

# U.S. Firms on Foreign (tax) Holidays

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We undertake the first large-sample analysis of foreign tax holiday participation among U.S. corporations. Tax holidays are temporary reductions of tax granted by governments, usually in conjunction with new business investment. We examine characteristics of countries that offer holidays and characteristics of companies that participate in them, and that different characteristics are associated with being a tax haven then offering tax holidays. We find that foreign tax holidays are economically important phenomena and participation in them has increased over time. We find an unintended consequence of foreign governments granting tax holidays is that, over the long run, they increase the amount of U.S. tax on foreign income. Indeed, our estimates imply that participating in a foreign tax holiday roughly doubles the eventual U.S. tax on foreign income.

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We thank Peter Barnes and Yee Loong Sum for helpful discussion about foreign tax holidays. We thank participants at the EIASM Conference on Current Research in Taxation, Scott Dyreng, Kevin Markle, Karen Pinto (discussant), Leslie Robinson, Terry Shevlin, and Jake Thornock for feedback on this paper. Travis Chow acknowledges financial support from the Singapore Ministry of Education (MOE) Academic Research Fund (AcRF) Tier 1 grant. Jeff Hoopes and Ed Maydew acknowledge financial support from the Kenan-Flagler Business School at the University of North Carolina at Chapel Hill.

## **1 Introduction**

We undertake the first large-sample analysis of foreign tax holiday participation among U.S. corporations. Tax holidays are temporary tax reductions that governments grant to firms, conditional on the firm satisfying some investment criteria. The rate reductions can be substantial, often completely exempting the firm's local income from tax for years at a time. For example, South Korea granted Cabot Microelectronics a zero percent tax rate for 2013-2015, followed by a tax rate that was 50 percent of the statutory tax rate (resulting in an 11 percent tax rate) for 2016 and 2017 (Cabot Microelectronics 2016). The investment conditions are often tied to a particular kind of business activity and sometimes to a particular region of the country.

Despite being well-known among tax professionals, academic research on foreign tax holiday participation has been hampered by a lack of data. For example, tax literature reviews by Graham (2003), Shackelford and Shevlin (2001), and Hanlon and Heitzman (2010) reveal little prior research on foreign tax holidays, citing only a single paper that asked tax executives to rank the importance of various factors, including tax holidays, in location decisions (Single 1999). Our study is made possible by our assembling the first large-sample dataset of foreign tax holiday participation among U.S. firms. We assemble the dataset by extracting information in 10-K filings on Edgar from 1995-2013 using a combination of automated procedures and hand collection.

The data show that foreign tax holidays are economically important phenomena and that participation in them has increased rapidly over time. We find that the percentage of publicly-traded U.S. firms reporting participation in at least one foreign tax holiday increased more than five-fold since the beginning of our sample in 1995. By the end of our sample period, 9.7 percent

of U.S. publicly-traded firms report participating in at least one foreign tax holiday, with participation greater among the largest firms. The rise in foreign tax holiday participation is broadly consistent with the increasing rate of multinational operations by U.S. firms over the past 25 years (Dyreng, Hanlon, Maydew, Thornock 2017), though holiday participation has increased much more rapidly. The firms in our sample most frequently participate in tax holidays offered by Asian countries, with China leading the way, followed by Singapore, India, and Malaysia. Other countries with heavy tax holiday participation by our sample firms include Israel, Switzerland, Brazil, and the Philippines.

Subsequent tests find that foreign tax holidays are economically important. We examine the impact of foreign tax holidays on firms' taxes by examining their effective tax rates (ETR), both cash effective tax rates and GAAP effective tax rates. After controlling for firm-level variables affecting firms' taxes as documented in prior research, we find that participating in a foreign tax holiday is associated with a reduced *CASH ETR* (*GAAP ETR*) of 2.4 (4.5) percentage points during the holiday years. To illustrate the economic significance of foreign tax holidays, we compare them to another phenomenon that has received substantially more attention in the academic literature—the use of tax havens. We find that tax holidays have a substantially larger effect on firms' effective tax rates than the use of tax havens. The estimated effect of participating in a foreign tax holiday is over four times larger than the effect of having at least one tax haven subsidiary. Even for firms that have at least eight subsidiaries in tax havens, the effect on firms' effective tax rates of participating in a foreign tax holiday is still as large as that of having the tax haven subsidiaries. One way to think about the large effect of tax holidays is from the point of view of the governments granting them and what they receive in return. Tax havens tend to attract relatively large amounts financial transactions and intangible assets

(Dischinger and Riedel 2011; Markle and Shackelford 2013; Hines and Rice 1994). In contrast, tax holidays are typically conditional on setting up physical operations, such as a new manufacturing plant, which has visible and direct effects on employment.

However, we also find that foreign tax holidays have consequences that are (presumably) unintended by the governments enacting them. In particular, we find that, over the long run, foreign tax holidays *increase* the amount of U.S. tax on foreign income. Indeed, our estimates imply that participating in a foreign tax holiday roughly doubles the eventual U.S. tax on foreign income. The reason is that, for U.S. multinationals, foreign tax holidays must be viewed in the context of the U.S. having a worldwide tax system. Under the U.S. worldwide tax system, foreign earnings are taxed at the U.S. rate when repatriated to the U.S., with relief provided by the foreign tax credit (we provide more details on U.S. taxation of foreign income in the next section). Therefore, the long-run effect of a foreign tax holiday on a U.S. multinational's taxes depends on the firm's future repatriation decisions, making an understanding of foreign tax holidays more complicated than it might at first seem.<sup>1</sup>

The results of prior research estimating the extent of U.S. tax on foreign income have been mixed. Altshuler and Newlon (1991) and Dyreng and Lindsey (2009) find that U.S. firms face additional U.S. federal tax on foreign income. However, Grubert and Mutti (1995) estimate that the residual U.S. tax rate on foreign income is negative. Moreover, Dyreng and Lindsey (2009) find that firm-years associated with tax haven use do not lead to higher U.S. tax on repatriated foreign earnings, compared to firm-years without tax haven use.

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<sup>1</sup> Hartman (1985) shows analytically that deferral of repatriation taxes should not affect the repatriation decision under certain assumptions, including a constant tax rate and inevitability of repatriation of foreign earnings (and hence repatriation tax). We describe the U.S. system of taxation of foreign income in more detail in section 2.

We modify the methodology developed in Dyreng and Lindsey (2009) to test whether foreign income earned during tax holiday years results in U.S. tax at a higher rate than foreign income earned during non-holiday years. Our findings suggest that firms pay little U.S. tax on foreign income in the short-term. Over the long-run, however, we find that firms pay more U.S. tax on foreign income earned during tax holiday years. These results are consistent with firms exerting discretion on the timing of repatriation. They also suggest that at least a portion of the tax savings from foreign tax holidays eventually goes to the U.S. government in the form of higher U.S. tax on foreign income.<sup>2</sup>

We next examine whether firms alter their designation of foreign income as permanently reinvested when they participate in foreign tax holidays. Under U.S. GAAP, firms do not recognize deferred U.S. tax liabilities on foreign earnings that are reinvested abroad indefinitely, sometimes referred to in the literature as “permanently reinvested earnings”, or PRE. We find that foreign income earned during tax holiday years is associated with greater increases in permanently reinvested earnings. Combined with the earlier results that foreign tax holidays eventually do result in additional U.S. tax on foreign income, these findings suggest that foreign tax holidays affect firm’s financial reporting decisions.

Our study makes at least five contributions to the literature. First, we introduce into the literature the first broad-sample evidence on foreign tax holiday participation by U.S. firms. Second, we show that foreign tax holidays are economically important phenomena whose effects

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<sup>2</sup> Despite the increased tax on foreign income, it is possible the U.S. is a net loser of corporate income tax revenue if foreign tax holidays result in what would otherwise be incremental U.S. investment to be invested abroad, such that U.S. domestic income is reduced. If, however, foreign tax holidays cause operations to be shifted from one foreign country to another, with no change to U.S. domestic income, then our results imply the U.S. is net winner in terms of corporate tax revenue.

are increasingly prevalent among publicly-traded U.S. firms. Participation in them by U.S. firms has increased rapidly over time and they have significant effects on firm's effective tax rates. At a minimum, our findings suggest that researchers interested in taxation of U.S. multinationals should consider the effects of foreign tax holidays in their research designs. Third, our findings suggest that tax inducements granted by one government are sometimes effectively shared not just with the firm whose investment it is trying to attract, but also with the U.S. government. By virtue of having a worldwide tax system, we find that the U.S. government effectively reaps some of the tax relief given by foreign governments when they extend tax holidays to U.S. firms. This finding has many implications. It should be of interest to academics and policy makers in light of the serious discussions of replacing the U.S. worldwide tax system with territorial taxation. While there are many problems with the current U.S. worldwide tax system, the results imply that territorial taxation would increase the attractiveness of foreign tax holidays to U.S. firms. Fourth, our findings contribute to the literature on the financial reporting consequences of tax decisions. Our results indicate that U.S. firms designate an increased amount of foreign earnings earned during tax holiday years as permanently reinvested, thereby avoiding financial statement recognition of deferred U.S. taxes.

Finally, this study contributes to our understanding of the institutional features that shape the international corporate tax environment, and provides estimates that quantify the magnitude of those features. Despite their increasing prevalence and large economic impact, lack of data has meant that foreign tax holidays have been largely ignored in prior research on U.S. firms. Instead, researchers, the popular press, and policymakers have focused almost exclusively on the role of tax havens and other aggressive tax strategies (e.g., Dyreng and Lindsey 2009; Bennesen and Zueme 2015; Slemrod and Wilson 2009; Hines and Rice 1994; Holms 2011; Drucker 2010;

Gramlich and Whiteaker-Poe 2013; Dyreng et al. 2016). We show that tax holidays are of sufficient magnitude that some countries not thought of as tax havens in effect offer corporate tax rates comparable to traditional tax havens. We hope that our initial evidence on foreign tax holidays encourages others to investigate these interesting phenomena.

The paper proceeds as follows. Section 2 provides background on institutional features and prior research on foreign tax holidays. Section 3 describes the sample selection process. Section 4 presents the research design and discusses the empirical results. Section 5 concludes.

## **2 Background on Foreign Tax Holidays**

Tax holidays are used by governments to encourage investment and promote local employment. Broadly speaking, tax holidays grant the recipient a lower tax rate than the published statutory tax rate or other favorable tax terms (e.g., faster depreciation). In exchange, the recipient is usually required to meet pre-specified investment or employment objectives. Tax holidays generally have finite durations, after which the tax rate returns to the regular statutory rate. Sometimes firms may reapply for the incentive program. Some tax holidays are privately negotiated between the firm and the host country, but the income tax holidays that we focus on in this study are available to any firm that meets the required investment or employment criteria.

While we focus on holidays from income tax, other tax holidays give relief from sales taxes, property taxes, etc. (Morse and Farmer 1986). Within the U.S., state and local governments sometimes give sales tax holidays to encourage shopping during certain periods of the year, such as back-to-school season (Cole 2009; Ross and Lozano-Rojas 2017) or hunting season (the Second Amendment Weekend Sales Tax Holiday (Bonin 2015)). States also offer tax holidays to incentivize firms to invest in their state (Buss 2001), including property tax

abatements (Kenyon, Langley, and Paquin 2012). Countries offer holidays from various kinds of taxes, including pollution related taxes (Conrad 1993). The U.S. government offered the well-studied repatriation tax holiday in 2004 to encourage firms to repatriate and invest cash previously held abroad (e.g., Blouin and Krull 2009; Faulkender and Petersen 2012; Dharmapala, Foley, and Forbes 2011). In this study, we focus on corporate income tax holidays offered by foreign countries.

A small set of studies examine the country-level effects of income tax holidays on investment. Mintz (1990), for example, produces analytical estimates of the after-tax user costs of capital and effective tax rates in a variety of developing nations (e.g., Bangladesh, Malaysia, Morocco, etc.). A limitation, however, is that the analysis assumes no home country taxation when the earnings are repatriated, making it not generalizable to the U.S. worldwide tax system.<sup>3</sup> Mintz (1990) concludes that while tax holidays will generally provide some tax benefit, the benefit might not encourage much investment because of the temporary nature of the holidays.<sup>4</sup> Klemm and Van Parys (2011) examine whether tax holidays lead to increased foreign investment using data from 40 Latin American, Caribbean, and African countries. They find that, with the exception of Africa, reduced tax rates and longer tax holidays are both effective in attracting

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<sup>3</sup> For example, Mintz (1990, 88–89) notes that “In some countries, such as Japan, a capital exporter will grant “tax sparing” whereby remitted earnings are not taxed in order to pass the tax incentive on to the firm. In the calculations reported below, it is assumed that tax sparing is provided. Otherwise the techniques developed would need to be substantially revised.” To our knowledge, the U.S. has never had tax sparing agreements (Azémar and Dharmapala 2015), although one was nearly established with Pakistan in 1957 (Hines 2000). Mintz and Tsiopoulos (1994) modify the analytical estimates to take into account home country taxation of foreign earnings, as occurs in the U.S.

