0.15)	(0.19)
ln(Acquiror Control of Corruption)	2.11***	1.77***	1.76***
	(0.51)	(0.31)	(0.31)
ln(Target Control of Corruption)	1.31***	0.88***	0.88***
	(0.34)	(0.31)	(0.31)
𝟙(Acquiror UK Legal Origin)		0.66***	0.67***
		(0.19)	(0.20)
𝟙(Target UK Legal Origin)		0.82***	0.81***
		(0.17)	(0.17)
ln(Acquiror Exports)			0.03
			(0.05)
ln(Acquiror Imports)			-0.01
			(0.07)
Baseline Controls	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Two-way SEs	Yes	Yes	Yes
N	447,434	447,434	447,434
Pseudo R^2	0.753	0.765	0.765
Dep Var Mean	4.50	4.50	4.50

Table C3: Gravity Model Robustness Tests I/II

This is the first of two tables testing the robustness of the results in Table C2. *Controls* refers to the controls used in column 2 of Table C2. To be included in the *Open* sample, both the acquiror and the target must be in tax havens or at least one side of the deal must be from an economically open/liberalized country, which includes Canada, the United States, and the non-haven countries of Western Europe. *KAOPEN* measures a country's capital account openness (Chinn and Ito, 2006). The *EOI* and *Double Tax Treaty* dummies are from the Exchange of Information Database (2019). Standard errors are double clustered at the acquiror and target country level, and are reported in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% levels.

	Dep Var: ln(M&A Value)		
	(1)	(2)	(3)
𝟙(Sm Haven Acquiror)	2.06***	1.78***	2.03***
	(0.34)	(0.25)	(0.28)
𝟙(Lg Haven Acquiror)	0.72**	0.77**	0.76***
	(0.32)	(0.30)	(0.26)
𝟙(Sm Haven Target)	1.42***	0.86***	1.40***
	(0.35)	(0.29)	(0.36)
𝟙(Lg Haven Target)	0.49***	0.53***	0.46***
	(0.16)	(0.15)	(0.12)
ln(Acquiror KAOPEN)		0.18	
		(0.45)	
ln(Target KAOPEN)		0.62	
		(0.58)	
𝟙(Double Tax Treaty)			-0.03
			(0.16)
𝟙(On Request EOI)			0.31**
			(0.14)
𝟙(Automatic EOI)			0.40
			(0.27)
Controls	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Clustering	Two-way	Two-way	Two-way
Sample	Open	All	All
N	136,864	414,696	447,434
Pseudo R^2	0.755	0.780	0.767
Dep Var Mean	4.78	4.51	4.50

Table C4: Gravity Model Robustness Tests II/II

This is the second of two tables testing the robustness of the results in Table C2. *Controls* refers to the controls used in column 2 of Table C2. The *Bilateral Investment Treaty* dummy equals 1 if the country pair has a bilateral investment treaty at time t (Bian et al., 2021). The dummies on economic integration agreements in the second column are from the NSF-Kellogg Institute Database on Economic Integration Agreements (Kellogg Institute for International Studies, 2019). Standard errors are clustered at the country-pair level or double-clustered at the acquiror- and target-country level, and are reported in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% levels.

	Dep Var: ln(M&A Value)		
	(1)	(2)	(3)
𝟙(Sm Haven Acquiror)	2.07***	2.25***	2.09***
	(0.29)	(0.25)	(0.25)
𝟙(Lg Haven Acquiror)	0.74***	0.80***	0.73***
	(0.26)	(0.21)	(0.17)
𝟙(Sm Haven Target)	1.43***	1.59***	1.45***
	(0.37)	(0.38)	(0.24)
𝟙(Lg Haven Target)	0.48***	0.54***	0.47**
	(0.14)	(0.14)	(0.19)
𝟙(Bilateral Investment Treaty)	-0.34***		
	(0.11)		
𝟙(Non-Reciprocal PTA)		-0.30	
		(0.25)	
𝟙(Preferential Trade Agreement)		0.44	
		(0.36)	
𝟙(Free Trade Agreement)		-0.13	
		(0.17)	
𝟙(Customs Union)		0.07	
		(0.24)	
𝟙(Common Market)		0.62**	
		(0.27)	
𝟙(Economic Union)		0.08	
		(0.28)	
Controls	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Clustering	Two-way	Two-way	Ctry-Pair
Sample	All	All	All
N	447,434	443,828	447,434
Pseudo R^2	0.766	0.768	0.765
Dep Var Mean	4.50	4.51	4.50

