Tax Avoidance through Cross-Border Mergers and Acquisitions

Abstract

While tax havens are known as custodians and intermediaries of assets, this is the first paper to document that havens affect the ownership of assets on a large scale. We investigate cross-border, tax-haven mergers and acquisitions (M&A) using hand-collected data on tax residence laws and a novel algorithm that derives the tax residence of any company. Tax havens have $2.4 trillion in M&A deal value beyond what is predicted based on economic fundamentals. Cross-border, tax-haven M&A results in $29.7 billion in tax avoidance annually, and cross-border, non-haven M&A results in an additional $34.0 billion in annual tax avoidance.

Keywords: Tax avoidance, tax havens, mergers and acquisitions, gravity model, capital flows, foreign direct investment, taxation, multinational corporations.
JEL classification: F21, G34, H25, H26, H73, K34.

1 Introduction

It is well known that tax havens are used as custodians and intermediaries of assets. In the former case, corporations and wealthy individuals use havens to reduce their tax burden in non-haven countries by reallocating financial or intangible assets to havens (Zucman, 2013; Alstadsæter et al., 2018; Tørsløv et al., 2020). However, the asset ownership only moves to the haven "on paper," while the actual ownership of the assets remains unchanged. In the latter case, foreign direct investment (FDI) or portfolio investment between two countries is routed through a tax haven as an intermediary (Bertaut et al., 2018; Damgaard et al., 2019; Coppola et al., 2021). The reason for the frequent use of tax havens for the aforementioned purposes is the favorable tax environment that results in legal (tax avoidance) and illegal (tax evasion) reductions of taxes in non-haven countries (Desai et al., 2006; Zucman, 2014).

Our paper is the first to document that the tax-induced distortions by havens are so large that they change the ownership of assets on a large scale. In particular, we investigate cross-border, tax-haven mergers and acquisitions (M&A). While inversions[1] have been well-documented in both the business media[2] and the academic literature, these are only a small part of cross-border, tax-haven M&A. For instance, Col et al. (2020) investigate 691 naked, M&A, and spin-off inversions, 38% of which are into a tax haven, while Babkin et al. (2017) examine 60 inversions out of the US, 35 of which involve a merger.

In contrast, we find 13,458 cross-border, tax-haven M&As from 1990 to 2017. 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). Using hand-collected data on tax residence laws and a novel algorithm that derives the tax residence of any company, we find that tax havens have

[1] An inversion is a transaction that relocates a company's tax residence. The term refers to the legal structure that facilitates the transaction, whereby a smaller entity, such as a firm's subsidiary or the target in an M&A deal, becomes the parent of the overall firm or the acquiror in an M&A deal.

[2] Wall Street Journal (2014): "How Tax Inversions Became the Hottest Trend in M&A," August 5, wsj.com/articles/how-tax-inversions-became-the-hottest-trend-in-m-a-1407240175.
Wall Street Journal (2015): "The Tax Inversion Wave Keeps Rolling," July 7, wsj.com/articles/horizon-pharma-at-the-nexus-of-taxes-and-deals-1436296946 (both accessed March 14, 2021).

$2.4 trillion in M&A deal value beyond what is predicted based on economic fundamentals. The drivers of these M&A transactions are the more aggressive tax avoidance techniques that can be employed through the acquisition of real assets in a tax haven, as opposed to those achieved through the opening of a shell company. This is because it is harder for tax authorities to minimize tax avoidance once a firm has actual operations in a tax haven, such as its global headquarters, manufacturing, or R&D facilities. We document that tax-haven M&A results in $29.7 billion in annual tax avoidance. In addition, tax avoidance from cross-border, non-haven M&A is $34.0 billion, bringing the total annual tax avoidance from cross-border M&A to $63.7 billion.

Importantly, our algorithm is the only option to easily determine the tax residence of any firm in 181 countries given the location of a company's headquarters and its location of incorporation. It is thus an important tool for any research on taxation in an international setting. No database exists that provides information on firms' tax residence and firms usually do not report this information. Relying on either the location of incorporation or the location of the firm's headquarters as a proxy for tax residence results in a systematic measurement error, since the most aggressive tax avoiders are also the firms for which the location of incorporation and the location of the headquarters are most likely to differ.

We use a gravity model approach from the international trade literature to quantify the extent to which cross-border M&A activity associated with tax havens exceeds their economic fundamentals. We use the standard implementation of the gravity model, the Poisson pseudo-maximum likelihood estimation of Silva and Tenreyro (2006). The unit of observation is an acquiror- and target-country pair in a given year. The dependent variable is the logarithm of M&A deal value. Since the difference between the GDP of the fifth and sixth largest havens is $273 billion, 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). This distinction is independent of a country's importance in our sample and its level of taxation, but it allows a more meaningful interpretation of the

results. Country pairs with a large (small) haven acquiror have 115% (502%) more deal value than predicted based on their economic fundamentals, and country pairs with a large (small) haven target have 72% (351%) more deal value. The corresponding total abnormal dollar values are $1,598.7 and $824.3 billion for large and small havens, respectively, resulting in a total of $2.4 trillion.[3] Our methodology classifies 57.7% of the cross-border M&A involving tax havens as abnormal deal value, with ratios ranging from 33.2% for Switzerland to 97.3% for British Virgin.

One can distinguish tax avoidance resulting from tax-haven M&A by deal type. Deals with a haven acquiror and a non-haven target are referred to as "asset building" deals. A firm in a tax haven has an incentive to acquire firms in non-havens to scale up the asset base exposed to the lower tax rate. In contrast, deals with a tax-haven target are referred to as "haven purchases." Buying tax-haven firms allows the acquiror to establish a presence in a haven. The scope for tax avoidance is higher for subsidiaries with real operations as opposed to shell companies, since this, for instance, facilitates the manipulation of transfer pricing if actual intra-firm trade is taking place between a firm's haven and non-haven operations (Bartelsman and Beetsma, 2003).

We estimate the tax avoidance from haven purchases 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.[4] 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 dating back to 1990, buying an Irish firm worth 5% of its total assets would result in an expected decline in its cash ETR of 3.55 percentage points. Aggregating across all firms, cross-border, *haven* purchases result in $19.3 billion in annual

[3] All M&A deal value numbers in this paper are in 2017 USD.

[4] For example, if a $4 billion firm with a 25% ETR buys a $1 billion firm with a 20% ETR, then the predicted ETR of the combined firm would be 24%, all else equal.

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 $34.0 billion. Asset building deals result in further tax avoidance of $10.4 billion per year. Therefore, tax-haven M&A results in $29.7 billion in annual tax avoidance, while the total annual tax avoidance from cross-border M&A is $63.7 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 0.21 percentage points higher cumulative announcement return in an M&A event study.

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 $326 ($390) million, with a total of $1.8 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 $2.0 trillion, and tax savings from haven M&A fall from $29.7 to $27.0 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 pur-

chases. While having a subsidiary in a haven significantly lowers a firm's cash ETR by 3.53 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 $2.3 trillion.

Moreover, 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 tax 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 fraud and theft from shareholders (Bennedsen and Zeume, 2018; O'Donovan et al., 2019), or by executives seeking worse corporate governance in tax havens. Furthermore, the results are robust to the inclusion of numerous controls, including capital account openness and bilateral tax treaties.

Which countries lose from the $29.7 billion in annual tax avoidance through cross-border, tax-haven M&A? The US suffers 30% of the total dollar losses. The UK, Germany, France, and Japan combined suffer 28% of the total dollar losses. The US losses from haven M&A correspond to 2.39% of its corporate income tax revenue.

Lastly, we discuss policy options to limit tax avoidance from cross-border (haven) M&A. First, countries could define tax residence based on the location of firms' headquarters, instead of (as is often the case) the location of incorporation. This would make the avoidance

strategies we document more costly. Additional options are tax audits and enforcement actions targeting the largest firms/M&As.

We contribute to five 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 ownership of assets on a large scale. Related to M&A and havens, Col and Errunza (2015) investigate the valuation effects of buying haven targets, while Col et al. (2020) study the determinants of inversions, of which only 38% are to 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 investment positions (mainly of portfolio investment) 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 $29.7 billion in annual tax avoidance. Cross-border, non-haven M&A results in an additional $34.0 billion in annual tax avoidance. Conditional on a cross-border M&A taking place, Huizinga and Voget (2009) investigate how taxes affect where the combined entity is headquartered. 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), this literature removes small havens such as Bermuda and the Cayman Islands from its samples, resulting in a significant amount of missing deal value.

Lastly, we make a contribution to the tax literature more broadly through our tax residence algorithm. If a company is headquartered and incorporated in the same nation, then

it is tax resident in that nation. Otherwise, one needs to account for whether a country considers the location of the headquarters or the location of incorporation when determining tax residence, and the applicable tie-breaking provisions when a company can be claimed in two different countries.[5] We use novel, hand-collected data on tax residence laws to create an algorithm that assigns a tax residence to every firm in 181 countries given data on its incorporation and headquarters. Importantly, since this information is not available in commercial databases and not typically reported in companies' regulatory filings, our algorithm is the only method to easily derive the tax residence of any firm in 181 countries. We rerun our gravity model results using the original, uncorrected Securities Data Company (SDC) Platinum M&A data from Refinitiv. Our data yields $419.8 billion more cross-border, haven M&A deal value and $404.2 billion more abnormal deal value than the SDC location data. The errors in the SDC data vary greatly across countries. For instance, aggregate cross-border M&A deal value is overcounted for Switzerland, but undercounted for Ireland and Singapore. In Compustat Global (Compustat North America), 6.7% (8.5%) of firms in 2017 are incorporated and headquartered in different countries. As for haven firms, 65% (48%) of Compustat Global (Compustat North America) firms are headquartered and incorporated in different countries. Thus, proxying for tax residence using either the location of incorporation or the location of the firm's headquarters results in a systematic measurement error, since haven-resident firms (which are the most aggressive tax avoiders) are also the firms most likely to be incorporated and headquartered in different countries. Consequently, our tax residence algorithm provides a powerful tool for future research on international taxation by allowing for improved measurement of the tax residence of firms.

[5]Suppose a firm is incorporated in Ireland. Based on current law, if it were headquartered in the US, then it would be tax resident in Ireland, while if it were headquartered in the UK, then it would be tax resident in the UK. This example is illustrated in Figure 1.