<sup>4</sup> This is yet another cost of tax benefits being temporary, mitigating the effect or causing other unintended consequences (Hoopes 2015).



foreign direct investment.<sup>5</sup> Single (1999) takes a different approach, asking 66 tax executives to evaluate a case study of where to locate a subsidiary. Among 29 possible factors affecting the location of investment, tax holidays ranked among the lower half. Thus, Single (1999) suggests that tax holidays are not a major determinant of subsidiary location.

Tax holidays for U.S. multinationals take place in the presence of a worldwide tax system. Unlike most countries, the U.S. taxes worldwide earnings. For example, if a U.S. firm earns \$100 of taxable income in the U.S. and \$100 in Singapore, all \$200 are taxable in the U.S. at the U.S. tax rate of 35%. There are several important caveats. First, the foreign tax credit mitigates the effect of U.S. taxation. If the firm pays a 17% Singapore tax rate on the \$100 Singaporean income, the U.S. will give the firm credit for the \$17 in taxes paid to Singapore. The U.S. will tax the firm's Singaporean income at the difference between the U.S. tax and the Singaporean tax on the Singaporean income ( $\$35 - \$17 = \$18$ ). If Singapore grants a tax holiday that lowers the Singapore tax rate to 5%, then the U.S. firm will pay \$5 to Singapore and \$30 to the U.S. on the Singaporean income. In both cases, \$35 in taxes are paid on the foreign earnings. The tax holiday changes how much tax is paid to Singapore and how much is paid to the U.S.

The second caveat is that if the Singaporean income is earned in a Singaporean subsidiary, that income is not taxable (generally) by the U.S. until the income is repatriated to a U.S. parent. This concept of deferral can provide incentives for U.S. multinationals to retain foreign earnings in the foreign subsidiaries to delay U.S. taxation (Foley, Hartzell, Titman, and Twite 2007). In the tax holiday example above, the firm qualifies for a 5% holiday tax rate in

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<sup>5</sup> See also Bond 1981; Bond and Samuelson 1986; Chan and Mo 2000; Doyle and Wijnbergen 1994; Lin 2006; Mintz 1990; Klemm and Parys 2011; Single 1999; Buettner and Ruf 2007; Cleeve 2008; Du, Harrison, and Jefferson 2014; Oleksiv 2000; Azhar and Sharif 1974; Chen-Young 1967; Tuomi 2011; Quan Li 2006; Jinyan Li 2006.

Singapore and repatriates the income, resulting in \$5 of tax to Singapore and \$30 of tax to the U.S. tax on the foreign income. However, if the firm does not repatriate the income, it will pay only the \$5 Singaporean tax and would owe no U.S. tax on the Singaporean income until it repatriates the earnings. The firm could retain the earnings in Singapore, hopeful that in the future the U.S. would enact territorial taxation with favorable transition rules or make some other change to decrease the tax cost of repatriation.

Finally, the previous examples only dealt with the eventual U.S. tax payments. U.S. GAAP requires that firms accrue taxes for financial accounting purposes when income is earned, even if taxes will only be paid in the future when repatriation occurs. Continuing with the earlier example, even if the firm did not repatriate the Singaporean income, it would still accrue a tax expense (which would affect the firm's GAAP effective tax rate and, in turn, its after-tax earnings) in anticipation of paying the taxes when the income was finally repatriated and taxed. In that case, the Singaporean tax holiday would reduce the firm's cash effective tax rate in the current year, but would not reduce the firm's GAAP effective tax rate. However, there is an important exception to this rule. APB 23 (now ASC 740-30) allows corporations to not accrue a tax expense for foreign earnings if they intend to indefinitely reinvest the earnings (sometimes called permanently reinvested earnings, or PRE). Thus, if the firm designated the Singaporean earnings as indefinitely reinvested, then both the GAAP effective tax rate and cash effective tax rate would decrease as a result of the Singaporean tax holiday.

While the prior literature focuses on whether tax holidays encourage investment in the country granting them, we are aware of no research about the effects on the investing firms, probably because of the lack of firm-level information about which firms participate in tax holidays. The next section describes our collection of such data.

### 3 Data Collection and Sample Selection

We collect firm-level information about tax holiday participation from disclosures in 10-Ks from 1995-2013.<sup>6</sup> Firms disclose participation in a tax holiday in a variety of locations in their 10-Ks, including the Management Discussion and Analysis (MD&A) and the tax footnote. Item 303(a)(3)(i) of Regulation S-K and Section III.B of SEC Release 33-8350 both discuss the requirements of the MD&A and risk factors section of the MD&A to highlight factors associated with future uncertainty, and it is sometimes in this context that firms discuss tax holidays. For example, firms discuss how becoming ineligible for a holiday could substantially increase tax expense and reduce earnings per share.<sup>7</sup> Discussion of tax holidays also accompanies discussions of effective tax rates in general, as firms discuss why the rate has changed from the prior year, reasons the rate may increase in the future, etc. Appendix B contains several examples of tax holiday-related disclosures.

To locate disclosures related to tax holidays, we search 10-Ks for the words “holiday” and “incentive” and extract the text surrounding instances of those two words. We read hundreds of these disclosures and compiled a dictionary of names of countries that grant tax holidays. We then execute a script that extracts text from 10-Ks that includes the words “holiday” or “incentive” within 30 characters of at least one country from the dictionary of more than 200

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<sup>6</sup> EDGAR filings reliably start in 1995. 10-Ks from the entire year of 2013 were the most recent available when our extensive hand-collection of data collection began.

<sup>7</sup> These requirements appear to be enforced. For example, in a comment letter from the SEC on August 22, 2012, the SEC suggested to Benchmark Electronics that “Considering the significance of the tax incentives and holidays to your net income, please tell us what consideration was given to disclosing further details regarding each significant tax incentive and holiday and the related expiration date.”

country names, and that references “tax” somewhere within 800 characters of the instance of “holiday” or “incentive”. When reading through many of these textual matches, we note several common terms that produce false positives. Accordingly, we exclude text matches that contain a list of terms that commonly produce false positives.<sup>8</sup> We then execute this code, which produces a 9.79 MB text file containing potential disclosures of tax holidays. We employ research assistants (RAs) to read through all matches and confirm that the disclosure relates to corporate income tax holidays offered by foreign governments (they discard non-income tax holidays, holidays offered by states or provinces, and false positives in general). If the match is valid, the RA records the following information for as many of these items as the firm discloses: the country/jurisdiction of the tax holiday, the starting/ending year of the tax holiday, the duration of the tax holiday, and the size of the tax holiday (i.e., whether it is a tax exemption or a significant rate reduction).

The source of our tax holiday data, firm-level disclosures, does present certain limitations. Similar to other studies that use information from SEC filings and financial statements, we recognize that disclosing a tax holiday is a choice. Because we can only examine disclosed holidays, we caution against generalizing the estimated magnitudes to undisclosed tax holidays.<sup>9</sup> Further, to the extent that we see over-time trends changing in tax holiday usage, these trends may be driven by the disclosure of tax holidays, rather than the tax holidays themselves. In later analysis, we examine the effects of various controls for disclosure. While we are unable

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<sup>8</sup> For example, the terms “school holiday”, “incentive pay system”, “Chinatown”, etc.

<sup>9</sup> While some firms with immaterial numbers may not disclose, it certainly is the case that some firms disclose immaterial values. For example, in their 10-K in 2014, Overstock disclosed a tax holiday worth \$3,000 of benefit for 2013 and \$15,000 in 2014. In 2014, total tax expense was \$4,404,000, suggesting that the tax holiday was not material.

to conclusively disentangle tax holiday participation and disclosure about tax holiday participation, we are able to document the effects of tax holidays that are disclosed.

We then combine our tax holiday data with firm-level data from Compustat and Audit Analytics. We require firms to be incorporated in the U.S. and have at least \$10 million of assets. We eliminate financial firms and firm-years missing data that are necessary for our tests. Our entire sample, which includes both firms that do and firms that do not disclose a foreign tax holiday, includes 25,422 firm-year observations between 1995 and 2013. Table 1 describes the sample selection procedure. The sample size decreases in some later tests that impose additional estimation constraints (e.g., positive pre-tax book income to calculate an effective tax rate) or that require permanently reinvested earnings data obtained from Audit Analytics.

Table 2 presents descriptive statistics for the firm-years in our sample, split based on whether the firm-year observation has a foreign tax holiday. The *CASH ETR* (*GAAP ETR*) for the firm-years with a foreign tax holiday is 19% (24%), while for the firms without a tax holiday the value is 25% (32%), suggesting that, at least without controlling for other differences in these firm-year observations, holiday firm-years appear to be associated with substantial tax savings. The natural log of assets, *LNAT*, is slightly larger for holiday firm-years than for non-holiday firm-years (7.16 compared to 6.60, suggesting a difference, in unlogged dollars, of approximately \$550 million). The descriptive statistics suggest that the characteristics of our sample firms are similar to those documented in prior research (e.g., Dyreng and Lindsey 2009). However, it is important to note that our sample is restricted to multinational firms, which are larger and more profitable than domestic-only firms. Table 3 presents pairwise correlations among the variables. Of note is that the correlations between *HOLIDAYYEAR* and both *CASH ETR* and *GAAP ETR* are negative, suggesting that tax holidays are associated with lower taxes.

## 4 Empirical Results

### 4.1 *The Prevalence of Foreign Tax Holidays*

We start by describing the prevalence of foreign tax holiday participation in our sample. We find 334 firms (9.1 percent of sample firms) that disclose having a foreign tax holiday, for a total of 1,734 holiday firm-years (6.8 percent of all sample firm-years). The data indicate that foreign tax holiday participation is increasing over time. Figure 1 shows the percentage of sample firms participating in foreign tax holidays across time. In 1995, 1.6 percent of sample firms disclosed having a foreign tax holiday. By 2000, this figure had more than doubled, to 3.4 percent, and by 2013 nearly 10 percent of the sample firms disclose having a foreign tax holiday.

Figure 2 displays the distribution of tax holiday firm-years in each country/jurisdiction, where the size of the circles corresponds to the number of holiday firm-years. The tax holidays are offered by a number of countries, mainly in Asia, Europe, and South America, including Brazil, China, Costa Rica, India, Ireland, Israel, Malaysia, Philippines, Puerto Rico, Singapore, Switzerland, and Thailand.<sup>10</sup> Of the countries in our sample, the most common grantor of tax holidays is China (25.7 percent). Second is Singapore (21.1 percent). Note that firms may receive holidays from more than one country at a time.

### 4.2 *Characteristics of Countries Granting Tax Holidays*

In Table 4 we examine what kind of countries tend to grant the tax holidays in which our sample firms participate. The dependent variable, *TAX HOLIDAY*, is an indicator variable that

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<sup>10</sup> As a territory of the United States, Puerto Rico occupies a special place in U.S. taxation, subject to provisions that are beyond the scope of this study and which have changed over time. We include Puerto Rico tax holidays in the tests except when we state otherwise.

takes on a value of one if the foreign country has a substantial number of U.S. firms participating in a tax holiday from that country, and zero otherwise. Specifically, *TAX HOLIDAY* takes on a value of one for 18 countries in Figure 2, which collectively account for about 95 percent of foreign holiday participation.<sup>11</sup> We consider a number of country-level characteristics that could explain which countries grant tax holidays, including potential overlap between countries that offer tax holidays and countries classified as tax havens. *TAX HAVEN* is an indicator variable that takes on a value of one for countries identified as tax havens by Dharmapala and Hines (2009). The results show no significant association between a country being a tax haven and its offering a tax holiday.

We then consider other country characteristics, such as its statutory corporate tax rate and whether the country is an island, of U.K. legal origin, landlocked, English-speaking, or a member of the United Nations. We also include measures of its geographic area, population, GDP per capita, political stability, regulatory quality, and corruption. The results show no significant association between most of the country characteristics and the offering of tax holidays. Two exceptions are geographic area and population. Highly populated countries with small geographic areas appear more likely to offer tax holidays than otherwise similar countries.

While our sample of countries and time period is different, these results contrast with the results in Dharmapala and Hines (2009), which investigate which countries become tax havens. Unlike the decision to become a tax haven, we find that countries that offer tax holidays are no more likely to be better governed than countries that do not offer tax holidays. Further, while

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<sup>11</sup> We omit Puerto Rico for this analysis, as many variables are measured at the country level and thus not available for Puerto Rico.

Dharmapala and Hines find that countries with smaller populations become tax havens, our results regarding tax holidays are exactly the opposite—countries with larger populations tend to offer tax holidays (indeed, three of the five most populous countries in the world offer tax holidays that are popular with U.S. firms—China, India, and Brazil).

#### 4.3 *Characteristics of Firms Participating in Foreign Tax Holidays*

Returning to the firms that participate in tax holidays, Table 5 examines participation by industry. For this analysis, we use the Fama-French 12 industries (Harford, Wang and Zhang 2017). The industry with the highest participation in foreign tax holidays is business equipment (FF 6), with 12.4 percent of firm-years participating in a foreign tax holiday, followed by healthcare, medical equipment, and drugs (FF 10), with 9.75 percent. This finding is consistent with certain kinds of firms, such as manufacturing and pharmaceutical firms, having operations that would be eligible for a tax holiday and also being mobile enough to participate. Among the industries with at least some foreign tax holiday participation, the industries whose firms are less likely to participate are utilities, telecommunication, and energy (FF 8, FF 7, and FF4). Firms in utilities and telecommunications industry, in particular, appear less likely to move operations to participate in a tax holiday, as they tend to locate near their customers.