Table C5: Tax Implications of Asset Building

This table tests whether asset building results in an increase in the acquiror's tax rate. A variable tracking prior asset building deals is added to the specification from column 1 of Table 5. Asset building deals occur when a haven-resident acquires a non-haven resident in a cross-border deal. Standard errors are clustered at the firm level and reported in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% levels.

Panel A: Continuous Measure of Prior M&A Activity

	Cash ETR(t)
ln(Asset Building M&A Value/TA)(i,t-2)	-0.04
	(0.41)
ln(Net Sm Haven M&A Value/TA)(i,t-2)	-1.31**
	(0.64)
ln(Net Lg Haven M&A Value/TA)(i,t-2)	-1.12***
	(0.35)
ln(Net Total M&A Value/TA)(i,t-2)	-0.87***
	(0.16)
Firm Controls	Yes
Year and Firm FE	Yes
Clustering	Firm
N	239,256
Adjusted R^2	0.361
Dep Var Mean	25.20

Panel B: Dummy for Prior M&A Activity

	Cash ETR(t)
$\mathbb{1}$(Asset Building M&A Value > 0)(i,t-2)	-0.35
	(1.02)
$\mathbb{1}$(Net Sm Haven M&A Value > 0)(i,t-2)	-3.71***
	(1.28)
$\mathbb{1}$(Net Lg Haven M&A Value > 0)(i,t-2)	-2.73***
	(0.70)
$\mathbb{1}$(Net Total M&A Value > 0)(i,t-2)	-1.91***
	(0.38)
Firm Controls	Yes
Year and Firm FE	Yes
Clustering	Firm
N	239,256
Adjusted R^2	0.361
Dep Var Mean	25.20

H Examples

H.1 Asset Building

The table below reports a selection of large asset building deals. For asset deals, the target location reported in SDC is the location of economic activity, which we equate with the headquarters. The incorporation is listed as *Unknown* in cases where it is missing for a standalone firm, which most commonly occurs when the firm is private. *Year* refers to the year the deal was completed. *Value* refers to the raw (not inflation adjusted) deal value in millions of USD.

Table C6: Asset Building Examples

Actavis Plc (now Allergan Plc): A pharmaceutical company that relocated their headquarters and incorporation from the US to Ireland in 2013. After merging with Allergan Inc, the combined entity was called Allergan Plc.

Target Name	Headquarters	Incorporation	Residence	Year	Value
Forest Laboratories Inc	United States	United States	United States	2014	$25,440
A pharmaceutical company that marketed a portfolio of branded drugs including those that treated gastrointestinal and respiratory ailments.					
Durata Therapeutics Inc	United States	United States	United States	2014	$800
A pharmaceutical company that developed antibiotics.					
Allergan Inc	United States	United States	United States	2015	$68,445
A pharmaceutical company and the maker of Botox.					
Auden Mckenzie Holdings Ltd	United Kingdom	Unknown	United Kingdom	2015	$461
A pharmaceutical company with a large portfolio of branded and generic products that treated a variety of conditions.					

Table C6: Asset Building Examples (Continued)

Arcelor SA (now ArcelorMittal): A Luxembourg tax resident and one of the largest producers of steel in the world. After merging with Mittal Steel Company NV in 2006, the combined entity was called ArcelorMittal.