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. 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, depending on whether a country has a territorial or worldwide system 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. 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) 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,[6] Tyco

[6]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).

International moved from Switzerland to Ireland in 2014,[7] and Aptiv moved from the UK to Ireland in 2018.[8]

Haven purchases. In contrast, when the target is in a tax haven, we refer to these deals as "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 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.[9] Regardless of the strategy used, we expect firms that have made haven purchases in the past to experience lower subsequent ETRs.

3 Data

Tax Residence. The notion of tax residence is important in this paper. If a company is headquartered and incorporated in the same nation, then it is a tax resident in that nation. Otherwise, the definition of tax residence is more complicated. We start by researching the tax residence laws for all countries in our sample using PwC's Worldwide Tax Summaries (2017). This allows us to establish whether a country considers the location of the headquarters or the jurisdiction of incorporation (or both) when determining tax residence. Next, we

[7]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).

[8]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).

[9]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).

must allocate the tax residence of a firm to a single country when the unilateral application of tax residence rules would render it a dual-resident. For example, in which country is a firm tax resident if it is headquartered in a country that considers headquarters, and incorporated in a country that considers incorporation when determining tax residence? Since there is no comprehensive source of tax treaties that stipulates the appropriate tie-breaking provisions, we manually searched annual reports of firms headquartered and incorporated in countries with various residency rules. Most firms do not report their tax residence in their annual reports, so we have to sample hundreds of firms to ascertain the tie-breaking provisions. Using the tax residence laws and this empirical classification of the tie-breaking provisions, we create an algorithm that assigns a tax residence to every firm in our sample given data on the firm's incorporation and headquarters. Appendix A provides details on this procedure.

To demonstrate the application of the algorithm, consider the following example (illustrated in Figure 1). Suppose a firm is incorporated in Ireland. Where is it tax resident? That depends on where it is headquartered. Suppose it were headquartered in the US, which only considers incorporation when determining tax residence. Ireland, however, considers both incorporation and the headquarters when determining tax residence. Thus, Ireland would claim the firm as a tax resident and the US would not, implying that the firm is tax resident in Ireland. What if, instead, it were headquartered in the UK? The UK, like Ireland, considers both the location of incorporation and the location of the headquarters in its tax residence determination. Thus, absent a tax treaty, both Ireland and the UK would claim the firm as a tax resident. In this case, however, there is a treaty between Ireland and the UK that stipulates that the firm is tax resident in the country where it is headquartered. Thus, the firm would be tax resident in the UK.

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. 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. This reduces the size of the gravity model dataset, and ensures that observations involving countries such as North Korea and Azerbaijan do not influence the estimates. The final dataset has 173,030 deals from 181 countries, 51,894 of which are cross-border. Intra-country deals are included for comparison only, and are not included in any of the regressions.

Unless otherwise stated, in all results in this paper, 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).

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. 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. Lastly, 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.

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 GDP and GDP per capita are missing, we use estimates from the United Nations (UN). We fill in these variables for additional countries using methods described in Appendix B.1. Since Ireland's GDP is highly volatile and does not reflect domestic economic activity due to tax avoidance by US multinationals (Lane, 2017), we use GNI instead of GDP for Ireland (see Appendix B.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, a measure of control of corruption from the World Governance Indicators (WGI), and corporate tax revenue data from Tørsløv et al. (2020).

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 34 small havens is $436 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, particularly for the gravity model.

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. A gvkey (the unique firm identifier in all Compustat databases) is assigned to each deal in SDC as follows: 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 3. 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 3.03 and 13.50 if the acquiror is in a large haven or a small haven, respectively. Similarly, the ratios when the target is in a non-haven, large haven, and small haven are 0.51, 2.12, and 7.31, 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 2. This pattern also holds for the number of M&A deals (Table C1, Panel A).

In Panels B and C 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 $273 million for non-havens, $301 million for large havens, and $286 million for small havens.

5 Gravity Model

5.1 Empirical Strategy

As the summary statistics show, there seems to be considerably more cross-border M&A associated with havens than can be explained by the size of their economies. To formally test this, we estimate the following gravity 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). This procedure eliminates 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 tax-haven dummies. Since the payoffs to asset building increase linearly with the size of the firms acquired, tax-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 4. The results indicate a positive and statistically significant effect for the tax-haven dummies in all three specifications. The coefficients are economically large. Small havens have 502%-2,100% more M&A deal value on the acquiror side than would be predicted based on economic, cultural, and geographic factors, and large havens have 115%-307% more.[10] The corresponding figures on the target side are 351%-1,278% for small havens and 72%-190% 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 tax 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

[10] 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.

and legal systems. Lastly, richer countries, as indicated by GDP per capita, tend to have greater M&A deal value. Large havens in particular have high levels of GDP per capita, so the inclusion of these variables attenuates the point estimate of the large-haven dummy. However, the large-haven dummy remains positive and statistically significant.

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 specification in column 3 of Table 4, we obtain a total abnormal deal value associated with havens of $2,423 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:

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

We disaggregate the total abnormal deal value by country. The total abnormal deal value for haven h should include all deals with a non-haven acquiror and h as the target (the first term of the sum). In addition, it should include 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 of the deal and another haven on the other?[11] We cannot take the sum, since this term would appear for both haven h and the other haven, resulting in double counting, which would invalidate equation 3. Thus, we adopt perhaps the

[11] Of the $4.2 trillion in total cross-border, haven M&A deal value, there is $0.2 trillion in deal value when both sides are in a haven.

simplest and most 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 C.

Aggregation: Results. α_h for the top tax havens is reported in column 1 of Table 5. There is $741.0 billion in abnormal deal value for the Netherlands, $315.4 billion for Ireland, $301.0 billion for Bermuda, $288.8 billion for Switzerland, $158.4 billion for Luxembourg, $138.5 billion for the Cayman Islands, $128.6 billion for Hong Kong, and $124.9 billion for Singapore. The remaining small havens have lower abnormal deal values. The total abnormal deal values for small and large havens are $824.3 billion and $1,598.7 billion, respectively.

For comparison, column 2 of Table 5 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 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 57.7% of the cross-border M&A deal value involving tax 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 33.2%. The Netherlands, Ireland, and Luxembourg have shares of 59.0%, 63.2%, and 67.2%, respectively. The two Asian havens, Hong Kong and Singapore, have similar shares of 45.7% and 50.8%, respectively. The havens with the highest shares of abnormal deal value are the British Virgin (97.3%), Neth Antilles (97.0%), Bermuda (96.7%), and Cayman Islands (96.7%). 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 3. Aside from Guernsey and Jersey, the regression line fits the data well (the coefficient of ln(GDP) is statistically significant at the 5% level).

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 4 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. While havens are known as custodians and intermediaries of assets, this is the first paper to document that havens affect the ultimate ownership of assets on a large scale. Moreover, cross-border, haven M&A makes up 25.9% of overall cross-border M&A by deal count and 29.4% 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. In addition, with the exception of Di Giovanni (2005), this literature removes small havens such as Bermuda and the Cayman Islands from its samples. As such, a significant amount of deal value is missing from most of these studies. One of our goals is to redress this imbalance in coverage.

6 Tax Avoidance

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:

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

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

- $ETR_{i,t}$: 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
- $SM_{i,t}$: one of two measures tracking deals where firm i completed an M&A deal with a small-haven target up to time t
- $LG_{i,t}$: one of two measures tracking deals where firm i completed an M&A deal with a large-haven target up to time t
- $ANY_{i,t}$: one of two measures tracking deals where firm i completed an M&A deal up to time t
- $Z_{i,t}$: cumulative mechanical effect on firm i's cash ETR from M&As completed up to time t
- $\boldsymbol{X_{i,t}}$: firm controls

The model is estimated using OLS with a global sample of firms. We focus on 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.

The variables of interest are the measures of small- and large-haven purchases. The first of the two measures of past small-haven acquisitions is

$$SM_{i,t} = \ln(\text{Net Sm Haven M\&A Value/TA})(i,t). \tag{6}$$

"Sm Haven" means that this variable only accumulates M&A deals where the target is in a small tax haven. We refer to this as the continuous measure of past small haven purchases. The continuous measures of $LG_{i,t}$ and $NON_{i,t}$ (tracks deals with non-haven targets) are similarly defined. $ANY_{i,t}$ is the sum of $SM_{i,t}$, $LG_{i,t}$, and $NON_{i,t}$. "Net" refers to this 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 the 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 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 since the ability to use cross-border M&A to lower taxes is concave in the ratio.[13] For instance, going

[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%, 1.16%, and 5.65%, respectively.

[13] We add 0.01 to the ratio prior to taking the log.

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.

The second measures of $SM_{i,t}$, $LG_{i,t}$, and $ANY_{i,t}$ are dummies that equal 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&As have on a firm's tax rate. For example, if a \$4 billion firm with a 25% ETR buys a \$1 billion firm with 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 acquiror's ETR. One can similarly calculate the mechanical ETR effect from selling assets. For details on this variable, see Appendix D. 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.