In Table 6 we examine factors associated with the decision to participate in a foreign tax holiday. First, we examine whether foreign tax holiday participation has intensified since the U.S. enacted a dividend repatriation holiday in 2004. Hartman (1985) shows, under constant costs of repatriation, tax deferral of the type associated with having a tax holiday should not add long-term value to the firm, and firms should only repatriate if the after-tax U.S. domestic return is higher than the after-tax foreign return. However, the Hartman assumption of constant repatriation costs does not generally exist in the real world (Altshuler, Newton, and Randolph



1995). When the cost of repatriation is not constant over time, tax holidays may be a useful tool to create “tax rate optionality”, wherein earnings generated with the help of a tax holiday and retained abroad can be repatriated when the tax cost of doing so is low. In 2004, the American Jobs Creation Act (AJCA) lowered the repatriation tax cost for nearly all U.S. firms, and firms responded by repatriating billions of dollars of foreign earnings. Existing literature (Clausing 2005; Blouin and Krull 2009; De Simone, Piotrosky and Rimmey 2017) suggests that this temporary decrease in repatriation tax costs was taken by firms as a signal of the increased possibility of future repatriation tax holidays.<sup>12</sup> Future repatriation holidays increase the value of tax rate optionality produced by foreign tax holidays, and as such, we expect firms to increase their usage of foreign tax holidays following 2004.

In column 1, the dependent variable, *HOLIDAYYEAR*, is an indicator that takes on a value of one if the firm participates in a foreign tax holiday that year, and zero otherwise. We include a trend variable and industry fixed effects. As we saw graphically earlier in Figure 1, the number of foreign tax holidays has been increasing over time. The coefficient on *TREND* is 0.003 and significant ( $p < 0.001$ ). We also interact the trend with the 2004 indicator, *POST2004*, to examine if the trend changes following the American Jobs Creation Act tax holiday. The coefficient on *POST\*TREND2004* is 0.003 and significant ( $p < 0.001$ ), indicating that the trend of increasing foreign tax holidays approximately doubled in the post 2004 period. This is consistent with firms now viewing the expected costs of reparation as being lower, and therefore the expected benefit of a foreign tax holiday as being higher.

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<sup>12</sup> In contrast, a survey of tax executives suggests that most believe that the AJCA of 2004 was a one-time rate reduction and that their firms have not reduced repatriations in anticipation of similar tax relief in the future (Graham, Hanlon and Shevlin 2010).

In column 2, we find a number of firm characteristics are associated with the choice to participate in a foreign tax holiday. The first is whether the firm also has a subsidiary in a tax haven. We measure tax haven subsidiaries with *HAVENYEAR*, an indicator variable that takes on a value of one if the firm has a subsidiary in a tax haven that year, as disclosed in Exhibit 21 of the 10-K, and zero otherwise (Dyreng and Lindsey, 2009). Firms that have a tax haven subsidiary are more likely to also participate in a foreign tax holiday. The coefficient on *HAVENYEAR* is positive and significant, with a value of 0.33. To be clear, that result does not suggest that the tax haven subsidiary itself is participating in the tax holiday. The tax haven subsidiary already likely faces a minimal or zero local tax rate and is unlikely to benefit from a tax holiday. Rather, it suggests that the kind of firms that utilize tax haven subsidiaries are more likely to also participate in foreign tax holidays.

The results also reveal that foreign tax holiday participation is more common in large firms (*LNAT*), firms with a high pre-tax return on their foreign assets (*ROA\_PIFO*), low research and development expenditures (*XRD*), low intangible assets (*INTAN*), high capital intensity (*PPENT*), and firms in certain industries: consumer durables and non-durables, manufacturing, business equipment, and healthcare, medical equipment, and drugs. It is important to note that the length of the firm's 10-K report (*WORDCOUNT10K*) is not associated with *HOLIDAYYEAR*, suggest that the disclosure of tax holiday is unlikely driven by the firm's overall quantity of disclosure. Broadly speaking, these results are consistent with foreign tax holidays being targeted to certain industries and types of investments deemed to be desirable from an economic development perspective (e.g., manufacturing). The results are also consistent with certain types of firms being most attracted to the prospect of a foreign tax holiday, namely large firms with highly profitable foreign operations, which presumably could face large tax burdens otherwise.

#### 4.4 *Foreign Tax Holidays and Effective Tax Rates of U.S. Firms*

In this section, we examine the association between foreign tax holiday participation and firms' effective tax rates. We examine both the effect on the cash effective tax rate (*CASH ETR*) and the traditional GAAP effective tax rate (*GAAP ETR*). While we fully expect tax holidays to result in tax savings for income earned in the holiday country, the extent of the firm-wide tax savings cannot be determined without empirical analysis.

Moreover, as previously explained, under the worldwide tax system used by the U.S., the tax consequences depend on the firm's repatriation decisions. For example, tax holidays that reduce the tax rate on foreign income will typically reduce the firm's cash effective tax rate, at least in the short run, assuming the firm does not repatriate the foreign earnings. However, if the firm repatriates the foreign earnings to the U.S. in the same year that it is earned, then the cash effective tax rate may be unaffected because under the U.S. worldwide tax system what is saved in foreign tax can be lost in additional U.S. tax.

We examine both cash and GAAP effective tax rates because foreign tax holidays can affect them differently. For example, tax holidays that accelerate depreciation for tax purposes will typically reduce cash effective tax rates (assuming no immediate repatriation) but not affect GAAP effective tax rates. The reason is that under U.S. GAAP (the same is true under IFRS), accelerating tax depreciation relative to accounting depreciation will result in a temporary difference and corresponding deferred tax liability and deferred tax expense. What is saved in current taxes is then lost to deferred taxes. In the literature, this is sometimes referred to as non-conforming tax avoidance and is one reason for examining cash effective tax rates in addition to GAAP effective tax rates (Dyreg, Hanlon, Maydew 2008).

Additionally, the effect on the firm's GAAP effective tax rate depends on financial reporting decisions. Specifically, the GAAP effective tax rate is determined by the effects on current U.S. and foreign tax expense, deferred foreign taxes, and the effect on deferred U.S. taxes associated with future repatriation. The firm's deferred U.S. tax expense is affected by its financial reporting decision about whether the foreign earnings are designated as reinvested abroad indefinitely (often referred to as permanently reinvested earnings). Under U.S. GAAP, firms do not record deferred tax expense for the U.S. tax that would be due if indefinitely reinvested earnings were repatriated to the U.S. Because this financial reporting decision is subject to change over time as repatriation plans change, the effect on the GAAP effective tax rate could be positive or negative in a particular year. Overall, how foreign tax holidays affect these different outcomes will be a function of what types of income tax incentives countries offer, whether firms repatriate the earnings, and if they do not repatriate, whether they designate the earnings as indefinitely or permanently reinvested. To investigate the relationships between holiday use and effective tax rates, we estimate the following regression:

$$ETR_{it} = \beta_0 + \beta_1 HOLIDAYYEAR_{it} + \beta_2 HOLIDAYFIRM_i + \sum_k \beta_k Control_{it}^k + \varepsilon_{it} \quad (1)$$

where *ETR* refers to either *CASH ETR* or *GAAP ETR*, depending on the regression. *HOLIDAYFIRM* is a firm-level indicator variable that equals one for firms that have at least one foreign tax holiday during the sample period. *HOLIDAYFIRM* controls for the general type of firm that will receive a tax holiday. We include control variables commonly used in papers that examine effective tax rates as dependent variables (e.g., Dyreng et al. 2008; Chen, Chen, Cheng, Shevlin 2010; Hoopes, Mescall, Pittman 2012), including firm size (*LNAT*), market-to-book ratio (*MB*), leverage (*DLTT*), capital intensity (*PPENT*), research & development expenditures (*XRD*),

intangible assets (*INTAN*), net operating loss (*NOL* and  $\Delta$ *NOL*), and the total word counts of the firm's 10-K report to (*WORDCOUNT10K*). These variables are defined in Appendix A. We also include industry and year fixed effects and cluster standard errors by firm.

The results are reported in Panel A of Table 7. In column 1, we find that foreign tax holidays are associated with *CASH ETR* reductions of 2.4 percentage points for the average firm in our sample, a substantial reduction for a factor omitted from prior tax studies of effective tax rates. Column 2 reports the results on the *GAAP ETR*. We find that foreign tax holidays are associated with lower *GAAP ETR* of 4.5 percentage points. In columns 3 and 4, we replace the indicator variables *HOLIDAYFIRM* and *HAVENFIRM* with firm fixed effects to control for unobservable, time-invariant firm characteristics, which also effectively makes *HOLIDAYYEAR* the change in the effective tax rate during the holiday period. We find that foreign tax holidays are associated with lower *CASH ETR* and *GAAP ETR* of 2.2 and 2.4 percentage points, respectively. These effects are of both economic and statistical significance. Overall, these results are consistent with U.S. firms deriving cash and GAAP tax benefits from foreign tax holidays, suggesting that firms are not immediately repatriating the income generated from countries with foreign tax holidays. Moreover, the effect on GAAP effective tax rates suggests firms designate more foreign earnings as indefinitely reinvested when participating in foreign tax holidays.

Having documented the association between effective tax rates and tax holiday use, we next turn to comparing the strength of the relationship between receiving a foreign tax holiday and having a subsidiary in a tax haven. This analysis is motivated by the enormous attention that has been paid in the academic literature and the popular press to the use of tax haven subsidiaries (Slemrod and Wilson 2009; Dyreng and Lindsey 2009; Bennesen and Zieme 2015; Desai,

Foley, and Hines 2006a; Desai, Foley, and Hines 2006b; Dyreng, Lindsey, Thornock 2013; Hines and Rice 1994; Dyreng et al. 2016). While this attention is certainly warranted given the importance of tax havens in firm's cross-border tax planning, the existing literature generally ignores the fact that some countries that are not classified as tax havens nevertheless offer tax holidays for certain types of activities, which effectively reduce their local tax rates on those activities far below the statutory tax rates. To compare the use of foreign tax holidays to the use of tax havens we compare the coefficient on the indicator variable *HOLIDAYEAR* with the coefficient on the indicator variable *HAVENYEAR*, where *HAVENYEAR* equals one for firm-year that is associated with tax haven use, and zero otherwise. We also include *HAVENFIRM*, which is an indicator that equals one for firms that have a subsidiary in a tax haven at least one year during the sample. This indicator controls for the general type of firm that will use a tax haven.

The results indicate that participating in at least one foreign tax holiday has a substantially larger average effect on firms' effective tax rates than does having at least one tax haven subsidiary. The effect of a foreign tax holiday is 2.4 percentage point decrease in the *CASH ETR* and a 4.5 percentage point decrease in *GAAP ETR*, which is substantially larger than the impact of the (statistically insignificant) 0.1 percentage point increase in *CASH ETR*, and a 1.1 percentage point reduction in *GAAP ETR* from having at least one tax haven subsidiary. These results suggest that in the case of *GAAP ETR*, for example, the effect of a foreign tax holiday is over four times larger than the effect of having a subsidiary in a tax haven. In untabulated analysis, we find that even for firms that have at least eight subsidiaries in tax havens, the effect of participating in a foreign tax holiday on a firm's *GAAP ETR* is still as strong as that of using tax havens.

Next, we investigate how these effective tax rates change before, during, and after foreign tax holiday participation. The regression model of Equation (1) classifies both firm-years before participating a foreign tax holiday and after participating a foreign tax holiday as non-holiday years. However, for a firm that participates in a tax holiday and establishes investment in the country offering the holiday, there is reason to believe that the post-holiday effective tax rates and the pre-holiday effective tax rates may be different. For example, a foreign tax holiday may cause a firm to invest in a country that, absent the tax holiday, imposes a high tax rate. If the tax holiday is not renewed, the firm's tax rate may increase to the level it was prior to the holiday, or even exceed the pre-holiday level if the firm faces significant adjustment costs of withdrawing operations from that country.

In Panel B of Table 7, we provide univariate evidence on the dynamics of effective tax rates before, during, and after participation in foreign tax holidays, conditioning on receipt of a foreign tax holiday at some time period. For both the cash and GAAP effective tax rates, we examine both 1-year and 3-year average measures to help smooth out year-to-year volatility in effective tax rates. Across all effective tax rate measures, we observe a reduction in effective tax rates during the period the firm receives a foreign tax holiday. For example, the average one-year cash effective tax rate (*CASH ETRI*) before receiving a tax holiday is 21.5%. During participation in a foreign tax holiday, the cash effective tax rate decreases to 18.7%. This is consistent with the decrease we document in our regression analysis in Panel A. However, following the foreign tax holiday, the tax rate increases to 21.8%, suggesting that the tax benefits of foreign tax holidays do not extend past the reported holiday period. Interestingly, the GAAP effective tax rate measures do not fully recover to their pre-tax-holiday levels, retaining roughly half of the original tax rate reduction. Note that there are fewer firm-year observations in the

post-tax-holiday period because of the increasing trend of foreign tax holiday in recent years, many of which are still in effect at the end of our sample period. A graphical illustration of this Table is provided in Figure 3, which displays a “v-shaped” pattern of firms’ average effective tax rates before, during, and after participation in foreign tax holidays.