Target Name	Headquarters	Incorporation	Residence	Year	Value
Dofasco Inc	Canada	Canada	Canada	2006	$4,807
A steel producer based in Canada.					
Sicartsa	Mexico	Unknown	Mexico	2007	$1,440
A steel producer with production facilities in Mexico and Texas and an annual production capacity of about 2.7 million tons.					
Bayou Steel Corp	United States	Unknown	United States	2008	$509
A steel producer with production facilities in Louisiana and Tennessee.					
Brazilian Iron Ore Assets	Brazil	Asset Deal	Brazil	2008	$817
Acquired from London Mining, a UK-based developer of mines worldwide.					
Coal Mines	Russia	Asset Deal	Russia	2008	$720
The mines, along with the associated coal deposit mining rights, were acquired from Severstal, a Russian steel and mining company.					
Unicon	Venezuela	Unknown	Venezuela	2008	$350
A manufacturer of welded steel pipes in Venezuela.					

Table C6: Asset Building Examples (Continued)

Bacardi Limited: Bacardi is one of the largest spirits companies in the world. It is headquartered and incorporated in Bermuda.

Target Name	Headquarters	Incorporation	Residence	Year	Value
General Beverage Corp	Italy	Unknown	Italy	1992	$1,500
A holding company and owner of Martini & Rossi, a vermouth and wine company based in Italy.					
Dewar's Scotch and Bombay Gin	United Kingdom	Asset Deal	United Kingdom	1998	$1,935
Acquired from Diago, a UK-based spirits company.					

Bunge Ltd: Bunge is an agribusiness and one of the world's largest oilseed producers. It is headquartered in the US, incorporated in Bermuda, and tax resident in Bermuda.

Target Name	Headquarters	Incorporation	Residence	Year	Value
Cereol	France	Unknown	France	2002	$1,790
An oilseed company.					
European Margarine Business	Finland	Asset Deal	Finland	2009	$109
Acquired from Raiso Plc, a Finnish food company. The deal includes production facilities in Finland and Poland, and some consumer margarine brands.					
Usina Moema Participacoes SA	Brazil	Unknown	Brazil	2010	$932
A holding comany with ownership interests in six Brazilian sugar cane mills.					
Hypermarcas SA's Food Division	Brazil	Asset Deal	Brazil	2011	$100
The food division of Hypermarcas SA, a Brazilian consumer goods conglomorate, was acquired. The division produces staple food products, including sauces, pastes, condiments, and seasonings.					

Table C6: Asset Building Examples (Continued)

Glencore Plc: A commodity trading and mining company headquartered in Switzerland, incorporated in Jersey, and tax resident in Switzerland.

Target Name	Headquarters	Incorporation	Residence	Year	Value
Manganese Ferroalloys Operations	France	Asset Deal	France	2012	$160
The Manganese Ferroalloys Operations of Vale SA, a Brazilian mining company, were acquired. These operations were located in France and Norway.					
Viterra Inc	Canada	Canada	Canada	2012	$6,089
An agribusiness and one of the largest grain handlers in Canada.					
Caracal Energy Inc	Canada	Canada	Canada	2014	$1,349
An oil company that operated in Chad and had a production capacity of 25,100 barrels of oil per day.					
TRT-ETGO Du Québec Inc	Canada	Unknown	Canada	2015	$143
Operated an oilseed processing plant in Québec, the largest of its kind in eastern Canada.					

Ingersoll Rand Plc (now Trane Technologies Plc): A manufacturing conglomerate that was founded in the US, moved its tax residence to Bermuda in 2001, and then to Ireland in 2009 (where it is headquartered and incorporated).

Target Name	Headquarters	Incorporation	Residence	Year	Value
CISA SpA	United States	United States	United States	2005	$623
A manufacturer of safety and security products.					
Trane Inc	United States	United States	United States	2008	$9,751
A manufacturer of heating and air-conditioning systems.					

Table C6: Asset Building Examples (Continued)

Norwegian Cruise Line Holdings: A global cruise line operator. It is headquartered in the US, incorporated in Bermuda, and tax resident in Bermuda.

