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

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We undertake the first large-sample analysis of foreign tax holiday participation by U.S. firms. Tax holidays are temporary reductions of tax granted by governments, usually contingent on the firm making new operational investments in the country. We predict and find that firms are more likely to participate in foreign tax holidays if they are highly capital-intensive and have highly profitable foreign operations, and less likely to participate in foreign tax holidays if they are capital constrained and if the firm is headed by a short-term focused CEO. While foreign tax holidays reduce taxes on foreign income, we also find that during our sample period they increase the amount of U.S. tax on foreign income. Finally, we predict and find that firms participating in foreign tax holidays increase the amount of foreign earnings that they deem to be permanently reinvested for financial reporting purposes.

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## **1 Introduction**

We undertake the first large-sample analysis of foreign tax holiday participation among U.S. firms. Tax holidays are temporary tax reductions that governments grant to firms, usually predicated on the firm making new operational investments in the country, sometimes in a particular region. Unlike tax planning using tax havens, which often involves intangible property and/or financial transactions (Dyreng and Lindsey 2009; Dyreng et al. 2013; Cen et al. 2017), planning using tax holidays usually involves tangible investments in business operations, and thus capital outlays and significant adjustment costs requiring a long-term commitment. The benefits of tax holidays, however, 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).

Despite their wide use, research on firms' foreign tax holiday participation has been hampered by a lack of data. For example, literature reviews of tax research in finance and accounting by Graham (2003), Shackelford and Shevlin (2001), and Hanlon and Heitzman (2010) reveal little prior research on foreign tax holidays. Consequently, the prior literature is unable to answer fundamental questions about firms' participation in tax holidays. For example, it does not address the trade-offs that firms face when deciding whether to participate in tax holidays, how tax holiday participation compares tax haven participation, and the financial reporting implications of tax holidays. We address these questions and more, using the first large-sample dataset of foreign tax holiday participation among U.S. firms.

The results show that participation in foreign tax holidays has become fairly common among publicly-traded multinationals. By the end of our sample period, 9.7 percent of U.S.

publicly-traded multinational firms report participating in at least one foreign tax holiday, with participation greater among the largest firms. Among the Fama-French 12 industries, firms in the business equipment industry are most likely to participate in a foreign tax haven. 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. The probability of a country granting a tax holiday is increasing in its population and decreasing in its area, consistent with densely populated countries attempting to attract employment-increasing business operations.

Firms face significant trade-offs when deciding whether to participate in a tax holiday. Because tax holidays usually require tangible business investments, we predict that firms will be more likely to participate in them if they are capital intensive and less likely to participate in them if they are capital constrained. Such investments tend to be long-term in nature, with significant up-front costs and high adjustment costs that make it difficult to reverse the project at a later time. Accordingly, we predict that firms will be less likely to participate in foreign tax holidays when their CEOs have a short-term focus, as reflected by their tenure and age (Jenter and Lewellen 2015). The potential tax benefits from tax holidays depend on those investments being profitable in the future. Therefore, we predict that firms will be more likely to participate in a foreign tax haven when their existing foreign operations are highly profitable. The results are generally consistent with these predictions.

We next examine the impact of foreign tax holidays on firms' worldwide taxes, foreign taxes, and domestic (i.e., U.S.) taxes. Clearly, we expect tax holidays to reduce firms' foreign taxes and worldwide taxes, controlling for other factors associated with firms' tax burdens. In terms of

firms' worldwide taxes, we find that participating in a foreign tax holiday is associated with a reduced cash effective tax rate of 1.7 to 2.1 percentage points during the holiday years, with the magnitude depending on the specification. The corresponding reduction measured by GAAP effective tax rates is 1.9 to 3.3 percentage points.<sup>1</sup> To gauge the economic significance of foreign tax holidays, we compare them to another phenomenon that has received substantial attention in the literature—the use of tax havens (e.g., Hines and Rice 1994; Dyreng and Lindsey 2009; Desai et al. 2006a; Desai et al. 2006b; Dharmapala and Hines 2009; Slemrod and Wilson 2009; Dyreng et al. 2013; Akamah et al. 2017; Bennedsen and Zueme 2018). Our evidence indicates that participating in a tax holiday has, if anything, a larger effect on firms' effective tax rates than using a tax haven. Foreign tax holidays thus appear to be an important aspect of tax planning by multinational firms.