#### 4.5 *Short and Long-Run Effects of Foreign Tax Holidays on U.S. Taxes on Foreign Income*

We next examine the effects of foreign tax holidays on U.S. taxes on foreign income, considering both short-run and long-run effects. Because we are focusing on tax levied on a certain component of income (in this case foreign income), we utilize the methodology of Dyreng and Lindsey (2009). Specifically, we estimate the following regression:

$$\begin{aligned}
 TAX_{it} = & \alpha_0 + \alpha_1 PIDOM_{it} + \beta_1 PIFO_{it} \\
 & + \alpha_2 PIDOM_{it} \times HOLIDAYYEAR_{it} + \beta_2 PIFO_{it} \times HOLIDAYYEAR_{it} \\
 & + \alpha_3 PIDOM_{it} \times HOLIDAYFIRM_i + \beta_3 PIFO_{it} \times HOLIDAYFIRM_i + \mu_{it} \quad (2)
 \end{aligned}$$

Equation (2) regresses firms’ tax expense (using foreign tax expense in Panel A, U.S. federal tax expense in Panel B, and total tax expense in Panel C) on firms’ pre-tax U.S. domestic income (*PIDOM*) and pre-tax foreign income (*PIFO*), all deflated by firms’ current assets. *HOLIDAYYEAR* and *HOLIDAYFIRM* are defined as before. The coefficients  $\alpha_1$  and  $\beta_1$  are estimates of the rates of tax on U.S. domestic income and tax on foreign income, respectively. Our coefficient of interest is  $\beta_2$ , which is the estimate of the *incremental* tax on foreign income for the firm during firm-years of foreign tax holiday participation. We include in the regression the interaction terms of *PIDOM* and *PIFO* with *HOLIDAYFIRM* to control for potential firm-level differences in tax rates between firms that ever participate in a foreign tax holiday and those that never (during the sample period) participate in a foreign tax holiday. A positive and



significant  $\beta_2$  would suggest that foreign income earned during foreign tax holiday years maps into tax expense at a higher rate than foreign income earned during non-holiday years. If the dependent variable were U.S. federal tax, such a result would suggest that the holiday income is more likely to be repatriated and taxed than is non-holiday income.

We also modify Equation (2) to examine how the estimate of the tax rate on foreign income may change over a longer horizon. As discussed previously, firms can avoid repatriation taxes through a variety of methods, including delaying the repatriation of income (Altshuler and Newlon 1991; Grubert and Mutti 1995). All else equal, we expect that firms can better avoid such repatriation taxes in the short run than in the long run because firms are more likely to encounter changes in U.S. domestic financial constraints over the longer term, which may affect the benefits and costs of repatriation tax avoidance or deferral (Dyreng and Markle 2016). To test this, we modify Equation (2) above by summing the tax expense and pre-tax income variables over (i) a 5-year horizon and (ii) the entire sample period for each firm and estimate Equation (3) as follows:

$$\begin{aligned} \Sigma TAX_{it} = & \alpha_0 + \alpha_1 \Sigma PIDOM_{it} + \beta_1 \Sigma PIFO_{it} \\ & + \alpha_2 \Sigma (PIDOM_{it} \times HOLIDAYYEAR_{it}) + \beta_2 \Sigma (PIFO_{it} \times HOLIDAYYEAR_{it}) \\ & + \alpha_3 \Sigma (PIDOM_{it} \times HOLIDAYFIRM_i) + \beta_3 \Sigma (PIFO_{it} \times HOLIDAYFIRM_i) + \mu_i \quad (3) \end{aligned}$$

For estimation over a 5-year horizon,  $\Sigma TAX$ ,  $\Sigma PIDOM$ , and  $\Sigma PIFO$  are the sum of  $TAX$ ,  $PIDOM$ , and  $PIFO$ , respectively, for firm  $i$  over a 5-year window from year  $t$  to  $t+4$ , for  $t=0, 5$ , and 10 etc., where year 0 is the firm's first occurrence in the sample. Effectively,  $\Sigma (PIDOM \times HOLIDAYYEAR)$  is the sum of  $PIDOM$  for firm  $i$  during holiday years over the same window, and zero for non-holiday years,  $\Sigma (PIDOM \times HOLIDAYFIRM)$  is the sum of  $PIDOM$

over the same window for firm  $i$  if the firm is a tax holiday firm, and zero for non-holiday firms, and  $\Sigma(PIFO \times HOLIDAYYEAR)$  and  $\Sigma(PIFO \times HOLIDAYFIRM)$  are defined similarly. We require  $PIDOM > 0$  for all firm-years within the window (from year  $t$  to  $t+4$ ) for the observation to be in the regression. Note that for firms with a sample length of non-5 multiples years, a window is defined with less than 5 years as long as  $PIDOM > 0$  for all firm-years within the window.

For estimation over the entire sample period,  $\Sigma TXFED$ ,  $\Sigma PIDOM$ , and  $\Sigma PIFO$  are the sum of  $TXFED$ ,  $PIDOM$ , and  $PIFO$ , respectively, for firm  $i$  throughout the sample period,  $\Sigma(PIDOM \times HOLIDAYYEAR)$  is the sum of  $PIDOM$  for firm  $i$  in all holiday years, and zero for non-holiday firms,  $\Sigma(PIDOM \times HOLIDAYFIRM)$  is the sum of  $PIDOM$  throughout the sample period for firm  $i$  if the firm is a tax holiday firm (i.e., firms with at least one foreign tax holiday year during the sample period), and zero for non-holiday firms, and  $\Sigma(PIFO \times HOLIDAYYEAR)$  and  $\Sigma(PIFO \times HOLIDAYFIRM)$  are defined similarly. In be included in the estimation, we require the sum of pre-tax U.S. income to be positive ( $\Sigma PIDOM > 0$ ).<sup>13</sup>

We use the same set of control variables as in the estimation of Equations (1) and (2), namely, firm size ( $LNAT$ ), market-to-book ratio ( $MB$ ), leverage ( $DLTT$ ), capital intensity ( $PPENT$ ), research & development expenditures ( $XRD$ ), intangible assets ( $INTAN$ ), net operating loss ( $NOL$  and  $\Delta NOL$ ) (Dyreng et al. 2008; Chen, Chen, Cheng, Shevlin 2010; Hoopes, Mescall, Pittman 2012), and the total word counts of the firm's 10-K report to ( $WORDCOUNT10K$ ). We also include industry and year fixed effects and cluster standard errors by firm.

Table 8 reports the results of estimating Equations (2) and (3). Starting with Panel A, we examine how foreign taxes map into U.S. domestic and foreign income, and how that changes

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<sup>13</sup> Results are robust to additionally requiring a positive sum of pre-tax foreign income ( $\Sigma PIFO > 0$ ).

for tax holiday firm-years. As expected, the coefficient on  $\Sigma(PIFO \times HOLIDAYYEAR)$  is negative and significant, suggesting that during tax holiday years, U.S. firms pay less in foreign tax on their foreign income (a result of having low foreign tax rates because of the foreign tax holiday). Our estimates suggest that foreign tax rates on foreign income are reduced by between 4.1% and 11.1%, depending on the time horizon. The coefficient on  $\Sigma(PIDOM \times HOLIDAYYEAR)$  is insignificant, which is to be expected because U.S. domestic income of a U.S. firm is not generally subject to foreign taxes, whether in a tax holiday year or not.

In Panel B, we find that firms pay more in U.S. taxes on their foreign income during tax holiday years and the rate at which they pay increases as the time horizon lengthens. Specifically, the results indicate that foreign income earned during tax holiday years is associated with 1.6, 2.8, and 5.9 percentage point higher in U.S. federal tax expense over the short, medium, and long run. Our findings suggest that firms pay little additional U.S. federal tax on foreign income during tax holiday years in the short-term (i.e., 1.6 percentage point increase over what they generally pay on foreign income, which, from the coefficient on *PIFO*, is 5.3 percent). However, eventually more U.S. tax is paid on the foreign income, consistent with U.S. firms eventually repatriating at least some of the foreign income and facing U.S. tax on the income. For example, through the entire sample period, firms pay 4.6 percent tax on their foreign earnings (the coefficient on *PIFO* in Column 3). Over the long run, they pay an additional 5.9 percent if they participated in a foreign tax holiday, suggesting that their U.S. tax rate on foreign income is more than doubled as a result of having a foreign tax holiday. These findings suggest that, to some extent, foreign tax holidays eventually increase the U.S. tax revenue collected on foreign income.

Finally, in Panel C, we find that even with the tax payments to the U.S., the overall effect of foreign tax holidays is to decrease worldwide tax expense. Consistent with the effective tax rate-based evidence in Table 7, we find that foreign tax holidays are associated with reduced worldwide taxes. Despite losing some of the foreign tax savings to the U.S. upon repatriation (as in Panel B), firms apparently retain some of the tax savings from foreign tax holidays. Indeed, in Panel C, we estimate that the total tax rate on foreign income is on average is 26.6% (the coefficient on  $\Sigma PIFO$  in column 3), but that this rate is 3.8% points lower during tax holiday years.

#### 4.6 Financial Reporting Effects of Tax Holidays

In this section, we analyze the incremental effect foreign tax holidays on changes in indefinitely reinvested foreign earnings of U.S. firms. We estimate the following regression model:

$$\begin{aligned} \Delta PRE_{it} = & \alpha_0 + \alpha_1 PIFO_{it} + \alpha_2 PIFO_{it} \times HOLIDAYYEAR_{it} \\ & + \alpha_3 PIFO_{it} \times HOLIDAYFIRM_i + \sum_k \gamma_k Control_{it}^k + \mu_{it} \end{aligned} \quad (4)$$

where  $\Delta PRE$  is the annual change in “permanently” reinvested earnings, deflated by total assets. This regression estimates what portion, on average, of firms’ pre-tax foreign earnings is designated as indefinitely reinvested, as represented by the coefficient on  $PIFO$ . Including  $PIFO \times HOLIDAYYEAR$  in the regression allows us to estimate how much foreign income firms designate as indefinitely reinvested in years in which they participate in foreign tax holidays, incremental to their normal designations of foreign income. Note that the sample period for this analysis is restricted to 2007-2013 due to the availability of indefinitely reinvested earnings data from Audit Analytics Tax Footnotes.

Table 9 presents the results from estimation of Equation (4). In column 1, we find that firms not participating in foreign tax holidays add an average of 46 cents per dollar of foreign income to their balance of indefinitely reinvested earnings. Incremental to this, the coefficient on  $PIFO \times HOLIDAYYEAR$  suggests that firms designate an incremental 9.5 cents per dollar of foreign earnings as indefinitely reinvested in years in which they participate in a foreign tax holiday. This is after controlling for the type of firm that receives tax holidays ( $PIFO \times HOLIDAY FIRM$ ), as well as other controls. These results suggest that firms obtain financial reporting benefits, in the form of lower deferred taxes, by designating more income as indefinitely reinvested while participating in foreign tax holidays, relative to what they otherwise designate with their foreign income. In column 2, we add the tax haven variables  $HAVENYEAR$  and  $HAVENFIRM$  and their interaction with  $PIFO$  in the model to allow us to compare the effects between tax holidays and tax havens. The coefficient on  $PIFO \times HAVENYEAR$  in column 2 indicates that firms designate an incremental 14.4 cents per dollar of foreign earnings as indefinitely reinvested in years in which they report at least one tax haven subsidiary. The results suggest that firms obtain more financial reporting benefits from their tax haven operations than from foreign tax holidays. This is consistent with income associated with foreign tax holidays being less likely to be reinvested indefinitely compared to income associated with tax havens.

## **5 Conclusion**

We assemble and examine the first large-sample dataset of foreign tax holiday participation by U.S. corporations. The data reveal that foreign tax holidays are economically important phenomena and participation in them has increased rapidly over time, growing more than five-fold during since 1995. We find that countries with tax holidays differ from countries classified

as tax havens. Across countries, tax holidays are increasing in population and decreasing in area, and have no significant association with status as a tax haven nor with statutory corporate tax rates. For our sample firms, we find that the tax savings from participating in foreign tax holidays is large, at least in the short run. By way of comparison, we estimate that participating in a foreign tax holiday reduces firms' effective tax rates by over four times as much as the effect of having a tax haven subsidiary. However, over the long run, participation in foreign tax holidays increases the amount of U.S. tax on foreign income. Presumably this is a consequence that was not intended by the governments extending the holidays. Research on foreign tax holiday use by U.S. firms has been hampered by a lack of data until now. We hope that our initial evidence leads others to investigate these economically important phenomena.