Target Name	Headquarters	Incorporation	Residence	Year	Value
Prestige Cruises International	United States	Unknown	United States	2008	$9,751
The parent company of two luxury cruise lines–Oceania Cruises and Regent Seven Seas Cruises.					

Table C6: Asset Building Examples (Continued)

Hutchison Whampoa: An investment holding company that was headquartered and incorporated in Hong Kong.

Target Name	Headquarters	Incorporation	Residence	Year	Value
Felixstowe Dock and Railway Company	United Kingdom	Asset Deal	United Kingdom	1991	$132
A holding company that owned the UK's largest container port. It was acquired from Peninsular & Oriental Steam Navigation Company.					
MTS Holdings	United Kingdom	Asset Deal	United Kingdom	1998	$185
A holding company that owned a container port in the UK. It was acquired from Rutland Trust, a conglomerate holding company.					
ICTSI International Holdings Corp	Philippines	Asset Deal	Philippines	2001	$400
A holding company with eight port operations around the world. It was a subsidiary of International Container Terminal Services, Inc, a Philippines-based port management company.					
Container Terminals	South Korea	Asset Deal	South Korea	2002	$215
Three container ports in South Korea were acquired from Hyundai Merchant Marine, a container shipping company based in South Korea.					
Marionnaud Parfumeries	France	France	France	2005	$461
A retailer of perfumes and cosmetics.					
Orange Austria	Austria	Unknown	Austria	2013	$1,276
Austria's third-largest mobile operator.					

Table C6: Asset Building Examples (Continued)

Samsonite International SA: A luggage manufacturer and retailer. It was founded in the US and then acquired by CVC Capital Partners in July, 2007. It went public in an IPO on the Hong Kong stock exchange on June 16, 2011, and was subsequently headquartered and incorporated in Luxembourg.

Target Name	Headquarters	Incorporation	Residence	Year	Value
Tumi Holdings Inc	United States	Unknown	United States	2016	$1,809
A manufacturer of luxury business bags and travel luggage.					
eBags Inc	United States	Unknown	United States	2017	$105
An online retailer of luggage and handbags.					

SES SA: An owner and operator of satellites that provide telecommunication services. It is headquartered and incorporated in Luxembourg.

Target Name	Headquarters	Incorporation	Residence	Year	Value
GE Americom Communications	United States	Asset Deal	United States	2001	$4,326
The satellite subsidiary of GE (General Electric), a US-based conglomerate.					
RR Media	Israel	Israel	Israel	2016	$231
A provider of digital media services.					

Table C6: Asset Building Examples (Continued)

Shire Plc: A biotechnology company that relocated its tax residence from the UK to Ireland in 2008, at which point it was incorporated in Jersey and headquartered in Ireland. It was subsequently acquired by Takeda Pharmaceutical Company in 2019.

Target Name	Headquarters	Incorporation	Residence	Year	Value
Movetis NV	Belgium	Belgium	Belgium	2010	$524
A biotech company specializing in the treatment of gastrointestinal conditions.					
Advanced BioHealing	United States	United States	United States	2011	$750
A maker of a bio-engineered skin substitute, which is used to treat slow-healing ulcers.					
SARcode Bioscience Inc	United States	Unknown	United States	2013	$675
A ophthalmic biotech company. At the time of the merger, it was in phase 3 trials for a dry eye treatment.					
ViroPharma Inc	United States	United States	United States	2014	$4,211
A biotech company with a portfolio of products and product candidates for the treatment of rare diseases, including hereditary angioedema.					
NPS Pharmaceuticals Inc	United States	United States	United States	2015	$5,139
A biotech company focused on the development of treatments for rare diseases.					
Baxalta Inc	United States	Unknown	United States	2016	$30,952
A biotech company focused on the development of therapies to treat rare diseases.					
Dyax Corp	United States	United States	United States	2016	$6,557
A biotech company primarily focused on developing treatments for hereditary angioedema.					