Somewhat paradoxically, we also find that, over the long run, foreign tax holidays *increase* the amount of U.S. tax on foreign income. Our estimates indicate that participating in a foreign tax holiday roughly doubles the eventual U.S. tax on foreign income. This suggests that foreign tax holidays have consequences that are (presumably) unintended by the governments enacting them. If foreign tax holidays reduce firms' foreign taxes but increase their eventual U.S. taxes, that suggests that tax benefits given by the foreign government accrue not only to the firm participating in the tax holiday, but potentially to the U.S. government as well.<sup>2</sup> The reason is that, for U.S.

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<sup>1</sup> GAAP (Generally Accepted Accounting Principles) effective tax rates are those reported in firms' financial statements and reflected in their accounting earnings. GAAP effective tax rates include both current taxes and deferred taxes.

<sup>2</sup> Despite the increased U.S. tax on foreign income, it is possible the U.S. is a net loser of 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 tax revenue.

multinationals, foreign tax holidays must be viewed in the context of the U.S. worldwide tax system in existence during the sample period. Under the U.S. worldwide tax system, when foreign earnings were repatriated to the U.S. they would be subject to U.S. tax, 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 depended on the firm's future repatriation decisions, making an understanding of foreign tax holidays more complicated than it might at first seem.<sup>3</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 several contributions to the literature. First, we provide the first broad-sample evidence of foreign tax holiday participation by U.S. firms. We develop and test hypotheses about the trade-offs that firms' face when deciding whether to participate in a foreign tax holiday, and we estimate the effects of participating in foreign tax holidays on firms' worldwide taxes, foreign taxes, and domestic taxes, both in the short run and in the long run. Despite their prevalence and large economic impact, lack of data has meant that foreign tax holidays have been largely

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<sup>3</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.

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., Hines and Rice 1994; Dyreng and Lindsey 2009; Slemrod and Wilson 2009; Drucker 2010; Holms 2011; Gramlich and Whiteaker-Poe 2013; Dyreng et al. 2016; Bennesen and Zueme 2018). 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.

Second, we examine a specific mechanism through which firms avoid taxes, suggesting a specific way in which firms maintain low effective tax rates over time (Dyreng et al 2008) and a possible mechanism through which tax rates for multinational firms have been decreasing over time (Dyreng et al. 2017). The tax avoidance literature has focused on many different factors associated with tax avoidance and many different consequences associated with avoidance (Wilde and Wilson 2018), however, the literature is short on specific mechanism through which taxes are avoided (Dyreng and Maydew 2018). Our papers joins a small, but growing, set of papers that document specific mechanisms through which firms lower their tax rate (Col et al. 2016; Dyreng and Markle 2016; Hepfer et al. 2017). In addition, by virtue of it requiring long-term investment, we find that a specific managerial attribute (long-termism) is associated with use of the specific tax avoidance mechanism we examine.

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 recently enacted Tax Cuts and Jobs Act (TCJA), which made

significant changes to the U.S. taxation of foreign income. While our results imply that moving to a pure territorial tax system would have increased the attractiveness of foreign tax holidays to U.S. firms, the likely effects of the new law depend are more complex, depending on the extent to which different aspects of the new law (e.g., participation exemption, the minimum tax known as GILTI) apply to a given firm's fact pattern.

Fourth, our findings contribute to the literature on the financial reporting consequences of tax decisions. Our results indicate that U.S. firms designated an increased amount of foreign earnings earned during tax holiday years as permanently reinvested, thereby avoiding financial statement recognition of deferred U.S. taxes, decreasing tax expense reported in the financial statements, and increasing accounting earnings.