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## Appendix A. Variable Descriptions

| Variable            | Description  | Construction   |
|---------------------|--|--|
| <i>HOLIDAYYEAR</i>  | Indicates having a tax holiday in year $t$                                       | Form 10-K  |
| <i>HOLIDAYFIRM</i>  | Indicates having a tax holiday at some point during the sample period            | Form 10-K  |
| <i>HAVENYEAR</i>    | Indicates presence in a tax haven country in year $t$                            | Exhibit 21 of Form 10-K  |
| <i>HAVENFIRM</i>    | Indicates presence in a tax haven country at some point during the sample period | Exhibit 21 of Form 10-K  |
| <i>TXWW</i>         | Current worldwide tax expense scaled by total assets                             | $(\text{TXT} - \text{TXDI})/\text{AT}$   |
| <i>TXFED</i>        | Current federal tax expense scaled by total assets                               | $(\text{TXFED} + \text{TXS})/\text{AT}$ , missing values of TXS set to zero            |
| <i>TXFO</i>         | Current foreign tax expense scaled by total assets                               | $\text{TXFO}/\text{AT}$  |
| <i>PI</i>           | Pre-tax worldwide income scaled by total assets                                  | $\text{PI}/\text{AT}$  |
| <i>PIDOM</i>        | Pre-tax domestic income scaled by total assets                                   | $\text{PIDOM}/\text{AT}$   |
| <i>PIFO</i>         | Pre-tax foreign income scaled by total assets                                    | $\text{PIFO}/\text{AT}$  |
| <i>CASH ETR</i>     | Cash effective tax rates   | $\text{TXPD}/(\text{PI} - \text{SPI})$ , negative PI set to missing                    |
| <i>GAAP ETR</i>     | Traditional worldwide effective tax rate   | $\text{TXT}/\text{PI}$ , negative PI set to missing                                    |
| $\Delta\text{PRE}$  | Change in permanently reinvested foreign earnings scaled by total assets         | $(\text{PRE}_t - \text{PRE}_{t-1})/\text{AT}$  |
| <i>LNAT</i>         | Log total assets   | $\text{Ln}(\text{AT})$   |
| <i>ROA</i>          | Pre-tax worldwide income scaled by total assets                                  | $\text{PI}/\text{AT}$  |
| <i>ROA_PIDOM</i>    | Pre-tax domestic income scaled by total assets                                   | $\text{PIDOM}/\text{AT}$   |
| <i>ROA_PIFO</i>     | Pre-tax foreign income scaled by total assets                                    | $\text{PIFO}/\text{AT}$  |
| <i>MB</i>           | Market-to- book ratio  | $\text{PRCC}_F * \text{CSHO}/\text{CEQ}$   |
| <i>DLTT</i>         | Total long-term debt   | $\text{DLTT}/\text{AT}$ , missing values of DLTT set to zero                           |
| <i>PPE</i>          | Property, plant, and equipment   | $\text{PPENT}/\text{AT}$ , missing value of PPENT set to zero                          |
| <i>XRD</i>          | Research and development expense   | $\text{XRD}/\text{AT}$ , missing values of XRD set to zero                             |
| <i>INTAN</i>        | Intangible assets  | $\text{INTAN}/\text{AT}$ , missing values of INTAN set to zero                         |
| <i>NOL</i>          | Indicates a net operating loss at beginning of year                              | Indicator for positive $\text{TLCF}_{t-1}$   |
| $\Delta\text{NOL}$  | Change in tax loss carried forward   | $(\text{TLCF}_t - \text{TLCF}_{t-1})/\text{AT}_t$ , missing values of TLCF set to zero |
| <i>WORDCOUNT10K</i> | Natural logarithm of the number of words used in the firm's 10-K of year $t$ .   | $\text{Ln}(\text{Word Count in 10-K}_t)$   |

## Appendix B. Examples of 10-K Disclosures of Foreign Tax Holiday Use

**Example 1.** The 2005 effective tax rate reflected a benefit of approximately .5% attributable to the Domestic Production Activities Deduction and a one-time benefit for a China tax holiday of approximately 1.0%.

**Example 2.** The Company was granted a five year tax holiday upon its entry into China by the Chinese taxing authority/government... Effective January 1, 2008, a change in the Chinese tax law required that all tax holidays not active begin to take effect as of January 1, 2008, and remains in effect for the stated period for which they were originally issued. Under this arrangement, the tax holidays available to the Company's China subsidiary will expire after December 31, 2012.

**Example 3.** We currently benefit from income tax holiday incentives in the Philippines in accordance with our subsidiary's registrations with the Board of Investments and Philippine Economic Zone Authority, which provide that we pay no income tax in the Philippines for four years under our Board of Investments non-pioneer status and Philippine Economic Zone Authority registrations, and six years under our Board of Investments pioneer status registration. Our current income tax holidays expire in 2010, and we intend to apply for extensions. However, these tax holidays may or may not be extended.

**Example 4.** The Company is subject to a tax holiday in the Philippines, where it manufactures its products. This tax holiday is scheduled to expire in 2010, unless extended. As of yet, no tax benefit has been realized from the income tax holiday due to operating losses incurred in the Philippines.

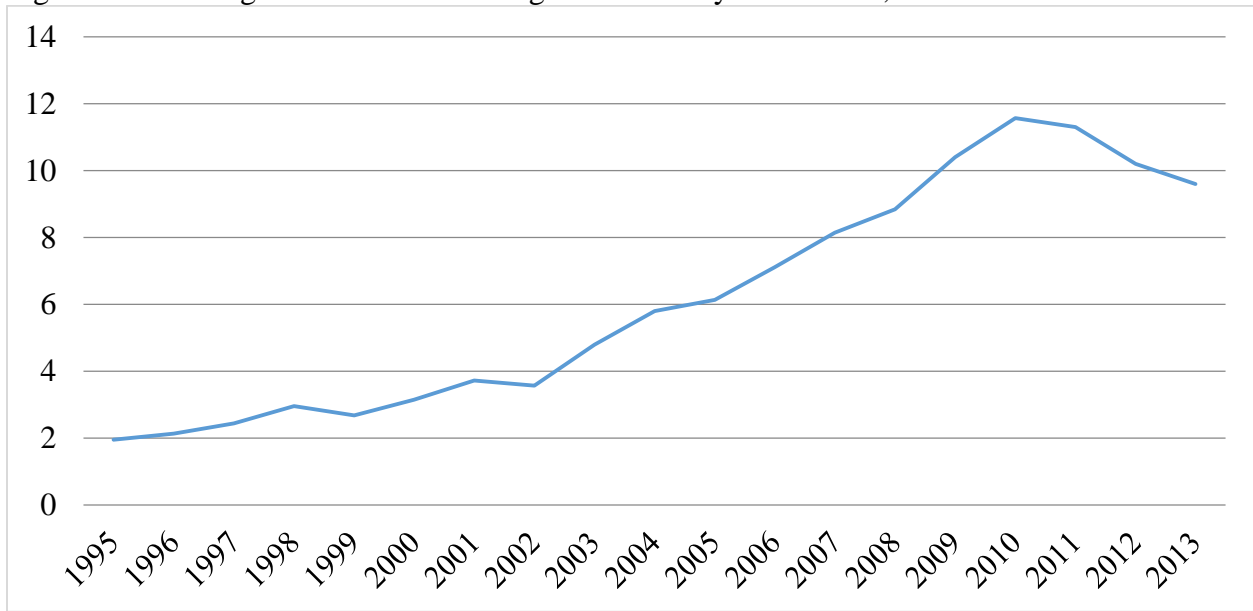
**Example 5.** We currently operate under tax holidays and favorable tax incentives in certain foreign jurisdictions. For instance, in Singapore we operate under tax holidays that reduce our taxes in that country on certain non- investment income. Such tax holidays and incentives often require us to meet specified employment and investment criteria in such jurisdictions. However, we cannot assure you that we will continue to meet such criteria or enjoy such tax holidays and incentives, or realize any net tax benefits from tax holidays or incentives. If any of our tax holidays or incentives are terminated, our results of operations may be materially and adversely affected.

**Example 6.** The earnings from our foreign operations in India are subject to a tax holiday from a grant effective through March 31, 2009. The tax holiday provides for zero percent taxation on certain classes of income and requires certain conditions to be met. We are in compliance with these conditions as of December 31, 2007.

**Example 7.** The Company has been granted tax holidays in several jurisdictions including China, Thailand and Bangladesh. The tax holidays expire between 2008 and 2015. These tax holidays reduced the Company's consolidated effective tax rate on continuing operations by less than 1% in both 2007 and 2006.

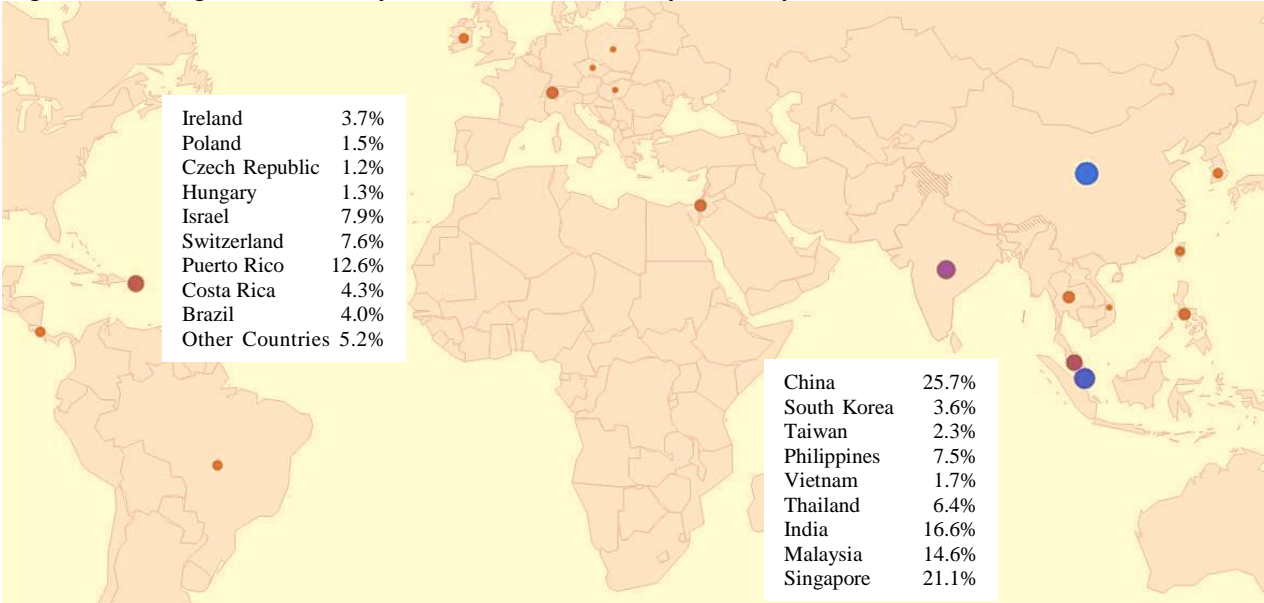
**Example 8.** The tax incentives that we have negotiated in Malaysia and other jurisdictions are also subject to our compliance with various operating and other conditions. If we cannot, or elect not to, comply with the operating conditions included in any particular tax incentive, we will lose the related tax benefits. In such event, we could be required to refund material tax benefits previously realized by us with respect to that incentive and, depending on the incentive at issue, could likely be required to modify our operational structure and tax strategy. Any such modified structure or strategy may not be as beneficial to us from an income tax expense or operational perspective as the benefits provided under the present tax concession arrangements. For fiscal years 2014, 2013 and 2012, the effect of all these tax incentives, in the aggregate, was to reduce the overall provision for income taxes by approximately \$99 million, \$77 million, and \$81 million, respectively, and increase diluted net income per share by \$0.37, \$0.31 and \$0.33, respectively.

Figure 1. Percentage of Firms with Foreign Tax Holidays over Time, 1995-2013



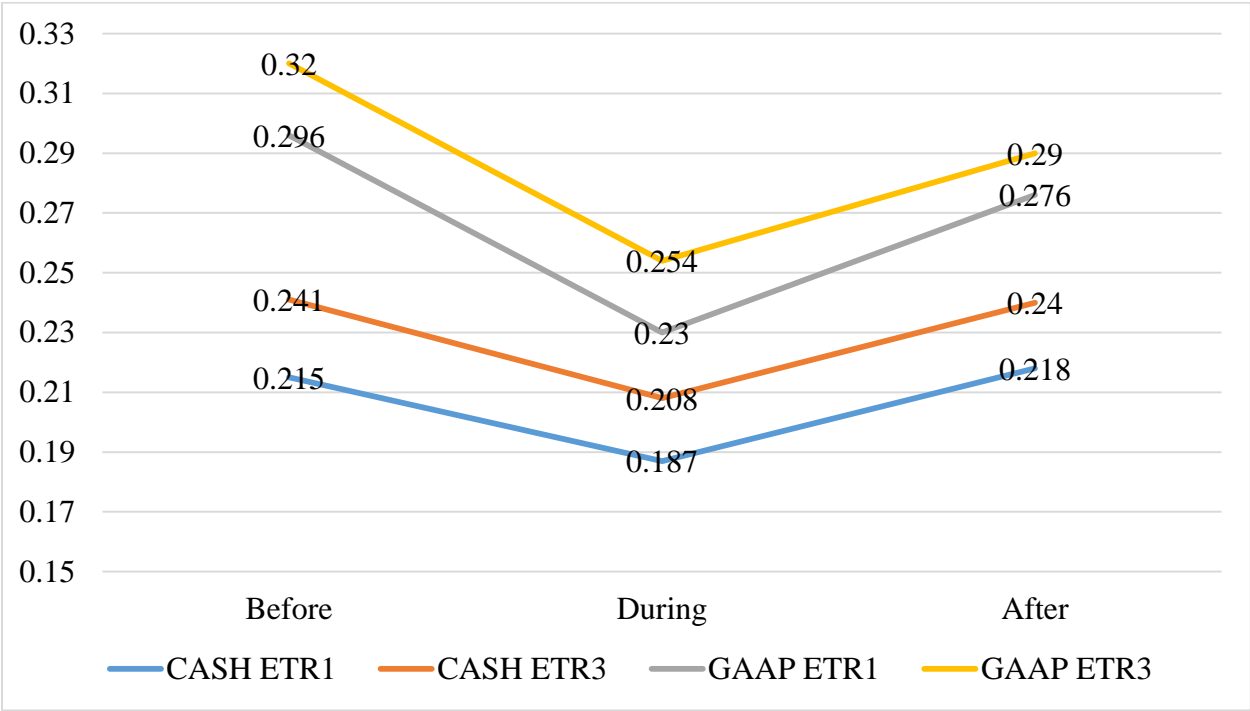
Notes. This figure illustrates the percentage of firms with at least one foreign tax holiday during the sample period.