6.1.2 Regression Results

First, we discuss the results for the continuous measures of past M&A activity reported in Panel A of Table 6. 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 0.01 to 0.06, 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.[14] 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 3.13 (1.99) 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 (including haven and non-haven), buying a small-haven (large-haven) company worth 5% of its total assets results in a cash ETR drop of 4.69 (3.55) percentage points. The estimated reductions in the cash ETR are large in economic terms, 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

[14]We add 0.01 to the ratio of M&A deal value to total assets prior to taking the log. Thus, a firm with no prior M&A activity would have a ratio of 0.01. Buying a firm worth 5% of its book assets would increase the ratio to 0.06. Therefore, $-0.87 \times (ln(0.06) - ln(0.01)) \approx 1.56\%$.

that is 3.53 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 6 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 1.98 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 4.38 (respectively, 2.64) percentage points in its cash ETR. Thus, in this case, the total savings from buying a small-haven (respectively, large-haven) firm is 6.36 (respectively, 4.62) 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 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:

$$\text{Aggregate Annual Tax Avoidance} = \sum_{i \in \Omega} P_{i,T} \times \Delta\tau_{i,T} \tag{7}$$

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 1990-2018, 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

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. The tax avoidance from cross-border M&A is calculated as follows:

$$\Delta\tau_{i,T} = ETR_{i,T}\left(SM_{i,T}, LG_{i,T}, ANY_{i,T}, \boldsymbol{X_{i,T}}\right) - ETR_{i,T}\left(0, 0, 0, \boldsymbol{X_{i,T}}\right), \tag{8}$$

where these variables are as defined in equation 5 using the continuous measures of M&A activity. Thus, $\Delta\tau_{i,T}$ 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

$$\Delta\tau_{i,T} = \beta_1 SM_{i,T} + \beta_2 LG_{i,T} + \beta_3 ANY_{i,T}. \tag{9}$$

Replacing the coefficients with their respective estimates from column 1 of Table 6, Panel A yields

$$\Delta\tau_{i,T} = -1.75 \times SM_{i,T} - 1.11 \times LG_{i,T} - 0.87 \times ANY_{i,T}. \tag{10}$$

Substituting this in equation 7 yields aggregate annual tax avoidance of \$53.3 billion. This represents the total annual tax avoidance from cross-border M&A that accrues to acquiring firms. This consists of \$34.0 billion of tax avoidance from non-haven purchases and \$19.3 billion of tax avoidance from haven purchases.[15]

[15]Disaggregating the aggregate savings by the location of the target requires us to specify the order of M&As if haven and non-haven purchases occur in the same firm-year. In such cases, we assume that haven purchases come first.

6.2 Asset Building

6.2.1 Aggregate Tax Avoidance

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

$$\text{Aggregate Annual Tax Avoidance} = \sum_{k \in K} PM_{k,t(k)} \times V_k \times \Delta\tau_{h(k)} \tag{11}$$

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 took place. The variables are defined as follows:

- $PM_{k,t(k)}$: pre-tax income divided by market capitalization for the target in year $t(k)$ for deal k. If missing, a country/industry average in year $t(k)$ is used.
- V_k: deal value for deal k, adjusted to 2017 dollars using the earnings growth from Robert Shiller's website (2020)
- $\Delta\tau_{h(k)}$: target tax rate change, where $h(k) \in \{SM, LG\}$ denotes the acquiror location

The details for how $PM_{k,t(k)}$ is calculated when it is missing are described in Appendix E. 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 6, 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

$$\Delta\tau_{h(k)} = \begin{cases} -6.36\%, \text{ if } h(k) = SM \\ -4.62\%, \text{ if } h(k) = LG. \end{cases} \tag{12}$$

The aggregate annual tax avoidance from asset building deals is \$10.4 billion.

6.3 Discussion of Tax Avoidance Results

Cross-border, haven purchases result in \$19.3 billion in annual tax avoidance, and cross-border, non-haven purchases result in \$34.0 billion in annual tax avoidance. In addition, asset building deals result in \$10.4 billion in tax avoidance per year. Thus, haven M&A results in \$29.7 billion in annual tax avoidance, while the total annual tax avoidance from cross-border M&A is \$63.7 billion. Estimates of 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&As, and not just the portion deemed "abnormal."[16] On average, all cross-border, haven M&As 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,[17] while these countries' cross-border M&A volumes would be expected to fall by the amount of the abnormal M&A volume.

[16]The total deal value for cross-border, tax-haven M&A is \$4.2 trillion.

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

6.4 Which Countries Lose?

Cross-border, haven M&A results in $29.7 billion in annual tax avoidance. We now analyze the flip side of this tax avoidance–the losses that accrue to the acquiror countries in haven purchases and the target countries in asset-building deals. Tax avoidance from non-haven purchases is excluded from this analysis, since it is not clear to which country the tax losses should be applied.[18] The tax avoidance estimated is the sum of an even larger reduction in tax revenue for high-tax jurisdictions and a small increase in taxes paid in low tax jurisdictions. Since firms usually do not disclose the amount of taxes paid to different jurisdictions, we cannot separately estimate the tax losses for non-haven countries and the increases in tax revenue for havens (including incorporation fees in havens such as Bermuda). As a consequence, we underestimate the tax revenue losses for high tax jurisdictions. Tørsløv et al. (2020), however, estimate that for each $1 in corporate tax revenue avoided in high-tax countries, about 20 cents in tax revenues are generated in havens.

We report the top 30 non-haven countries in terms of taxes lost through these M&A deals in Table C6. The top two countries are the US and the UK, with losses of $8,875 million and $3,692 million, respectively. Germany, France, and Japan are next, with losses of $1,602 million, $1,595 million, and $1,338 million, respectively. The US suffers 30% of the total dollar losses. The top 5 countries combined account for 58%.

In Figure 4, we plot the tax avoidance from haven M&A as a share of a country's corporate income tax revenue using a world map. The country with the highest ratio of taxes lost from haven M&A to corporate tax revenue is Kuwait, with a ratio of 15.88%. Among the major economies, the United Kingdom has the highest ratio (4.92%). The US is ninth overall with a ratio of 2.39%. Asian countries such as Japan, China, India, South Korea, and Indonesia have relatively low ratios.

[18] Imagine a UK firm buys a German firm–is Germany or the UK (or both) losing tax revenue?

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 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:

$$CAR_{j,t} = \boldsymbol{\kappa_t} + \boldsymbol{\delta_j} + \beta_1 \tau_{j,t} + \boldsymbol{\theta'} \boldsymbol{X_{j,t}} + \epsilon_{j,t}, \tag{13}$$

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 3,449 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.[19] We drop 1,534 such deals. Lastly, we include standard control variables 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 7.

7.1.2 Regression Results

The first column of Table 7 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 0.21 percentage points higher. This result gives us confidence in our interpretation of the tax avoidance from cross-border M&A.

7.2 Asset Building

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

[19]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.

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 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.

$$ETR_{i,t} = \boldsymbol{\kappa_t} + \boldsymbol{\delta_i} + \beta_1 AB_{i,t-2} + \beta_2 SM_{i,t-2} + \beta_3 LG_{i,t-2} + \beta_4 ANY_{i,t-2} + \lambda Z_{i,t-2} + \boldsymbol{\theta' X_{i,t-2}} + \epsilon_{i,t}. \tag{14}$$

We test the above specification using continuous and binary measures of prior M&A. We define the continuous measure of $AB_{i,t}$ as follows:

$$AB_{i,t} = \ln(\text{Asset Building M\&A Value/TA})(i,t). \tag{15}$$

"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. The dummy version of $AB_{i,t}$ takes on the value 1 if the continuous measure is 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 C7. 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. On average, non-haven purchases result in tax savings regardless of the location of the acquiror at the time of the deal.

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 17.0% (21.8%) 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 23.0% (26.3%) overall and 22.1% (28.5%) using the most recently reported data.

Asset builders have lower tax rates than the firms they acquire, 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. In this section, 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 $175.3 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 tax 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 the 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:

$$\ln(Y_{ij,t}) = \boldsymbol{\kappa_t} + \beta_1 US_i \times LG_j \times Y04_t + \beta_2 US_i \times SM_j \times Y04_t + \boldsymbol{\delta'} \boldsymbol{D_{ij,t}} + \boldsymbol{\theta'} \boldsymbol{X_{ij,t}} + \epsilon_{ij,t}, \quad (16)$$

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 8. 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."[20] 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 8, the results are robust to the exclusion of these years.

[20]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).

8.2 Further Alternative Explanations and Robustness

The Role of Shell Companies. A concern is that the majority of haven targets in M&As are shell companies. Since firms can easily set up shell companies themselves, it seems unlikely that they would spend nearly $1.8 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 deal when the target is in a large (small) haven is $326 million ($390 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 in this paper 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 $2.0 trillion, and tax savings from haven M&A fall from $29.7 to $27.0 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 2,330 cross-border asset deals[21] worth $582.1 billion where the target is in a haven, compared to $1.2 trillion

[21] A deal is an asset deal if the target is not a standalone firm and there is no sellside PE involvement. A

where an entire haven resident firm is sold. We manually look through the largest of these asset deals and classify 346 deals worth $439.6 billion as not having an intangible target, and 7 deals worth $9.3 billion as having an intangible target. The remaining 1,977 deals worth $133.2 billion we either did not look into (1,949 deals), or, due to a lack of information, could 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 $2.3 trillion, and tax avoidance from haven M&A increases from $29.7 to $30.2 billion.

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.

Fraud and Theft from Shareholders. Executives could defraud or steal from (minority) shareholders using the secrecy provided by havens (Bennedsen and Zeume, 2018; O'Donovan et al., 2019). But if executives seeking to defraud shareholders was the main motive in cross-border, haven M&A, the implied fraud and theft would be on such a massive scale—havens have $2.4 trillion in M&A deal value beyond what is predicted based on their economic fundamentals—that either haven M&A fraud and theft would regularly make the headlines, which is not the case, or there would be massive undiscovered amounts of fraud, which seems implausible.

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.

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.

Political and Economic Instability. Another alternative explanation is that M&As are structured through havens to protect the privacy of rich individuals in countries with a weak rule of law. These individuals might be worried about their safety, for instance, because of fears of kidnapping for a ransom. As such, they might structure M&As through havens not for tax avoidance purposes, but to protect their privacy and identity as owners of large businesses. A related argument is that M&As are structured through havens because the source country is politically or economically unstable. We rerun our main gravity-model specification and restrict the sample such that the acquiror or target is in a stable non-haven or both sides of the deal are in a haven. Stable non-haven countries include the United States, Canada, and non-haven countries in Western Europe, since these countries are both politically and economically more stable than many other parts of the world and rich people in them generally do not fear for their safety if their wealth becomes publicly known. The results reported in Table C4 indicate that our results are robust to this alternative story.

Legal and Regulatory Constraints. M&As 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&As between firms in Hong Kong and mainland China

(which are coded by SDC and us as cross-border). As with the concerns regarding political and economic instability, we address this concern by using the same stable-country subsample. The countries that we deem politically and economically stable have also liberalized their economies to a much greater extent than many other parts of the world. As the previous discussion indicated, the results reported in Table C4 imply that our results are robust to this story.