Table C6: Asset Building Examples (Continued)

Tommy Hilfiger Corp: Prior to 2010, Tommy Hilfiger was a standalone clothing manufacturer and retailer. It was headquartered in Hong Kong, incorporated in the British Virgin Islands, and tax resident in Hong Kong.

Target Name	Headquarters	Incorporation	Residence	Year	Value
Pepe Jeans USA and Tommy Hilfiger Canada	United States	Unknown	United States	1998	$1,299
Licensees of Tommy Hilfiger (TH). Pepe Jeans USA had a license to develop and market apparel in the US using the TH trademark. TH Canada had the rights to manufacture and distribute TH apparel in Canada.					

Wilmar International Ltd: An agribusiness engaged in the production and processing of oils, specialty fats, grains, and sugar. It is headquartered and incorporated in Singapore.

Target Name	Headquarters	Incorporation	Residence	Year	Value
PGEO Group	Malaysia	Unknown	Malaysia	2007	$319
Refined and marketed edible oils, and had an annual production capacity of 4.7 million metric tonnes.					
PPB Oil Palms	Malaysia	Unknown	Malaysia	2007	$1,125
Cultivated, processed, and marketed palm oil, with plantations and mills in Malaysia and Indonesia. It was a subsidiary of the Malaysia-based conglomerate PPB.					
Sucrogen Ltd	Australia	Asset Deal	Australia	2010	$1,839
The fifth largest sugar refiner in the world and a subsidiary of CSR, a building materials company based in Australia.					
Proserpine Sugar Mill	Australia	Asset Deal	Australia	2011	$123
A sugar mill located in Australia with an annual milling capacity of 1.7 million tonnes.					
PT Duta Sugar International	Indonesia	Unknown	Indonesia	2011	$104
Operated a sugar refinery in Indonesia.					

H.2 Haven Purchases

The table below reports a selection of large haven purchases. For asset deals, the target location reported in SDC is the location of economic activity, which we equate with the headquarters. The incorporation is listed as *Unknown* in cases where it is missing for a standalone firm, which most commonly occurs when the firm is private. *Value* refers to the raw (not inflation adjusted) deal value in millions of USD.

Table C7: Haven Purchases Examples

Company Name	Headquarters	Incorporation	Residence	Year	Value
Acquiror: Actavis Inc	United States	United States	United States	2013	$5,096
Developed, manufactured, and marketed generic and branded pharmaceuticals.					
Target: Warner Chilcott Plc	Ireland	Ireland	Ireland		
A specialty pharmaceutical company focused on the development, manufacture, and sale of branded pharmaceuticals.					
Notes: *Combined firm renamed Actavis Plc, with headquarters and incorporation in Ireland.*					
Acquiror: ArcelorMittal	Luxembourg	Luxembourg	Luxembourg	2008	$1,472
One of the largest producers of steel in the world.					
Target: China Oriental Group Co Ltd	Hong Kong	Bermuda	Hong Kong		
A Chinese steel producer with a production capacity of about 4 million tons.					
Acquiror: Archer Daniels Midland	United States	United States	United States	2014	$3,129
An agribusiness and one of the world's largest grain traders.					
Target: Wild Flavors GmbH	Switzerland	Germany	Switzerland		
A natural ingredient company that produced flavors, seasonings, and colors used in processed foods and drinks.					
Acquiror: Bayer AG	Germany	Germany	Germany	2005	$2,961
A pharmaceutical and chemical company.					
Target: Roche Consumer Health	Switzerland	Asset Deal	Switzerland		
The non-prescription drug division of Roche, a multinational pharmaceutical and healthcare company based in Switzerland. It owns over-the-counter medicine brands and five manufacturing sites.					