Figure 2. Foreign Tax Holiday-Year Observations by Country



Notes. This figure illustrates the percentage of holiday-year observations by country.

Figure 3. Mean Effective Tax Rates Before, During, and After Foreign Tax Holidays



Notes. This figure depicts the mean effective tax rates before, during, and after firms receive a foreign tax holiday.

Table 1. Sample Selection

|  | Firm-years    |
|--|---------------|
| U.S. incorporated non-financial firm-years with total assets of at least 10 million between 1995 and 2013.         | 100,148       |
| Replace missing values of Compustat items TXC, TXFED, TXFO, PI, PIDOM, PIFO according to Dyreng and Lindsey (2009) | -             |
| Less: Observations with zero values in both TXFO and PIFO  | (8,621)       |
| Less: Observations with missing values of tax expense, pre-tax income, cash tax paid, and other control variables  | (66,105)      |
| Final Sample:  | <u>25,422</u> |



Table 2. Descriptive Statistics

| Variable            | Firm-years with a foreign tax holiday |      |       |       |      |      | Firm-years without a foreign tax holiday |      |       |       |      |      |
|---------------------|---------------------------------------|------|-------|-------|------|------|--|------|-------|-------|------|------|
|                     | N                                     | Mean | StDev | P25   | P50  | P75  | N  | Mean | StDev | P25   | P50  | P75  |
| <i>HOLIDAYYEAR</i>  | 1,734                                 | 1.00 | 0.00  | 1.00  | 1.00 | 1.00 | 23,688                                   | 0.00 | 0.00  | 0.00  | 0.00 | 0.00 |
| <i>HOLIDAYFIRM</i>  | 1,734                                 | 1.00 | 0.00  | 1.00  | 1.00 | 1.00 | 23,688                                   | 0.07 | 0.26  | 0.00  | 0.00 | 0.00 |
| <i>TXWW</i>         | 1,734                                 | 0.02 | 0.02  | 0.00  | 0.01 | 0.03 | 23,688                                   | 0.02 | 0.03  | 0.00  | 0.01 | 0.03 |
| <i>TXFED</i>        | 1,717                                 | 0.01 | 0.02  | 0.00  | 0.00 | 0.02 | 23,306                                   | 0.01 | 0.02  | 0.00  | 0.00 | 0.02 |
| <i>TXFO</i>         | 1,717                                 | 0.01 | 0.01  | 0.00  | 0.01 | 0.01 | 23,306                                   | 0.01 | 0.01  | 0.00  | 0.00 | 0.01 |
| <i>PI</i>           | 1,734                                 | 0.04 | 0.16  | 0.00  | 0.07 | 0.12 | 23,688                                   | 0.02 | 0.19  | -0.01 | 0.05 | 0.11 |
| <i>PIDOM</i>        | 1,734                                 | 0.00 | 0.13  | -0.02 | 0.01 | 0.06 | 23,688                                   | 0.01 | 0.15  | -0.02 | 0.03 | 0.07 |
| <i>PIFO</i>         | 1,734                                 | 0.04 | 0.07  | 0.01  | 0.04 | 0.08 | 23,688                                   | 0.02 | 0.06  | 0.00  | 0.01 | 0.04 |
| <i>CASH ETR</i>     | 1,281                                 | 0.19 | 0.16  | 0.07  | 0.16 | 0.26 | 16,464                                   | 0.25 | 0.20  | 0.11  | 0.23 | 0.34 |
| <i>GAAP ETR</i>     | 1,299                                 | 0.24 | 0.17  | 0.13  | 0.24 | 0.32 | 17,080                                   | 0.32 | 0.18  | 0.25  | 0.33 | 0.38 |
| <i>HAVENYEAR</i>    | 1,734                                 | 0.82 | 0.39  | 1.00  | 1.00 | 1.00 | 23,688                                   | 0.59 | 0.49  | 0.00  | 1.00 | 1.00 |
| <i>HAVENFIRM</i>    | 1,734                                 | 0.95 | 0.23  | 1.00  | 1.00 | 1.00 | 23,688                                   | 0.78 | 0.41  | 1.00  | 1.00 | 1.00 |
| <i>ΔPRE</i>         | 714                                   | 0.03 | 0.06  | 0.00  | 0.03 | 0.04 | 4,082                                    | 0.02 | 0.04  | 0.00  | 0.01 | 0.03 |
| <i>LNAT</i>         | 1,734                                 | 7.16 | 1.74  | 5.91  | 7.07 | 8.23 | 23,688                                   | 6.60 | 1.96  | 5.18  | 6.52 | 7.91 |
| <i>ROA</i>          | 1,734                                 | 0.04 | 0.16  | 0.00  | 0.07 | 0.12 | 23,688                                   | 0.02 | 0.19  | -0.01 | 0.05 | 0.11 |
| <i>ROA_PIDOM</i>    | 1,734                                 | 0.00 | 0.13  | -0.02 | 0.01 | 0.06 | 23,688                                   | 0.01 | 0.15  | -0.02 | 0.03 | 0.07 |
| <i>ROA_PIFO</i>     | 1,734                                 | 0.04 | 0.07  | 0.01  | 0.04 | 0.08 | 23,688                                   | 0.02 | 0.06  | 0.00  | 0.01 | 0.04 |
| <i>MB</i>           | 1,701                                 | 2.95 | 4.07  | 1.39  | 2.26 | 3.81 | 22,899                                   | 2.83 | 4.97  | 1.24  | 2.05 | 3.49 |
| <i>DLTT</i>         | 1,722                                 | 0.16 | 0.21  | 0.00  | 0.11 | 0.24 | 23,581                                   | 0.21 | 0.26  | 0.01  | 0.14 | 0.31 |
| <i>PPENT</i>        | 1,734                                 | 0.20 | 0.15  | 0.09  | 0.16 | 0.28 | 23,688                                   | 0.24 | 0.23  | 0.08  | 0.18 | 0.33 |
| <i>XRD</i>          | 1,734                                 | 0.07 | 0.07  | 0.01  | 0.05 | 0.10 | 23,688                                   | 0.05 | 0.08  | 0.00  | 0.01 | 0.07 |
| <i>INTAN</i>        | 1,734                                 | 0.20 | 0.21  | 0.03  | 0.13 | 0.31 | 23,688                                   | 0.19 | 0.24  | 0.01  | 0.11 | 0.29 |
| <i>NOL</i>          | 1,734                                 | 0.56 | 0.50  | 0.00  | 1.00 | 1.00 | 23,688                                   | 0.48 | 0.50  | 0.00  | 0.00 | 1.00 |
| <i>ΔNOL</i>         | 1,734                                 | 0.12 | 0.33  | -0.03 | 0.07 | 0.21 | 23,688                                   | 0.13 | 0.46  | -0.02 | 0.07 | 0.19 |
| <i>WORDCOUNT10K</i> | 1,734                                 | 11.0 | 0.73  | 10.5  | 10.9 | 11.6 | 23,688                                   | 10.7 | 0.79  | 10.2  | 10.6 | 11.2 |

Table 3. Correlation Matrix

|                         | 1.    | 2.    | 3.    | 4.    | 5.    | 6.    | 7.    | 8.    | 9.    | 10.   | 11.   | 12.   | 13.   | 14.   | 15.  | 16.  |
|-------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|------|
| 1. <i>HOLIDAYYEAR</i>   | 1.00  |       |       |       |       |       |       |       |       |       |       |       |       |       |      |      |
| 2. <i>HOLIDAYFIRM</i>   | 0.67  | 1.00  |       |       |       |       |       |       |       |       |       |       |       |       |      |      |
| 3. <i>TXWW</i>          | -0.02 | 0.01  | 1.00  |       |       |       |       |       |       |       |       |       |       |       |      |      |
| 4. <i>TXFED</i>         | -0.04 | -0.02 | 0.88  | 1.00  |       |       |       |       |       |       |       |       |       |       |      |      |
| 5. <i>TXFO</i>          | 0.04  | 0.07  | 0.43  | 0.03  | 1.00  |       |       |       |       |       |       |       |       |       |      |      |
| 6. <i>PI</i>            | 0.03  | 0.05  | 0.51  | 0.47  | 0.25  | 1.00  |       |       |       |       |       |       |       |       |      |      |
| 7. <i>PIDOM</i>         | 0.00  | 0.02  | 0.48  | 0.52  | 0.08  | 0.92  | 1.00  |       |       |       |       |       |       |       |      |      |
| 8. <i>PIFO</i>          | 0.10  | 0.11  | 0.32  | 0.12  | 0.53  | 0.57  | 0.25  | 1.00  |       |       |       |       |       |       |      |      |
| 9. <i>CASH ETR</i>      | -0.08 | -0.08 | 0.24  | 0.20  | 0.14  | -0.02 | 0.01  | -0.05 | 1.00  |       |       |       |       |       |      |      |
| 10. <i>GAAP ETR</i>     | -0.12 | -0.10 | 0.22  | 0.18  | 0.10  | -0.07 | 0.01  | -0.13 | 0.31  | 1.00  |       |       |       |       |      |      |
| 11. <i>LNAT</i>         | 0.07  | 0.07  | 0.08  | 0.05  | 0.11  | 0.27  | 0.24  | 0.22  | -0.03 | 0.00  | 1.00  |       |       |       |      |      |
| 12. <i>MB</i>           | 0.01  | 0.03  | 0.18  | 0.16  | 0.09  | 0.08  | 0.07  | 0.08  | -0.05 | 0.00  | 0.03  | 1.00  |       |       |      |      |
| 13. <i>DLTT</i>         | -0.05 | -0.07 | -0.15 | -0.13 | -0.07 | -0.06 | -0.05 | -0.06 | 0.01  | 0.09  | 0.24  | -0.08 | 1.00  |       |      |      |
| 14. <i>XRD</i>          | 0.05  | 0.07  | -0.10 | -0.09 | -0.06 | -0.38 | -0.38 | -0.17 | -0.12 | -0.13 | -0.33 | 0.10  | -0.23 | 1.00  |      |      |
| 15. <i>INTAN</i>        | 0.00  | -0.02 | -0.02 | 0.00  | -0.04 | 0.06  | 0.06  | 0.02  | 0.00  | 0.05  | 0.17  | 0.01  | 0.18  | -0.11 | 1.00 |      |
| 16. <i>NOL</i>          | 0.04  | 0.01  | -0.15 | -0.15 | -0.02 | -0.10 | -0.10 | -0.04 | -0.08 | -0.06 | 0.01  | -0.02 | 0.04  | 0.06  | 0.09 | 1.00 |
| 17. $\Delta$ <i>NOL</i> | 0.01  | 0.01  | 0.01  | 0.01  | 0.00  | -0.03 | -0.03 | -0.01 | 0.04  | 0.04  | 0.02  | 0.00  | 0.00  | -0.01 | 0.01 | 0.00 |

Notes. This table reports the Pearson correlations among selected variables used in the analysis. The shading represents correlation coefficients that are significant at the 0.10 level (based on two-tailed tests).