Additional Control Variables and Samples. We run robustness tests for the gravity model controlling for the measure of capital account openness from Chinn and Ito (2006), tax information exchange arrangements from the Exchange of Information Database (2019), economic integration agreements (Kellogg Institute for International Studies, 2019), bilateral investment treaties (Bian et al., 2021), the World Uncertainty Index (Ahir et al., 2018), and EU, Euro Area, and WTO membership. Tables C3, C4, and C5 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 $2.2 trillion, and aggregate tax avoidance from cross-border M&A increases from $63.7 to $65.3 billion.

Alternative Clustering. We use double clustered standard errors in regressions that correspond to a gravity model research design 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 Table C4. The haven coefficients remain statistically significant.

9 Our Tax Residence Data vs. Uncorrected Data

Our algorithm is the only option to easily determine the tax residence of any firm in 181 countries since no database exists that provides this information and firms usually do not report this information. In our cross-border M&A sample from SDC, 10.1% of the total deal value involves a target or acquiror that is headquartered and incorporated in different countries, necessitating the use of our algorithm in determining the appropriate tax resi-

dence. This figure jumps to 23.5% for M&A deals involving a haven-resident firm. Overall, relying solely on headquarters results in about the same error rate (5.2%) as relying solely on incorporation (5.0%) as a proxy for tax residence. For haven deals, using headquarters (incorporation) as a proxy results in an error rate of 11% (12.7%). In Compustat Global (Compustat North America), 6.7% (8.5%) of the 35,777 (8,242) firms with non-missing assets in 2017 are incorporated and headquartered in different countries. For the subset of these firms that are resident in havens, 65% (48%) of Compustat Global (Compustat North America) firms are headquartered and incorporated in different countries. Thus, proxying for tax residence using either the location of incorporation or the location of the headquarters results in a systematic measurement error, since haven resident firms (that are the most aggressive tax avoiders) are also the firms most likely to be incorporated and headquartered in different countries.

We further illustrate the importance of our algorithm by rerunning the gravity model results using the original, uncorrected SDC data. Table 9 reports this comparison of our data to the uncorrected SDC data. Columns 1 and 2 report our data, columns 3 and 4 report the SDC data, and columns 5 and 6 report the differences between columns 1 and 3, and 2 and 4, respectively. Columns 1, 3, and 5 report abnormal deal value based on the location of the acquiror using the gravity model estimates from column 3 of Table 4. Columns 2, 4, and 6 report total cross-border deal value based on the location of the acquiror. *Abnormal Deal Value* equals *Total Deal Value* minus the predicted M&A deal value had the country not been a tax haven. Our data yields $419.8 billion more cross-border, tax haven M&A deal value and $404.2 billion more abnormal deal value than the SDC location data. Importantly, the errors in the SDC data are heterogeneous across countries. A graphical illustration of the errors in cross-border M&A deal value is shown in Figure 5. For instance, SDC overcounts the aggregate cross-border M&A deal value for Switzerland, and is fairly accurate for Luxembourg. In contrast, SDC undercounts cross-border M&A deal value by 21% for Singapore, 31% for Ireland, 87% for the Cayman Islands, and 93%

for the Netherlands Antilles. At the deal-level, the misclassification is even higher than at the country-level, with a total of $621.2 billion in misclassified cross-border, haven M&A (some of these misclassifications get canceled out through the country-level aggregation). These numbers highlight the importance of our tax residence algorithm for research on (international) taxation.

10 Policy Implications

Formulary apportionment, which allocates profits based on the share of total sales for each jurisdiction, is the most effective way to fight tax avoidance, since it targets all forms of tax avoidance by eroding the incentives for profit shifting in the first place (Keen and Konrad, 2013; Clausing, 2016).[22] Policy makers have four additional options that are narrower but target the avoidance strategies documented in this paper.

First, countries can change their laws so that a firm's tax residence is determined by the location where its executives meet–usually at the company's headquarters–rather than its location of incorporation. While many countries already do so (e.g., Canada, Germany, and the United Kingdom), some (e.g., France, Japan, and the US) do not (see Appendix A). Importantly, relocating headquarters is more costly than relocating the location of incorporation, since, for many firms, it is important that executives are close to their establishments (Giroud, 2013).

Second, while tax avoidance from individual cross-border, tax-haven deals do not constitute a significant share of aggregate global tax avoidance associated with such M&As, it may be significant for individual countries. Many small to medium-sized countries often have one or a small number of firms that are very large relative to the rest of the economy, such as Samsung for South Korea, Anheuser-Busch InBev for Belgium, and Nokia for Finland. While such multinational companies usually do not break the letter of tax laws, they

[22]During OECD negotiations on international taxation in April 2021 the US proposed a sales-based taxation of the most profitable multinational firms. Financial Times (2021): "US offers new plan in global corporate tax talks," April 8, ft.com/content/847c5f77-f0af-4787-8c8e-070ac6a7c74f (accessed May 19, 2021).

are often violating the spirit of these laws. Tax audits and enforcement actions against the corporations/M&As responsible for the largest dollar amounts of tax avoidance might thus be a way to reduce such losses in tax revenue.[23]

Lastly, there are two policy options that target inversions, which, however, are only a small subset of tax-haven M&As. Countries can introduce or increase substance requirements, similar to the "substantial operations" threshold in the US, that make it harder for firms to move their tax residence abroad by requiring that a large share of a firm's operations be in the country where it seeks tax residence. Another method is a one-off exit tax for firms that move their tax residence to another country.[24]

11 Conclusion

Tax havens are known as custodians and intermediaries of assets that help corporations and wealthy individuals avoid and evade taxes in non-haven countries. Our paper is the first to document that the tax-induced distortions by tax havens are so large that they change the ownership of assets on a large scale. We find 13,458 cross-border, tax-haven M&As from 1990 to 2017. Using hand-collected data on tax residence laws and a novel algorithm that derives the tax residence of any company, we find that tax havens have $2.4 trillion in M&A deal value beyond what is predicted based on economic fundamentals. The driver of these M&A transactions are the more aggressive tax avoidance techniques that can be employed through the acquisition of real assets in a tax haven, as opposed to those which can be facilitated through the opening of a shell company. We document that tax-haven M&A results in $29.7 billion in annual tax avoidance. In addition, tax avoidance from cross-border, non-haven M&A is $34.0 billion, bringing the total annual tax avoidance from cross-border M&A to $63.7 billion. For identification, we use a US tax-law change in 2004. Our algorithm is

[23]There are a lot of grey areas, for instance, with internal transfer pricing that firms can use for their advantage. The more resources tax authorities spend on audits and enforcement actions, the more they can shrink these grey areas and the associated tax avoidance.

[24]Financial Times (2020): "Dutch plan to tax departing multinationals gains momentum," August 16, `https://www.ft.com/content/d5e84695-5f9b-498a-bb05-ba1a080a9b0f` (accessed August 22, 2020).

the only option to easily determine the tax residence of any firm in 181 countries given a company's location of headquarters and incorporation, and is thus an important tool for any research on taxation in an international setting. No database exists that provides information on firms' tax residence and firms usually do not report this information. Relying on either the location of incorporation or the location of the headquarters as a shortcut results in systematic measurement error in determining a firm's tax residence, since the most aggressive tax avoiders are also the firms for which the location of incorporation and headquarters are most likely to differ.

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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
𝟙(Colonial Relation)	Dummy that equals 1 if the acquiror and target countries have a past colonial relationship.
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.
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.
𝟙(UK Legal Origin)	Dummy that equals 1 if a country has a UK legal origin.
𝟙(Lg Haven Acquiror)	Dummy that equals 1 if the acquiror is in a large tax haven.
𝟙(Sm Haven Acquiror)	Dummy that equals 1 if the acquiror is in a small tax haven.
𝟙(US Acquiror)	Dummy that equals 1 if the acquiror is in the United States.
𝟙(Yr$\geq$ 2004)	Dummy that equals 1 if the year is 2004 or later.
M&A Taxes Lost	Annual amount of corporate income taxes lost from tax avoidance through cross-border, tax-haven M&A.
Corp. Tax Revenue	Annual amount of corporate income tax revenue.

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&As 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: M&A Summary Statistics

This table reports M&A deal value summary statistics based on the location of the acquiror/target and whether the deal is cross-border or intra-country. Dollar figures are in billions of 2017 USD.

	Acquiror	Target	
Cross-Border	\$11,674	\$12,613	
Intra-Country	\$24,578	\$24,578	Non-Haven
Ratio	0.47	0.51	
Cross-Border	\$1,944	\$1,357	
Intra-Country	\$641	\$641	Large Haven
Ratio	3.03	2.12	
Cross-Border	\$766	\$415	
Intra-Country	\$57	\$57	Small Haven
Ratio	13.50	7.31	

Table 4: Gravity Model with Baseline Controls

This is the first of two tables documenting the effect of tax havens on cross-border M&A deal value. This table uses a smaller set of control variables with substantial 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. 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)	3.09***	2.88***	1.80***
	(0.31)	(0.36)	(0.32)
𝟙(Lg Haven Acquiror)	1.38***	1.40***	0.77***
	(0.29)	(0.28)	(0.22)
𝟙(Sm Haven Target)	2.62***	2.37***	1.51***
	(0.52)	(0.46)	(0.45)
𝟙(Lg Haven Target)	1.05***	1.07***	0.54**
	(0.12)	(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)	-0.60***	-0.54***	-0.39***
	(0.04)	(0.08)	(0.08)
𝟙(Same Country)		-0.17	0.37
		(0.28)	(0.30)
𝟙(Common Language)		0.98***	0.88***
		(0.19)	(0.19)
𝟙(Colonial Relation)		0.75***	0.56***
		(0.13)	(0.14)
ln(Acquiror GDPPC)			0.69***
			(0.11)
ln(Target GDPPC)			0.53***
			(0.10)
Year FE	Yes	Yes	Yes
Two-way SEs	Yes	Yes	Yes
N	796,030	796,030	796,030
Pseudo R^2	0.709	0.737	0.759
Mean of Dep Var	4.49	4.49	4.49