Table C7: Haven Purchases Examples (Continued)

Company Name	Headquarters	Incorporation	Residence	Year	Value
Acquiror: Deutsche Annington	Germany	Germany	Germany	2015	$10,431
A real estate company with a portfolio of about 210,000 residential units.					
Target: Gagfah SA	Luxembourg	Luxembourg	Luxembourg		
A real estate company with a portfolio of about 141,000 residential units in Germany.					
Acquiror: Deutsche Bank	Germany	Germany	Germany	2010	$1,914
A financial services company.					
Target: Sal. Oppenheim	Luxembourg	Unknown	Luxembourg		
A bank that provided wealth management services for the wealthy. It was founded in Germany, but moved its headquarters to Luxembourg in 2007.					
Acquiror: Eaton Corp	United States	United States	United States	2012	$11,461
A diversified industrial manufacturer.					
Target: Cooper Industries Plc	Ireland	Ireland	Ireland		
An electrical equipment supplier.					
Notes: *Combined firm renamed Eaton Corp Plc, with headquarters and incorporation in Ireland.*					
Acquiror: Exor SpA	Italy	Italy	Italy	2016	$6,715
A holding company controlled by the Agnelli Family. It controlled Fiat Chrysler, and had ownership stakes in CNH Industrial and Cushman & Wakefield.					
Target: PartnerRe	Bermuda	Bermuda	Bermuda		
A global reinsurer.					

Table C7: Haven Purchases Examples (Continued)

Company Name	Headquarters	Incorporation	Residence	Year	Value
Acquiror: Exxon Mobil	United States	United States	United States	2017	$3,952
An international oil and gas company, and one of the largest refiners in the world.					
Target: InterOil Corporation	Singapore	Canada	Singapore		
An oil exploration and production company with operations in Papua New Guinea.					
Acquiror: Giovanni Agnelli & C.	Italy	Unknown	Italy	1999	$1,649
A trust of the Agnelli family.					
Target: Exor Group	Luxembourg	Unknown	Luxembourg		
A holding company. Its assets included 19% of Club Mediterranee, 20.5% of Rockefeller Center Properties Inc., and 75% of Chateaux Margaux at the time of the deal. Subsequently known as Exor SpA.					
Acquiror: Global Marine Inc	United States	United States	United States	2001	$4,044
An offshore drilling contractor with a fleet of 33 offshore drilling rigs worldwide.					
Target: Santa Fe International Corp	United States	Cayman Islands	Cayman Islands		
An offshore and land contract driller of oil and natural gas, with a fleet of 26 marine and 31 land drilling rigs.					
Notes: *The surviving entity was named GlobalSantaFe Corp, and was headquartered in the US, incorporated in the Cayman Islands, and tax resident in the Cayman Islands.*					
Acquiror: HSBC Holdings	United Kingdom	United Kingdom	United Kingdom	2004	$1,199
A financial services company.					
Target: Bank of Bermuda	Bermuda	Bermuda	Bermuda		
A financial services company that employed 3,000 people in 13 countries and had assets of $11.8 billion.					

Table C7: Haven Purchases Examples (Continued)

Company Name	Headquarters	Incorporation	Residence	Year	Value
Acquiror: HSBC Holdings Plc	United Kingdom	United Kingdom	United Kingdom	1999	$2,591
A financial services company.					
Target: Safra Republic Holdings	Luxembourg	Luxembourg	Luxembourg		
A bank that catered to wealthy individuals.					
Acquiror: Medtronic Inc	United States	United States	United States	2015	$42,730
A designer, manufacturer, and seller of medical equipment.					
Target: Covidien Plc	Ireland	Ireland	Ireland		
A manufacturer of medical devices and supplies.					
Notes: *The combined firm was renamed Medtronic Plc, with headquarters and incorporation in Ireland.*					
Acquiror: Pinault-Printemps-Redoute	France	France	France	2004	$5,964
A luxury goods company.					
Target: Gucci Group NV	Netherlands	Netherlands	Netherlands		
A luxury fashion company.					
Acquiror: Phillips-Van Heusen	United States	United States	United States	2010	$3,160
A clothing company that owned Calvin Klein and Izod.					
Target: Tommy Hilfiger	Hong Kong	British Virgin Is.	Hong Kong		
A clothing manufacturer and retailer.					