Table 4. What Kinds of Countries Grant Tax Holidays?

| Variables:                 | <i>TAX HOLIDAY</i>   |
|----------------------------|----------------------|
| <i>TAX HAVEN</i>           | 0.004<br>(0.098)     |
| <i>CORP TAX RATE</i>       | -0.235<br>(0.152)    |
| <i>ISLAND</i>              | -0.001<br>(0.075)    |
| <i>UK LEGAL ORIGIN</i>     | -0.004<br>(0.082)    |
| <i>LANDLOCKED</i>          | 0.034<br>(0.057)     |
| <i>ENGLISH</i>             | 0.046<br>(0.090)     |
| <i>UN MEMBER STATE</i>     | 0.040<br>(0.120)     |
| <i>LN_AREA</i>             | -0.040***<br>(0.015) |
| <i>LN_POPULATION</i>       | 0.103***<br>(0.028)  |
| <i>LN_GDP_PER_CAPITA</i>   | 0.019<br>(0.023)     |
| <i>POLITICAL STABILITY</i> | 0.001<br>(0.002)     |
| <i>REGULATORY QUALITY</i>  | 0.003<br>(0.002)     |
| <i>CORRUPTION</i>          | -0.002<br>(0.002)    |
| N                          | 177                  |
| Adjusted R <sup>2</sup>    | 0.197                |

Notes. *TAX HAVEN* is an indicator variable coded to equal one for countries identified as tax havens by Dharmapala and Hines (2009). *TAX HOLIDAY* is an indicator variable coded to equal one for all countries that have a material number of U.S. firms that disclose that they received a tax holiday in that country anytime in our sample period. *CORP TAX RATE* is the highest marginal tax rate for corporations in the country, in 2014, from the Tax Foundation (<https://files.taxfoundation.org/legacy/docs/world-corporate-tax-rates-2014.xlsx>). *ISLAND* is an indicator variable equal to one for countries which are also islands, from [https://en.wikipedia.org/wiki/List\\_of\\_island\\_countries](https://en.wikipedia.org/wiki/List_of_island_countries). *UK LEGAL ORIGIN* is an indicator variable equal to one for countries with a legal original based on the United Kingdom, from La Porta et al. (2008). *LANDLOCKED* is an indicator variable equal to one if the country is landlocked, from [http://www.cepii.fr/cepii/en/bdd\\_modele/bdd.asp](http://www.cepii.fr/cepii/en/bdd_modele/bdd.asp). *ENGLISH* is an indicator variable equal to one if any of the countries three official languages are English, from [http://www.cepii.fr/cepii/en/bdd\\_modele/bdd.asp](http://www.cepii.fr/cepii/en/bdd_modele/bdd.asp). *UN MEMBER STATE* is an indicator variable equal to one if the country is a member of the United Nations as of 2010, from <http://www.un.org/en/member-states/>. *LN\_AREA* is the natural log of the area of the country, from [http://www.cepii.fr/cepii/en/bdd\\_modele/bdd.asp](http://www.cepii.fr/cepii/en/bdd_modele/bdd.asp). *LN\_POPULATION* is the natural log of the population of the country in 2010, from the World Bank, <http://data.worldbank.org/data-catalog/>, indicator code SP.POP.TOTL. *LN\_GDP\_PER\_CAPITA* is the GDP per capita in 2010, from the World Bank, <http://data.worldbank.org/data-catalog/>, indicator code NY.GDP.PCAP.PP.CD. *POLITICAL STABILITY* is the rank of the country based on the country's political stability in 2010, from <http://info.worldbank.org/governance/wgi/wgidataset.xlsx>. *REGULATORY QUALITY* is the rank of the regulatory quality of the country in 2010, from <http://info.worldbank.org/governance/wgi/wgidataset.xlsx>. *CORRUPTION* is the rank of the country based on its control of corruption, from <http://info.worldbank.org/governance/wgi/wgidataset.xlsx>.

Table 5. Foreign Tax Holiday Use by Industry

| Fama-French 12 Industries                              | Number of firm-years<br>in an industry with<br><i>HOLIDAYYEAR=1</i> | Percentage of firm-years<br>in an industry with<br><i>HOLIDAYYEAR=1</i> |
|--|---|---|
| <i>FF1 CONSUMER NONDURABLES</i>                        | 59  | 3.37%   |
| <i>FF2 CONSUMER DURABLES</i>                           | 76  | 6.97%   |
| <i>FF3 MANUFACTURING</i>                               | 243   | 5.03%   |
| <i>FF4 ENERGY</i>                                      | 13  | 1.26%   |
| <i>FF5 CHEMICALS AND APPLIED PRODUCTS</i>              | 32  | 2.42%   |
| <i>FF6 BUSINESS EQUIPMENT</i>                          | 1,003   | 12.40%  |
| <i>FF7 TELECOMMUNICATION</i>                           | 3   | 0.75%   |
| <i>FF8 UTILITIES</i>                                   | 0   | 0.00%   |
| <i>FF9 WHOLESALERS, RETAIL, &amp; SERVICES</i>         | 37  | 2.03%   |
| <i>FF10 HEALTHCARE, MEDICAL EQUIPMENT, &amp; DRUGS</i> | 213   | 9.75%   |
| <i>FF12 OTHERS</i>                                     | 55  | 1.91%   |

Notes. This table reports the use of tax holiday by industry.

Table 6. Firm-level Characteristics and Foreign Tax Holiday

| Variables:   | (1)<br><i>HOLIDAYYEAR</i> | (2)<br><i>HOLIDAYYEAR</i> |
|--|---------------------------|---------------------------|
| <i>POST2004</i>  | -0.011<br>(0.015)         | -0.007<br>(0.015)         |
| <i>TREND</i>   | 0.003***<br>(0.001)       | 0.003***<br>(0.001)       |
| <i>POST2004</i> × <i>TREND</i>                         | 0.003**<br>(0.001)        | 0.002*<br>(0.001)         |
| <i>HAVENYEAR</i>                                       |                           | 0.033***<br>(0.003)       |
| <i>LNAT</i>  |                           | 0.011***<br>(0.001)       |
| <i>ROA_PIDOM</i>                                       |                           | -0.035***<br>(0.010)      |
| <i>ROA_PIFO</i>  |                           | 0.323***<br>(0.034)       |
| <i>XRD</i>   |                           | -0.062**<br>(0.024)       |
| <i>INTAN</i>   |                           | -0.062***<br>(0.007)      |
| <i>PPENT</i>   |                           | 0.017**<br>(0.007)        |
| <i>WORDCOUNT10K</i>                                    |                           | 0.001<br>(0.002)          |
| <i>FF1 CONSUMER NONDURABLES</i>                        | 0.019***<br>(0.005)       | 0.013***<br>(0.005)       |
| <i>FF2 CONSUMER DURABLES</i>                           | 0.054***<br>(0.008)       | 0.048***<br>(0.008)       |
| <i>FF3 MANUFACTURING</i>                               | 0.038***<br>(0.004)       | 0.032***<br>(0.004)       |
| <i>FF4 ENERGY</i>                                      | -0.001<br>(0.005)         | -0.039***<br>(0.006)      |
| <i>FF5 CHEMICALS AND APPLIED PRODUCTS</i>              | 0.009*<br>(0.005)         | -0.009<br>(0.006)         |
| <i>FF6 BUSINESS EQUIPMENT</i>                          | 0.107***<br>(0.005)       | 0.119***<br>(0.006)       |
| <i>FF7 TELECOMMUNICATION</i>                           | -0.018***<br>(0.005)      | -0.022***<br>(0.006)      |
| <i>FF8 UTILITIES</i>                                   | -0.020***<br>(0.008)      | -0.069***<br>(0.009)      |
| <i>FF9 WHOLESALES, RETAIL, &amp; SERVICES</i>          | 0.001<br>(0.004)          | -0.004<br>(0.005)         |
| <i>FF10 HEALTHCARE, MEDICAL EQUIPMENT, &amp; DRUGS</i> | 0.077***<br>(0.007)       | 0.091***<br>(0.007)       |
| N  | 25,422                    | 25,422                    |
| Adjusted R <sup>2</sup>                                | 0.048                     | 0.073                     |

Notes. This table reports the analysis of the use of foreign tax holiday by U.S. firms over time using a linear probability model. The standard errors are reported below the coefficient estimates in parenthesis, and are clustered by firm. \*\*\*, \*\*, and \* denote statistical significance at the 1%, 5%, and 10% levels, respectively (two-tailed test).

Table 7. The Association between Foreign Tax Holidays and Tax Rates for U.S. Firms

Panel A. Regression Analysis

| Variables:          | (1)<br><i>CASH ETR</i> | (2)<br><i>GAAP ETR</i> | (3)<br><i>CASH ETR</i> | (4)<br><i>GAAP ETR</i> |
|---------------------|------------------------|------------------------|------------------------|------------------------|
| <i>HOLIDAYYEAR</i>  | -0.024***<br>(0.006)   | -0.045***<br>(0.004)   | -0.022***<br>(0.008)   | -0.024***<br>(0.008)   |
| <i>HOLIDAYFIRM</i>  | -0.013***<br>(0.004)   | -0.020***<br>(0.003)   |                        |                        |
| <i>HAVENYEAR</i>    | 0.001<br>(0.003)       | -0.011***<br>(0.002)   | -0.002<br>(0.005)      | -0.009**<br>(0.004)    |
| <i>HAVENFIRM</i>    | 0.015***<br>(0.004)    | 0.001<br>(0.003)       |                        |                        |
| <i>LNAT</i>         | 0.005***<br>(0.001)    | -0.001***<br>(0.001)   | 0.027***<br>(0.004)    | 0.025***<br>(0.004)    |
| <i>MB</i>           | -0.001**<br>(0.000)    | -0.000<br>(0.000)      | -0.001***<br>(0.000)   | 0.000<br>(0.000)       |
| <i>DLTT</i>         | -0.046***<br>(0.006)   | -0.009**<br>(0.004)    | -0.001<br>(0.002)      | 0.007***<br>(0.002)    |
| <i>PPENT</i>        | -0.059***<br>(0.006)   | -0.031***<br>(0.004)   | 0.000<br>(0.000)       | -0.000<br>(0.000)      |
| <i>XRD</i>          | -0.395***<br>(0.026)   | -0.461***<br>(0.018)   | 0.198**<br>(0.087)     | 0.463***<br>(0.103)    |
| <i>INTAN</i>        | 0.029***<br>(0.005)    | 0.033***<br>(0.003)    | -0.010<br>(0.009)      | 0.008<br>(0.009)       |
| <i>NOL</i>          | -0.028***<br>(0.002)   | -0.009***<br>(0.002)   | -0.004<br>(0.005)      | -0.001<br>(0.004)      |
| $\Delta NOL$        | 0.030***<br>(0.005)    | 0.125***<br>(0.003)    | 0.000<br>(0.007)       | 0.004<br>(0.008)       |
| <i>WORDCOUNT10K</i> | -0.019***<br>(0.002)   | -0.004***<br>(0.001)   | 0.004<br>(0.003)       | 0.005*<br>(0.003)      |
| Fixed Effects       | Industry + Year        | Industry + Year        | Firm + Year            | Firm + Year            |
| N                   | 17,213                 | 17,821                 | 16,689                 | 17,293                 |
| Adj. R <sup>2</sup> | 0.119                  | 0.257                  | 0.237                  | 0.266                  |

Panel B. Univariate Analysis: Mean Effective Tax Rates Before, During, and After Foreign Tax Holidays

|                  |           | Before | During | After |
|------------------|-----------|--------|--------|-------|
| <i>CASH ETR1</i> | Mean      | 0.215  | 0.187  | 0.218 |
|                  | Std. Dev. | 0.168  | 0.150  | 0.171 |
|                  | N         | 950    | 648    | 126   |
| <i>CASH ETR3</i> | Mean      | 0.241  | 0.208  | 0.240 |
|                  | Std. Dev. | 0.191  | 0.175  | 0.199 |
|                  | N         | 1,076  | 733    | 147   |
| <i>GAAP ETR1</i> | Mean      | 0.296  | 0.230  | 0.276 |
|                  | Std. Dev. | 0.169  | 0.168  | 0.198 |
|                  | N         | 968    | 656    | 136   |
| <i>GAAP ETR3</i> | Mean      | 0.320  | 0.254  | 0.290 |
|                  | Std. Dev. | 0.211  | 0.218  | 0.212 |
|                  | N         | 988    | 652    | 132   |

Notes. Panel A of this Table reports the incremental effect of firms with tax holidays on effective tax rate measures for U.S. firms using robust estimation on the model:  $ETR_{it} = \alpha_0 + \alpha_1 HOLIDAYYEAR_{it} + \alpha_2 HOLIDAYFIRM_i + \sum_k \gamma_k Control_{it}^k + \varepsilon_{it}$ . The standard errors are reported below the coefficient estimates in parenthesis, and are clustered by firm. \*\*\*, \*\*, and \* denote statistical significance at the 1%, 5%, and 10% levels, respectively (two-tailed test). Panel B documents how the effect of tax holidays on effective tax rates changes before, during, and after implementation of the tax holiday.