Table 5: 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 4. *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	741.0	1,255.4	59.0
Ireland	315.4	499.3	63.2
Bermuda	301.0	311.3	96.7
Switzerland	288.8	870.1	33.2
Luxembourg	158.4	235.6	67.2
Cayman Islands	138.5	143.3	96.7
Hong Kong	128.6	281.6	45.7
Singapore	124.9	246.0	50.8
Netherlands Antilles	45.4	46.8	97.0
Cyprus	36.1	44.1	81.8
British Virgin Islands	35.8	36.8	97.3
Guernsey	31.3	69.5	45.1
Panama	28.1	33.5	84.0
Bahrain	24.4	31.0	78.7
Jersey	11.7	28.9	40.4
All Other Tax Havens	13.4	67.0	20.1
Total	2,423	4,200	57.7

Table 6: 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(t)	
	(1)	(2)
ln(Net Sm Haven M&A Value/TA))(i,t-2)	-1.75**	-1.70**
	(0.69)	(0.70)
ln(Net Lg Haven M&A Value/TA)(i,t-2)	-1.11***	-1.09***
	(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)		-3.53***
		(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(t)	
	(1)	(2)
$\mathbb{1}$(Net Sm Haven M&A Value > 0)(i,t-2)	-4.38***	-4.28***
	(1.33)	(1.34)
$\mathbb{1}$(Net Lg Haven M&A Value > 0)(i,t-2)	-2.64***	-2.61***
	(0.71)	(0.71)
$\mathbb{1}$(Net Total M&A Value > 0)(i,t-2)	-1.98***	-1.97***
	(0.37)	(0.37)
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

Table 7: 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	0.48***	0.21***
	(0.05)	(0.05)
Controls	No	Yes
Year FE	Yes	Yes
Industry FE	Yes	Yes
Country FE	Yes	Yes
N	18,110	18,110
Adjusted R^2	0.028	0.041

Table 8: 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)	0.57**	0.64*
	(0.26)	(0.35)
$\mathbb{1}$(US Acquiror)×$\mathbb{1}$(Sm Haven Target)×$\mathbb{1}$(Yr≥ 2004)	-0.08	-0.07
	(0.45)	(0.42)
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	767,304	709,512
Pseudo R^2	0.708	0.708
Mean of Dep Var	4.48	4.46

Table 9: Comparison of Our Tax Residence Data to Uncorrected Data

This table reports abnormal and actual deal value in tax havens using our tax residence data as well as the location reported in SDC Platinum. *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 4. *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.

	Our Data		SDC Data		Difference	
	Abnormal Deal Value	Total Deal Value	Abnormal Deal Value	Total Deal Value	Abnormal Deal Value	Total Deal Value
Netherlands	741.0	1,255.4	700.1	1,236.9	40.9	18.5
Ireland	315.4	499.3	164.9	343.9	150.5	155.5
Bermuda	301.0	311.3	249.5	258.9	51.5	52.4
Switzerland	288.8	870.1	351.0	922.6	-62.2	-52.5
Luxembourg	158.4	235.6	161.7	237.7	-3.3	-2.1
Cayman Islands	138.5	143.3	13.7	18.0	124.8	125.3
Hong Kong	128.6	281.6	132.0	275.9	-3.3	5.7
Singapore	124.9	246.0	83.1	193.8	41.7	52.2
Netherlands Antilles	45.4	46.8	1.8	3.1	43.6	43.7
Cyprus	36.1	44.1	36.4	44.1	-0.3	-0.0
British Virgin Islands	35.8	36.8	26.3	27.2	9.5	9.6
Guernsey	31.3	69.5	33.4	73.2	-2.1	-3.7
Panama	28.1	33.5	9.3	14.4	18.8	19.1
Bahrain	24.4	31.0	24.8	31.0	-0.4	-0.0
Jersey	11.7	28.9	14.3	33.4	-2.7	-4.5
All Other Tax Havens	13.4	67.0	16.5	66.3	-3.0	0.7
Total	2,423	4,200	2,019	3,780	404.2	419.8

Figure 1: Tax Residence Algorithm Example

This figure reports the tax residence of an Ireland-incorporated firm given two possible locations of the headquarters.

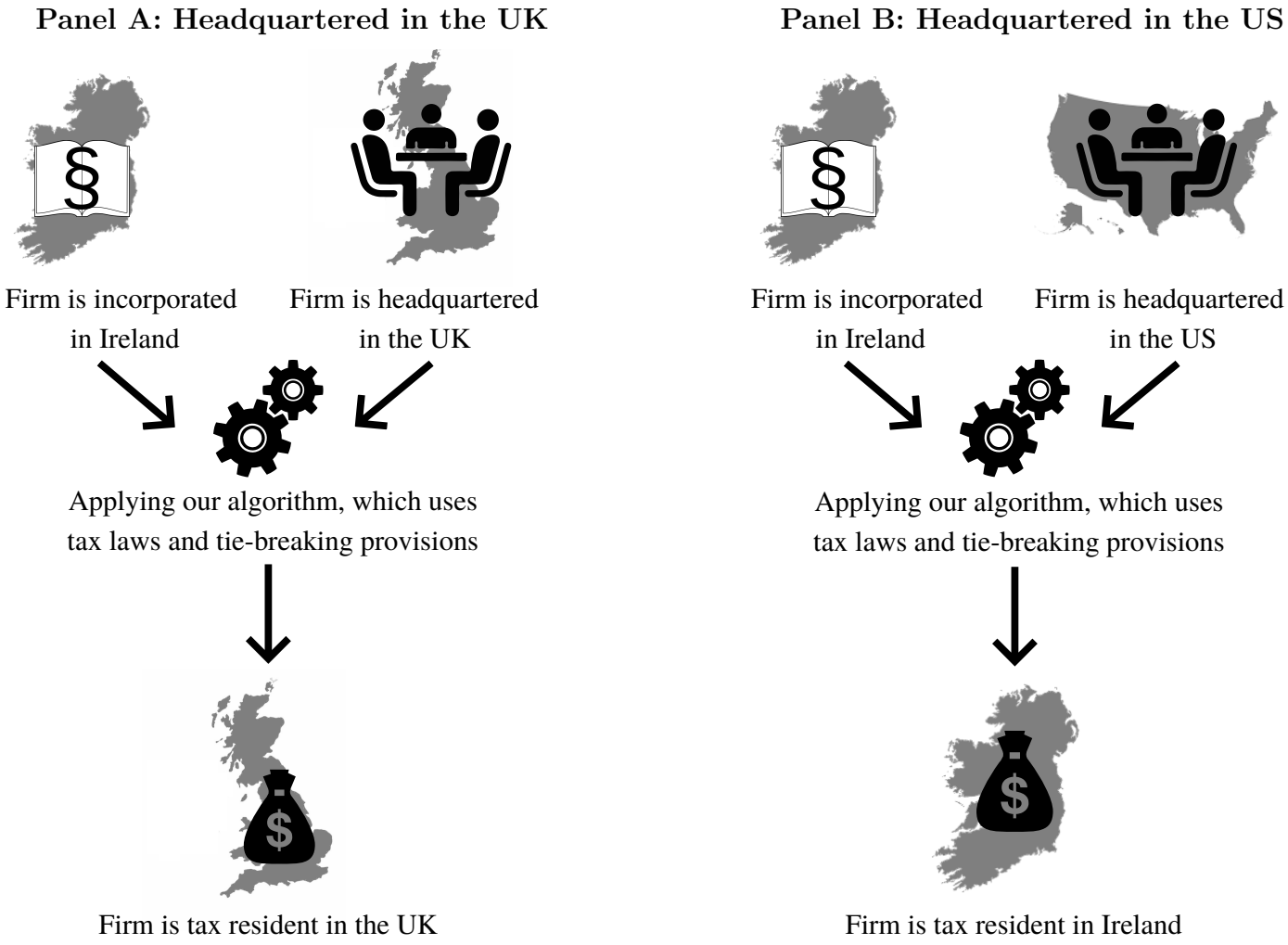
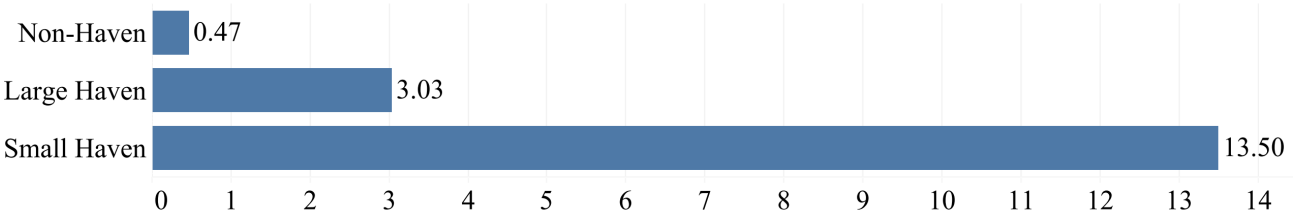


Figure 2: Ratio of Cross-Border to Intra-Country M&A Deal Value

These figures show the ratio of cross-border to intra-country M&A deal value depending on the location of the acquiror and target.

Panel A: Based on Acquiror Location



Panel B: Based on Target Location

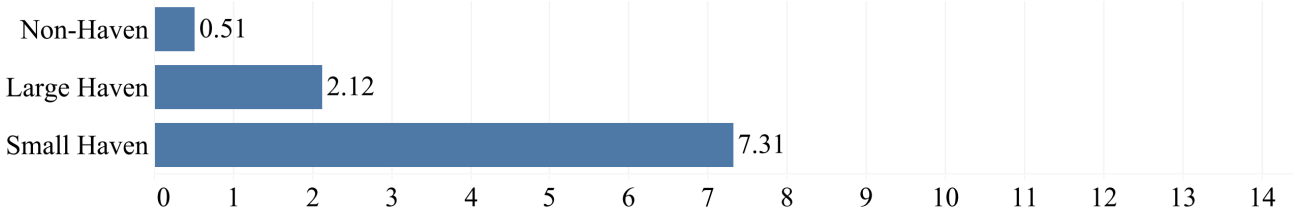


Figure 3: Abnormal to Total M&A Deal Value vs GDP

This figure compares the ratio of abnormal to total M&A deal value to ln(GDP) for the havens with the largest abnormal deal value (as reported in Table 5). The x-axis is the log of GDP (in millions). The equation of the linear regression line is Ratio $= 90.67 - 6.12 \times ln(\text{GDP})$. *BVI* refers to the British Virgin Islands.

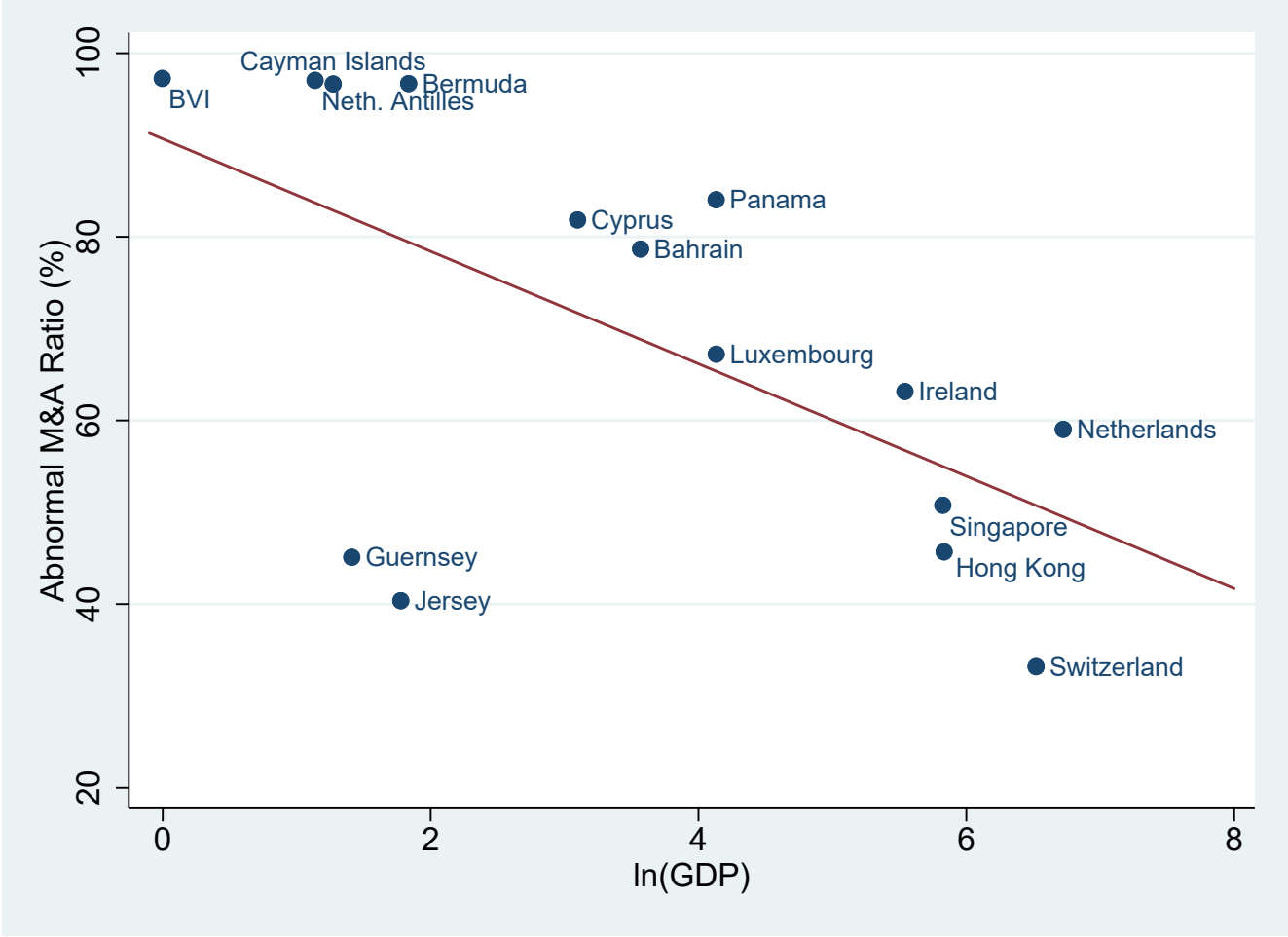


Figure 4: Taxes Lost from Cross-Border, Tax-Haven M&A to Corporate Tax Revenue

This figure shows the ratio of *M&A Taxes Lost* to *Corp. Tax Revenue* by country. These variables are defined in Table 1. The data on annual corporate income tax revenue is from Tørsløv et al. (2020). The green dots correspond to tax havens. In cases where tax havens are geographically close, we slightly separate the green dots for clarity. All data is as of 2017. Ratios are in percentage points.

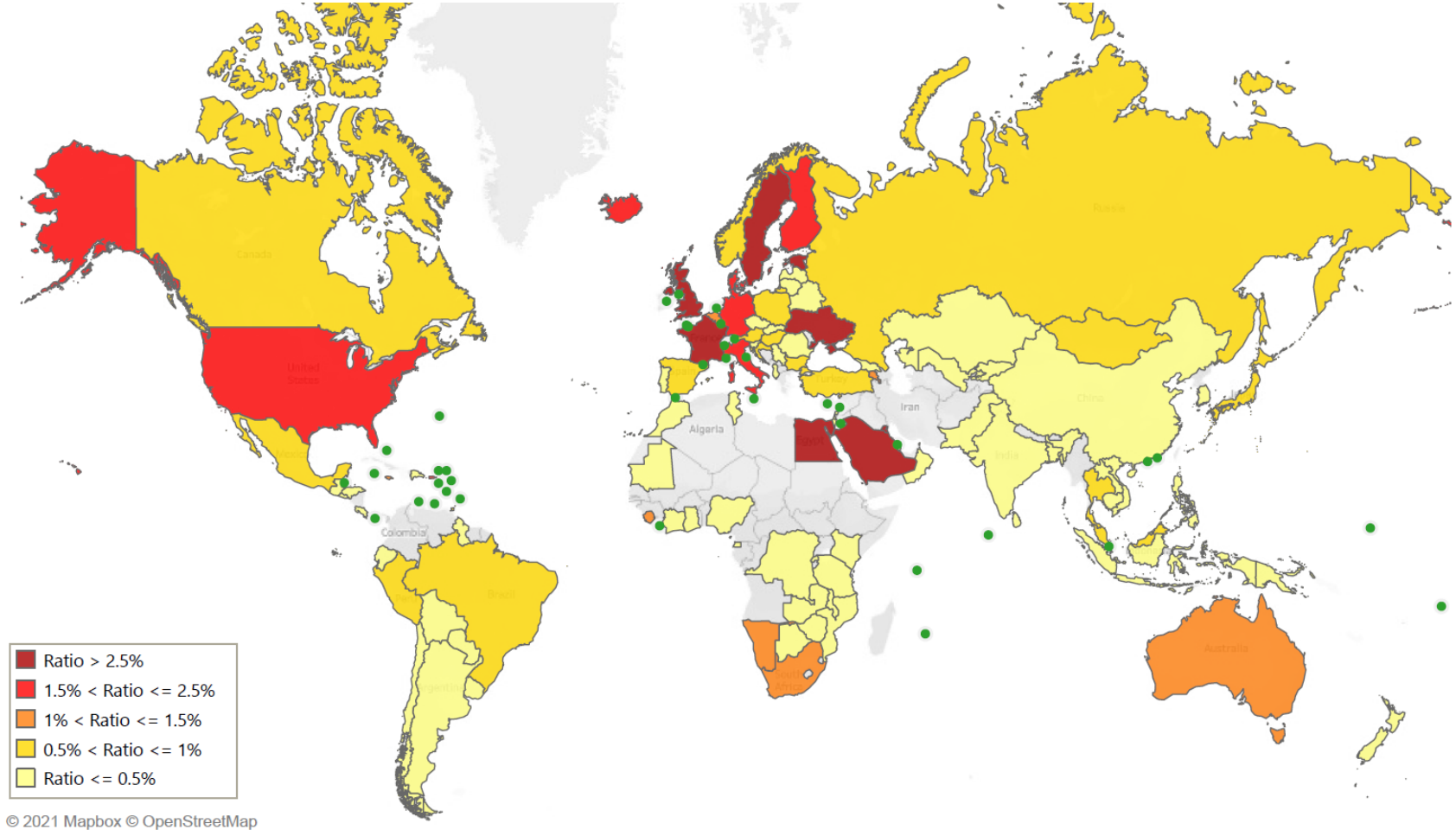
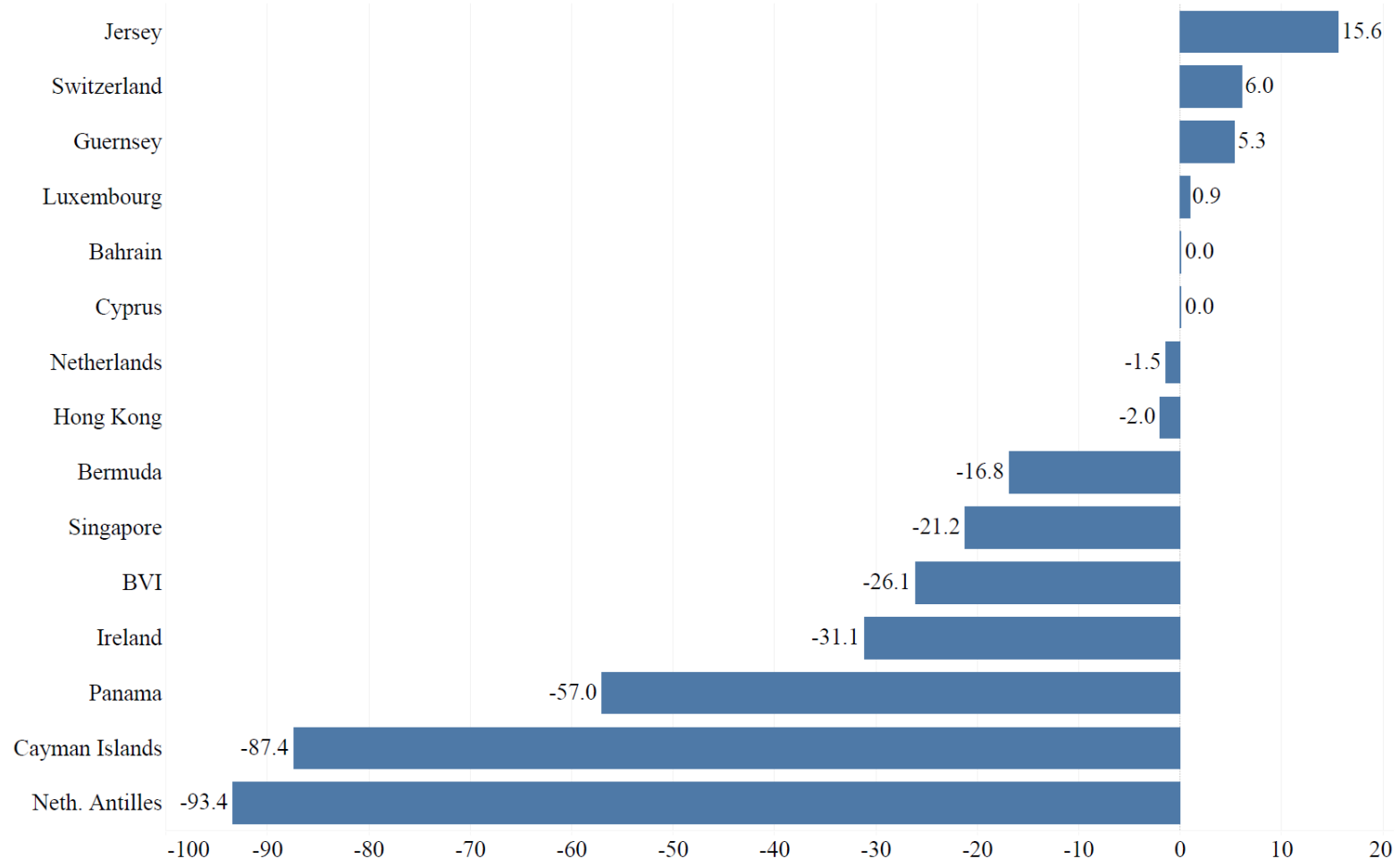