Table 8. Foreign Tax Holidays and Corporate Taxes in the Short and Long Run

## Panel A. Foreign Tax Holidays and Foreign Taxes in the Short and Long Run

| Variables:                         | (1)<br><i>TXFO</i>   | (2)<br>$\Sigma TXFO$ | (3)<br>$\Sigma TXFO$                       |
|------------------------------------|----------------------|----------------------|--|
| <i>Summation window:</i>           | <i>Annual</i>        | <i>Over 5 years</i>  | <i>Throughout the firm's sample period</i> |
| $\Sigma PIDOM$                     | 0.005***<br>(0.001)  | 0.002<br>(0.002)     | 0.003<br>(0.002)                           |
| $\Sigma PIFO$                      | 0.247***<br>(0.002)  | 0.231***<br>(0.002)  | 0.247***<br>(0.003)                        |
| $\Sigma(PIDOM \times HOLIDAYYEAR)$ | 0.009***<br>(0.002)  | 0.009<br>(0.007)     | 0.005<br>(0.005)                           |
| $\Sigma(PIFO \times HOLIDAYYEAR)$  | -0.076***<br>(0.003) | -0.041***<br>(0.006) | -0.111***<br>(0.007)                       |
| $\Sigma(PIDOM \times HOLIDAYFIRM)$ | 0.001<br>(0.001)     | 0.001<br>(0.002)     | 0.005<br>(0.003)                           |
| $\Sigma(PIFO \times HOLIDAYFIRM)$  | -0.024***<br>(0.002) | -0.047***<br>(0.005) | 0.026***<br>(0.005)                        |
| <i>PI</i> × <i>CONTROLS</i>        | Included             | Included             | Included                                   |
| Fixed Effects                      | Industry + Year      | Industry + Year      | Industry + Year                            |
| N                                  | 14,178               | 2,886                | 2,341                                      |
| Adjusted R <sup>2</sup>            | 0.846                | 0.923                | 0.952                                      |

## Panel B. Foreign Tax Holidays and U.S. Taxes in the Short and Long Run

| Variables:                         | (1)<br><i>TXFED</i>  | (2)<br>$\Sigma TXFED$ | (3)<br>$\Sigma TXFED$                      |
|------------------------------------|----------------------|-----------------------|--|
| <i>Summation window:</i>           | <i>Annual</i>        | <i>Over 5 years</i>   | <i>Throughout the firm's sample period</i> |
| $\Sigma PIDOM$                     | 0.333***<br>(0.003)  | 0.375***<br>(0.004)   | 0.356***<br>(0.005)                        |
| $\Sigma PIFO$                      | 0.053***<br>(0.004)  | 0.050***<br>(0.006)   | 0.046***<br>(0.006)                        |
| $\Sigma(PIDOM \times HOLIDAYYEAR)$ | -0.035***<br>(0.008) | -0.013<br>(0.009)     | -0.011<br>(0.012)                          |
| $\Sigma(PIFO \times HOLIDAYYEAR)$  | 0.016**<br>(0.007)   | 0.028*<br>(0.016)     | 0.059***<br>(0.015)                        |
| $\Sigma(PIDOM \times HOLIDAYFIRM)$ | -0.003<br>(0.003)    | -0.005<br>(0.006)     | 0.007<br>(0.007)                           |
| $\Sigma(PIFO \times HOLIDAYFIRM)$  | -0.001<br>(0.005)    | -0.012<br>(0.013)     | -0.027**<br>(0.011)                        |
| <i>PI</i> × <i>CONTROLS</i>        | Included             | Included              | Included                                   |
| Fixed Effects                      | Industry + Year      | Industry + Year       | Industry + Year                            |
| N                                  | 14,177               | 2,886                 | 2,341                                      |
| Adjusted R <sup>2</sup>            | 0.839                | 0.930                 | 0.941                                      |



Panel C. Foreign Tax Holidays and Worldwide Taxes in the Short and Long Run

| Variables:                         | (1)<br><i>TXWW</i>   | (2)<br>$\Sigma TXWW$ | (3)<br>$\Sigma TXWW$                       |
|------------------------------------|----------------------|----------------------|--|
| <i>Summation window:</i>           | <i>Annual</i>        | <i>Over 5 years</i>  | <i>Throughout the firm's sample period</i> |
| $\Sigma PIDOM$                     | 0.399***<br>(0.003)  | 0.382***<br>(0.005)  | 0.368***<br>(0.005)                        |
| $\Sigma PIFO$                      | 0.322***<br>(0.004)  | 0.282***<br>(0.007)  | 0.266***<br>(0.007)                        |
| $\Sigma(PIDOM \times HOLIDAYYEAR)$ | 0.009<br>(0.006)     | 0.008<br>(0.010)     | -0.021<br>(0.014)                          |
| $\Sigma(PIFO \times HOLIDAYYEAR)$  | -0.070***<br>(0.008) | -0.120***<br>(0.017) | -0.038**<br>(0.018)                        |
| $\Sigma(PIDOM \times HOLIDAYFIRM)$ | -0.011**<br>(0.004)  | -0.009<br>(0.007)    | 0.004<br>(0.008)                           |
| $\Sigma(PIFO \times HOLIDAYFIRM)$  | -0.013*<br>(0.007)   | 0.025*<br>(0.014)    | 0.009<br>(0.013)                           |
| <i>PI</i> × <i>CONTROLS</i>        | Included             | Included             | Included                                   |
| Fixed Effects                      | Industry + Year      | Industry + Year      | Industry + Year                            |
| N                                  | 14,370               | 2,887                | 2,341                                      |
| Adjusted R <sup>2</sup>            | 0.845                | 0.941                | 0.947                                      |

Notes. This table reports the incremental effect of participating in foreign tax holidays on foreign (Panel A), U.S. (Panel B), and Worldwide (Panel C) on pre-tax income and foreign pre-tax income for U.S. firms using robust regression estimation on the model:  $TXFO_{it}$  or  $TXFED_{it}$  or  $TXWW_{it} = \alpha_0 + \alpha_1 PIDOM_{it} + \beta_1 PIFO_{it} + \alpha_2 PIDOM_{it} \times HOLIDAYYEAR_{it} + \beta_2 PIFO_{it} \times HOLIDAYYEAR_{it} + \alpha_3 PIDOM_{it} \times HOLIDAYFIRM_i + \beta_3 PIFO_{it} \times HOLIDAYFIRM_i + \sum_k \gamma_k PI_{it} \times Control_{it}^k + \mu_i$ .  $PI_{it} \times Control_{it}^k$  is a vector of the interaction terms of pre-tax income (*PI*) with the same set of control variables as in the regression represented in Table 7. The standard errors are reported below the coefficient estimates in parenthesis, and are clustered by firm. \*\*\*, \*\*, and \* denote statistical significance at the 1%, 5%, and 10% levels, respectively (two-tailed test).

For results reported in columns (2) and (3), we aggregate the regression variables over (i) a 5-year period and (ii) the entire sample period of the firm, using the following model:  $\Sigma TXFO_{it}$  or  $\Sigma TXFED_{it}$  or  $\Sigma TXWW_{it} = \alpha_0 + \alpha_1 \Sigma PIDOM_{it} + \beta_1 \Sigma PIFO_{it} + \alpha_2 \Sigma(PIDOM_{it} \times HOLIDAYYEAR_{it}) + \beta_2 \Sigma(PIFO_{it} \times HOLIDAYYEAR_{it}) + \alpha_3 \Sigma(PIDOM_{it} \times HOLIDAYFIRM_i) + \beta_3 \Sigma(PIFO_{it} \times HOLIDAYFIRM_i) + \sum_k \gamma_k PI_{it} \times Control_{it}^k + \mu_i$ .

For results reported in column (2),  $\Sigma TXFED$ ,  $\Sigma PIDOM$ , and  $\Sigma PIFO$  are the sum of *TXFED*, *PIDOM*, and *PIFO*, respectively, for firm *i* over a 5-year window from year *t* to *t+4*, for *t=0, 5, and 10, etc.*, where year 0 is the firm's first occurrence in the sample. Effectively,  $\Sigma(PIDOM \times HOLIDAYYEAR)$  is the sum of *PIDOM* for firm *i* during holiday years over the same window, and zero for non-holiday years,  $\Sigma(PIDOM \times HOLIDAYFIRM)$  is the sum of *PIDOM* over the same window for firm *i* if the firm is a tax holiday firm, and zero for non-holiday firms, and  $\Sigma(PIFO \times HOLIDAYYEAR)$  and  $\Sigma(PIFO \times HOLIDAYFIRM)$  are defined similarly. For all variables, we require *PIDOM* > 0 for all firm-years within the window (from year *t* to *t+4*) to be included in the sample. Note that for firms with a sample length of non-5 multiples years, a window is defined with less than 5 years as long as *PIDOM* > 0 for all firm-years within the window.

For results reported in column (3),  $\Sigma TXFED$ ,  $\Sigma PIDOM$ , and  $\Sigma PIFO$  are the sum of *TXFED*, *PIDOM*, and *PIFO*, respectively, for firm *i* throughout the sample period;  $\Sigma(PIDOM \times HOLIDAYYEAR)$  is the sum of *PIDOM* for firm *i* in all holiday years, and zero for non-holiday firms,  $\Sigma(PIDOM \times HOLIDAYFIRM)$  is the sum of *PIDOM* throughout the sample period for firm *i* if the firm is a tax holiday firm (i.e., firms with at least one holiday year during the sample period), and zero for non-holiday firms, and  $\Sigma(PIFO \times HOLIDAYYEAR)$  and  $\Sigma(PIFO \times HOLIDAYFIRM)$  are defined similarly. To be included in the estimation, we require the sum of pre-tax U.S. domestic income to be positive ( $\Sigma PIDOM > 0$ ). Results are robust to the additional restriction of a positive sum of pre-tax foreign income ( $\Sigma PIFO > 0$ ).

Table 9. Changes in Permanently Reinvested Earnings and Tax Holidays

| Variables                                 | (1)<br>$\Delta PRE$  | (2)<br>$\Delta PRE$  |
|---|----------------------|----------------------|
| <i>PIFO</i>                               | 0.461***<br>(0.007)  | 0.528***<br>(0.026)  |
| <i>PIFO</i> × <i>HOLIDAYYEAR</i>          | 0.095***<br>(0.036)  | 0.098***<br>(0.035)  |
| <i>PIFO</i> × <i>HOLIDAYFIRM</i>          | 0.110***<br>(0.023)  | 0.105***<br>(0.024)  |
| <i>HOLIDAYYEAR</i>                        | -0.001<br>(0.002)    | -0.001<br>(0.002)    |
| <i>HOLIDAYFIRM</i>                        | -0.001<br>(0.002)    | -0.001<br>(0.002)    |
| <i>PIFO</i> × <i>HAVENYEAR</i>            |                      | 0.144***<br>(0.024)  |
| <i>PIFO</i> × <i>HAVENFIRM</i>            |                      | -0.198***<br>(0.036) |
| <i>HAVENYEAR</i>                          |                      | -0.000<br>(0.001)    |
| <i>HAVENFIRM</i>                          |                      | 0.003*<br>(0.002)    |
| <i>LNAT</i>                               | 0.000<br>(0.000)     | 0.000<br>(0.000)     |
| <i>MB</i>                                 | -0.000<br>(0.000)    | -0.000<br>(0.000)    |
| <i>DLTT</i>                               | -0.002<br>(0.002)    | -0.003<br>(0.002)    |
| <i>PPENT</i>                              | 0.001<br>(0.002)     | 0.002<br>(0.002)     |
| <i>XRD</i>                                | 0.007<br>(0.006)     | 0.004<br>(0.006)     |
| <i>INTAN</i>                              | 0.001<br>(0.002)     | 0.001<br>(0.002)     |
| <i>NOL</i>                                | 0.003***<br>(0.001)  | 0.002***<br>(0.001)  |
| $\Delta NOL$                              | 0.008***<br>(0.001)  | 0.008***<br>(0.001)  |
| <i>WORDCOUNT10K</i>                       | -0.001<br>(0.001)    | -0.001<br>(0.001)    |
| <i>FF1 CONSUMER NONDURABLES</i>           | 0.004***<br>(0.002)  | 0.004***<br>(0.002)  |
| <i>FF2 CONSUMER DURABLES</i>              | -0.003<br>(0.002)    | -0.002<br>(0.002)    |
| <i>FF3 MANUFACTURING</i>                  | -0.000<br>(0.001)    | -0.000<br>(0.001)    |
| <i>FF4 ENERGY</i>                         | -0.007***<br>(0.002) | -0.007***<br>(0.002) |
| <i>FF5 CHEMICALS AND APPLIED PRODUCTS</i> | -0.002<br>(0.002)    | -0.002<br>(0.002)    |
| <i>FF6 BUSINESS EQUIPMENT</i>             | 0.004***<br>(0.001)  | 0.004***<br>(0.001)  |
| <i>FF7 TELECOMMUNICATION</i>              | -0.002               | -0.002               |

|  |                 |                 |
|--|-----------------|-----------------|
|  | (0.003)         | (0.003)         |
| <i>FF8 UTILITIES</i>                                   | 0.001           | 0.001           |
|  | (0.010)         | (0.010)         |
| <i>FF9 WHOLESALERS, RETAIL, &amp; SERVICES</i>         | 0.003*          | 0.003*          |
|  | (0.002)         | (0.002)         |
| <i>FF10 HEALTHCARE, MEDICAL EQUIPMENT, &amp; DRUGS</i> | 0.009***        | 0.009***        |
|  | (0.002)         | (0.002)         |
| <i>CONTROLS</i>  | Included        | Included        |
| Fixed Effects  | Industry + Year | Industry + Year |
| N  | 4,678           | 4,678           |
| Adjusted R <sup>2</sup>                                | 0.621           | 0.631           |

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Notes. This table reports the incremental effect of firms with foreign tax holidays on changes in permanently reinvested foreign earnings for U.S. firms using robust regression estimation on the model:  $\Delta PRE_{it} = \alpha_0 + \alpha_1 PIFO_{it} + \alpha_2 PIFO_{it} \times HOLIDAYYEAR_{it} + \alpha_3 PIFO_{it} \times HOLIDAYFIRM_i + \sum_k \gamma_k Control_{it}^k + \mu_{it}$ .  $Control_{it}^k$  is the same set of control variables as in the regression represented in Table 7. The sample period is restricted to 2007-2013 due to the availability of *PRE* data from Audit Analytics Tax Footnotes. The standard errors are reported below the coefficient estimates in parenthesis, and are clustered by firm. \*\*\*, \*\*, and \* denote statistical significance at the 1%, 5%, and 10% levels, respectively (two-tailed test).