Figure 5: Comparison of Our Tax Residence Data to Uncorrected Data: Percentage Deviations

This figure reports the percent deviation in total M&A deal value using SDC location data as opposed to our tax residence data. Specifically, it is the ratio of column 6 to column 2 of Table 9. A positive (negative) value indicates that SDC overcounts (undercounts) deal value relative to the amount calculated using our tax residence data.



For Online Publication

Appendix to

"Tax Avoidance through Cross-Border Mergers and Acquisitions"

A Tax Residence Definition

We explain how we define the tax residence of a company when it is headquartered and incorporated in different countries. First, we use the PwC Worldwide Tax Summaries for Corporate Taxes guide from 2017 to determine the applicable laws for 150 countries (PwC, 2017). The assumption is that the relevant laws have not changed during the sample period. Using this reference document, we classify all countries into five categories.

1. Incorporation or management and control (INC/MC): A company is a tax resident in an INC/MC country if it is incorporated or managed and controlled in that country. This catch-all definition is the most common, as it applies to 74 of the 150 countries classified. Prominent examples include the UK, Hong Kong, Russia, and Germany.

2. Incorporation (INC): A company is a tax resident in an INC country if it is incorporated in that country. This category includes 47 countries, such as the United States, France, Sweden, and Thailand. A notable exception to this rule applies in the US according to section 7874 of the Internal Revenue Code, which prevents firms from moving their incorporation outside of the US if nearly all of their business is conducted in the US (Marples and Gravelle, 2014). In practice, this rule rarely applies since a company would not incorporate outside of the US if it knew it would still be a US tax-resident.

3. Management and control (MC): A company is a tax resident in an MC country if it is managed and controlled in that country. This applies to 9 countries, including Singapore, Malaysia, and Cyprus.

4. Does not matter (DM): The fourth category includes countries with laws stipulating that if the nation of incorporation and the nation where the company is managed differ, the other country (not in this category) can always claim the company as a tax

resident. This group has 11 countries with small economies, including Panama and the UAE. For instance, the laws in Panama stipulate that a company is a tax resident in Panama if it is incorporated and headquartered in Panama. For the UAE, there is no concept of tax residence.

5. No taxes (NO): The final category includes countries with no corporate taxes. This includes 9 countries, such as Bermuda, the Cayman Islands, and the British Virgin Islands.

The location where management and control is exercised is the place where the executives meet, which is typically the place where the headquarters is located. Thus, we use the term "headquarters" interchangeably with references to the location where management and control is exercised.

The difficult part about determining tax residence is the appropriate tie-breaking provision. For example, if two countries can claim the same company as a tax resident, then where is the company tax-resident? In rare cases, the company is a dual resident (tax-resident in both countries). However, in most cases, the countries have a treaty in place that stipulates a single place of tax residence when both countries can claim the company as a tax resident. We have not found a comprehensive source for tax treaties. Instead, we rely on examples in annual reports filed with the SEC. We used a sampling of companies to determine the application of tax treaty rules in practice. To get a sample of firms, we collected a list of firms for which the nation of incorporation differs from the nation of headquarters using two sources: Snapshot and data on SEC filings in WRDS. We then manually searched annual reports for hundreds of these companies in EDGAR, which contains SEC filings. There is good coverage in these filings of firms that are neither incorporated nor headquartered in the US.[25] For each company, we looked at the most recent annual report and determined the place of residence. Mostly, the filings do not mention anything about tax residence. When they do, they typically state the place of residence with a brief description of why this is the case. Based on our findings, we developed the following rules. These rules are applied sequentially to the entire sample of M&A deals. That is, rule 1 is applied first, and if rule 1 doesn't apply, then rule 2 applies, etc.

1. A company is tax resident in the US if and only if it is incorporated in the US. For example, consider the 2017 10-K of MySize, Inc. At the time, this company was

[25]Foreign firms that have equity listed on a US exchange are required to file annual reports with the SEC. Canadian firms file form 40-F, and non-Canadian foreign firms file form 20-F. In addition, numerous foreign firms report 10-K filings. To give an idea of how common it is for foreign firms to file annual reports with the SEC, we searched for annual reports from the 10 largest publicly listed companies in each of the G20 countries. Excluding the US and the EU, this yields 180 companies. Of these, 51 filed an annual report (40-F, 20-F, or 10-K) with the SEC between 2019-2021.

incorporated in the US with headquarters in Israel. Here is a statement in its 10-K about its tax position: "We are subject to federal, state and local taxes in the U.S., as well as local taxes in Israel in [sic] respect to our operations in Israel."

2. If a company is headquartered in China (INC/MC) and incorporated in an INC/MC or NO country, then it is resident in the country of incorporation. For example, here is a quote from the 2017 20-F of YY Inc, which has its HQ in China and its incorporation in the Cayman Islands: "We are not aware of any offshore holding companies with a corporate structure similar to ours ever having been deemed to be a People's Republic of China (PRC) 'resident enterprise' by the PRC tax authorities."

3. If a company is incorporated in Mauritius (INC/MC) and managed in India (INC/MC), then it is resident in Mauritius. For example, Azure Power Global satisfies this criterion according to its 2017 20-F.

4. If the company is headquartered in an INC/MC or MC country, then it is resident in that country. Here are some examples:

   (a) IHS Markit is incorporated in Bermuda and headquartered in the UK. Here is a quote from its 2017 10-K:

   > It is the intention of the directors to conduct the affairs of IHS Markit Ltd. so that the central management and control of IHS Markit Ltd. is exercised in the United Kingdom such that IHS Markit Ltd. is treated as resident in the United Kingdom for U.K. tax purposes.

   (b) Delphi Automotive is incorporated in Jersey and headquartered in the UK. Here is a quote from its 2014 10-K. "We will seek to run ourselves in such a way that we are and remain tax resident in the United Kingdom."

   (c) Invitel Holdings stated the following in its 2009 20-F: "Invitel Holdings is a Danish incorporated company, however is [sic] considered a tax resident company in Hungary given that the effective place of management of Invitel Holdings is in Hungary."

   (d) Amarin Corporation is incorporated in the UK and headquartered in Ireland. Here is a quote from its 2017 10-K:

   > Where a company is treated as tax resident under the domestic laws of both the UK and Ireland then the provisions of article 4(3) of the Double Tax Convention between the UK and Ireland provides that such enterprise shall be treated as resident only in the jurisdiction in which its

place of effective management is situated. We have sought to conduct our affairs in such a way so as to be resident only in Ireland for tax purposes by virtue of having our place of effective management situated in Ireland.

5. If the company is incorporated in an INC or INC/MC country and headquartered in a DM, NO, or INC country, then it is resident in the country of incorporation.

6. Otherwise, the company is resident in the country of headquarters.

Rules 1-3 are exceptions to rules 4 and 5. The application of rule 4 is clear if the company is incorporated in a country that does not consider incorporation when determining residence (DM and MC). Next, with NO countries, we find that the residence tends to be allocated to the country of headquarters, as illustrated by examples 4a and 4b. Lastly, when the company is incorporated in an INC/MC, the appropriate double-tax treaty comes into play since both the country of incorporation and the country of headquarters could claim the company as being tax resident. We have found that these treaties tend to allocate tax residence to the country of headquarters, as illustrated by examples 4c and 4d.

Rule 5 is straightforward when the company is headquartered in a DM or INC country. Although there are few examples of this, we presume that if the headquarters is in a NO country, then the country of incorporation will claim the company as a tax resident. Lastly, if rules 1-5 do not apply, then we assume that the company is a resident in the nation of its headquarters. This most often occurs when the nation of incorporation is missing in the data or the company is headquartered in a country where we are unable to determine the tax residence laws and the country of incorporation is such that rules 1-5 do not apply. There are 181 countries in our sample but we are only able to obtain tax residence laws for 151 of them. Thus, there are 30 countries for which tax residence laws are unavailable and which are thus affected by the assumption underlying rule 6.

B Country-Level Data Notes

B.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, 2017.[26]

[26]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).

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.[27] 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.[28] 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 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,[29] and the official languages of Jersey are English and French.[30] 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.[31] Since KAOPEN is

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

[28]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).

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

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

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

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.

B.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.

C 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.

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

D 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 \$4 billion firm with a 25% ETR buys a \$1 billion firm with 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&As, 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&As) 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&As) 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.

E Calculation of Pre-Tax Profit Margin

In this appendix, we will explain how $PM_{k,t(k)}$, the pre-tax profit margin, is calculated for the purposes of aggregate tax avoidance from asset building in cases where the firm-year measure is missing. We replace the pre-tax margin with an average 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.

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F Additional Results

Table C1: Additional M&A Summary Statistics

Extending Table 3, this table reports additional M&A summary statistics based on the location of the acquiror/target and whether the deal is cross-border or intra-country.

Panel A: Number of Deals

	Acquiror	Target	
Cross-Border	42,755	46,671	
Intra-Country	116,822	116,822	Non-Haven
Ratio	0.37	0.40	
Cross-Border	6,460	4,157	
Intra-Country	4,076	4,076	Large Haven
Ratio	1.58	1.02	
Cross-Border	2,679	1,066	
Intra-Country	238	238	Small Haven
Ratio	11.26	4.48	

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

	Acquiror	Target	
Cross-Border	\$273	\$270	Non-Haven
Intra-Country	\$210	\$210	
Cross-Border	\$301	\$326	Large Haven
Intra-Country	\$157	\$157	
Cross-Border	\$286	\$390	Small Haven
Intra-Country	\$239	\$239	

Panel C: 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	\$39	\$55	Small Haven
Intra-Country	\$29	\$29	

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. 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 4. 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)	0.70***	0.75***	0.74***
	(0.19)	(0.27)	(0.26)
𝟙(Sm Haven Target)	1.73***	1.47***	1.47***
	(0.47)	(0.37)	(0.35)
𝟙(Lg Haven Target)	0.46***	0.50***	0.49**
	(0.15)	(0.16)	(0.20)
ln(Acquiror Control of Corruption)	2.18***	1.83***	1.82***
	(0.49)	(0.28)	(0.28)
ln(Target Control of Corruption)	1.38***	0.95***	0.95***
	(0.34)	(0.33)	(0.33)
𝟙(Acquiror UK Legal Origin)		0.66***	0.67***
		(0.19)	(0.20)
𝟙(Target UK Legal Origin)		0.81***	0.80***
		(0.17)	(0.18)
ln(Acquiror Exports)			0.04
			(0.05)
ln(Acquiror Imports)			-0.02
			(0.07)
Baseline Controls	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Two-way SEs	Yes	Yes	Yes
N	449,180	449,180	449,180
Pseudo R^2	0.753	0.765	0.765
Mean of Dep Var	4.50	4.50	4.50

Table C3: Gravity Model Robustness Tests I/III

This is the first of three tables testing the robustness of the results in Table C2. *Controls* refers to the controls used in column 2 of Table C2. The *FX Regime 1-5* dummy equals 1 if the country has a course classification code from 1-5 according to Ilzetzki et al. (2017). *KAOPEN* measures a country's capital account openness (Chinn and Ito, 2006). *WUI* is the World Uncertainty Index developed in Ahir et al. (2018). The *Bilateral Investment Treaty* dummy equals 1 if the country pair has a bilateral investment treaty at time t (Bian et al., 2021). 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)	(4)
𝟙(Sm Haven Acquiror)	2.02***	1.78***	2.06***	1.46**
	(0.30)	(0.23)	(0.29)	(0.62)
𝟙(Lg Haven Acquiror)	0.75***	0.77**	0.76***	0.80***
	(0.27)	(0.31)	(0.27)	(0.31)
𝟙(Sm Haven Target)	1.30***	0.87***	1.45***	1.61***
	(0.40)	(0.29)	(0.37)	(0.43)
𝟙(Lg Haven Target)	0.52***	0.56***	0.52***	0.57***
	(0.17)	(0.15)	(0.15)	(0.15)
𝟙(Acquiror FX Regime 1-5)	-1.19***			
	(0.39)			
𝟙(Target FX Regime 1-5)	1.72***			
	(0.33)			
ln(Acquiror KAOPEN)		0.17		
		(0.46)		
ln(Target KAOPEN)		0.57		
		(0.59)		
𝟙(Bilateral Investment Treaty)			-0.39***	
			(0.12)	
ln(Acquiror WUI)				0.29
				(0.35)
ln(Target WUI)				0.79*
				(0.41)
Controls	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Clustering	Two-way	Two-way	Two-way	Two-way
Sample	All	All	All	All
N	443,018	414,696	449,180	291,104
Pseudo R^2	0.770	0.779	0.765	0.781
Mean of Dep Var	4.50	4.50	4.50	4.56

Table C4: Gravity Model Robustness Tests II/III

This is the second of three tables testing the robustness of the results in Table C2. *Controls* refers to the controls used in column 2 of Table C2. The *EOI* and *Double Tax Treaty* dummies are from the Exchange of Information Database (2019). The dummies on economic integration agreements in the last column are from the NSF-Kellogg Institute Database on Economic Integration Agreements (Kellogg Institute for International Studies, 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)
𝟙(Sm Haven Acquiror)	2.02***	2.26***
	(0.28)	(0.26)
𝟙(Lg Haven Acquiror)	0.78***	0.81***
	(0.26)	(0.21)
𝟙(Sm Haven Target)	1.43***	1.61***
	(0.35)	(0.37)
𝟙(Lg Haven Target)	0.49***	0.56***
	(0.12)	(0.15)
𝟙(Double Tax Treaty)	-0.02	
	(0.17)	
𝟙(On Request EOI)	0.32**	
	(0.14)	
𝟙(Automatic EOI)	0.43	
	(0.27)	
𝟙(Non-Reciprocal PTA)		-0.35
		(0.25)
𝟙(Preferential Trade Agreement)		0.32
		(0.33)
𝟙(Free Trade Agreement)		-0.12
		(0.18)
𝟙(Customs Union)		0.15
		(0.26)
𝟙(Common Market)		0.62**
		(0.28)
𝟙(Economic Union)		0.11
		(0.29)
Controls	Yes	Yes
Year FE	Yes	Yes
Clustering	Two-way	Two-way
Sample	All	All
N	449,180	443,828
Pseudo R^2	0.766	0.768
Mean of Dep Var	4.50	4.51

Table C5: Gravity Model Robustness Tests III/III

This is the last of three 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 *Stable* sample, both the acquiror and the target must be in tax havens or at least one side of the deal must be from a politically stable country, which includes Canada, the United States, and the non-haven countries of Western Europe. *EU* refers to the European Union. *WTO* refers to the World Trade Organization. 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)	(4)
𝟙(Sm Haven Acquiror)	2.05***	2.09***	2.25***	1.91***
	(0.34)	(0.25)	(0.25)	(0.23)
𝟙(Lg Haven Acquiror)	0.72**	0.75***	0.81***	0.76***
	(0.33)	(0.17)	(0.23)	(0.28)
𝟙(Sm Haven Target)	1.42***	1.47***	1.60***	1.32***
	(0.34)	(0.25)	(0.37)	(0.32)
𝟙(Lg Haven Target)	0.51***	0.50***	0.53***	0.51***
	(0.16)	(0.18)	(0.17)	(0.17)
𝟙(Acquiror is in EU)			0.30***	
			(0.10)	
𝟙(Target is in EU)			0.17	
			(0.21)	
𝟙(Both Sides are in EU)			0.35	
			(0.27)	
𝟙(Acquiror is in Euro Area)			-0.02	
			(0.12)	
𝟙(Target is in Euro Area)			0.10	
			(0.19)	
𝟙(Both Sides are in Euro Area)			-0.55*	
			(0.28)	
𝟙(Acquiror is in WTO)				-0.53
				(0.78)
𝟙(Target is in WTO)				-0.38
				(0.50)
𝟙(Both Sides are in WTO)				-0.32
				(0.52)
Controls	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Clustering	Two-way	Ctry-Pair	Two-way	Two-way
Sample	Stable	All	All	All
N	139,160	449,180	449,180	449,180
Pseudo R^2	0.757	0.765	0.768	0.766
Mean of Dep Var	4.79	4.50	4.50	4.50

Table C6: Top 30 Countries by Taxes Lost from Cross-Border, Haven M&A

This table summarizes the top 30 countries by the amount of taxes lost per year through cross-border, tax-haven M&A. The M&A data is from SDC Platinum. The data on tax revenue is from Tørsløv et al. (2020). *Ratio* is the ratio of *M&A Taxes Lost* to *Tax Revenue*, displayed in percentage points. All variables are as of 2017. Dollar figures are in millions of USD.

	M&A Taxes Lost	Corp. Tax Revenue	Ratio
U.S.	8,875	372,035	2.39
U.K.	3,692	75,058	4.92
Germany	1,602	73,576	2.18
France	1,595	60,654	2.63
Japan	1,338	218,497	0.61
China	1,179	469,878	0.25
Italy	696	40,891	1.70
Australia	676	62,614	1.08
Brazil	484	57,827	0.84
Canada	481	56,366	0.85
Russia	470	56,798	0.83
Sweden	437	14,287	3.06
India	436	101,770	0.43
Ukraine	368	2,761	13.32
Mexico	336	40,624	0.83
Spain	294	30,215	0.97
Belgium	234	20,748	1.13
Egypt	202	7,861	2.57
South Africa	200	18,689	1.07
Denmark	183	9,884	1.85
Malaysia	158	18,667	0.85
Saudi Arabia	151	3,737	4.04
Turkey	132	14,521	0.91
South Korea	131	58,650	0.22
Thailand	120	18,204	0.66
Norway	118	13,648	0.86
Finland	110	6,963	1.57
Poland	94	10,191	0.92
Austria	89	10,289	0.86
Kuwait	70	443	15.88

Table C7: 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 6. 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)	-0.12
	(0.39)
ln(Net Sm Haven M&A Value/TA))(i,t-2)	-1.75**
	(0.69)
ln(Net Lg Haven M&A Value/TA)(i,t-2)	-1.13***
	(0.35)
ln(Net Total M&A Value/TA)(i,t-2)	-0.86***
	(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)	-0.64
	(0.94)
$\mathbb{1}$(Net Sm Haven M&A Value $>$ 0)(i,t-2)	-4.39***
	(1.33)
$\mathbb{1}$(Net Lg Haven M&A Value $>$ 0)(i,t-2)	-2.67***
	(0.71)
$\mathbb{1}$(Net Total M&A Value $>$ 0)(i,t-2)	-1.92***
	(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