The paper proceeds as follows. Section 2 provides institutional background on tax holidays and develops the hypotheses that we test. Section 3 describes the sample selection process. Section 4 presents the research design and discusses the empirical results. Section 5 concludes.

## **2 Background, Related Literature, and Predictions**

Tax holidays are used by governments to encourage investment and promote local employment. Broadly speaking, tax holidays grant the receiving firm a lower tax rate than the published statutory tax rate or other favorable tax terms (e.g., faster depreciation). In exchange, the firm 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.

While we focus on holidays from income tax, other tax holidays give relief from sales taxes, property taxes, etc. (Morse and Farmer 1986). For example, state and local governments in



the U.S. 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.

There is little prior research about income tax holidays. A small set of studies examine the effects of income tax holidays on country-level 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 in existence during our sample period.<sup>4</sup> Mintz (1990) concludes that while tax holidays will generally provide some tax benefit, the benefit might

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<sup>4</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.

not encourage much investment because of the temporary nature of the holidays.<sup>5</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 foreign direct investment.<sup>6</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 tax system designed to tax, at least to some extent, worldwide income. During our sample period, the U.S. taxed worldwide earnings such that both domestic and foreign income would be subject to U.S. tax. For example, consider a U.S. firm earning \$100 of taxable income in the U.S. and \$100 in Singapore. All \$200 would be taxable in the U.S. at the U.S. tax rate of 35 percent. There were several important caveats. First, the foreign tax credit mitigated the effect of U.S. taxation. If the firm paid a 17 percent Singapore tax rate on the \$100 Singaporean income, the U.S. would give the firm credit for the \$17 in taxes paid to Singapore. Essentially, the U.S. would tax the firm's Singaporean income at the difference between the U.S. tax and the Singaporean tax on the Singaporean income. With a 35 percent U.S. tax rate during our sample period, the net U.S. tax would be  $\$35 - \$17 = \$18$ . Despite earning income in a country with taxes lower than the U.S., the firm would pay a 35

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<sup>5</sup> This is yet another cost of tax benefits being temporary, mitigating the effect or causing other unintended consequences (Hoopes 2018).

<sup>6</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.

percent total tax rate on its Singaporean income: \$17 of tax to Singapore when the income was earned, and \$18 of tax to the U.S.

If Singapore were to grant a tax holiday that lowered the Singapore tax rate to 5 percent, then the U.S. firm would pay \$5 to Singapore and \$30 to the U.S. on the Singaporean income. In both cases, \$35 in taxes would be paid on the foreign earnings. The tax holiday would change the amount of tax paid to Singapore and to the U.S., but not the total amount of tax.

The second caveat is that if the Singaporean income was earned in a Singaporean subsidiary, that income generally would not be taxable by the U.S. until the income was repatriated to a U.S. parent. This concept of deferral provided 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 qualified for a 5 percent holiday tax rate in Singapore and repatriated 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 did not repatriate the income, it would pay only the \$5 Singaporean tax and would owe no U.S. tax on the Singaporean income until it repatriated the earnings. The firm could retain the earnings in Singapore, hopeful that in the future the U.S. would lower the corporate tax rate and/or move towards territorial taxation to decrease the tax cost of repatriation (both of which the U.S. did, effective in 2018).

Thus, the amount of U.S. tax eventually collected on firms' foreign income is an empirical question, depending on the countries in which those firms operate, how their operations are structured, and their repatriation decisions. The results of prior research estimating the extent of U.S. tax on foreign income are 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.

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 future U.S. taxes on 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 discussion makes it clear that participating in a foreign tax holiday confers tax benefits to U.S. firms, at least in the short run, we do not observe a corner solution where all firms participate in foreign tax holidays. In fact, evidence we present later in this study indicates that while foreign tax holidays are commonly used, the majority of multinationals do not use them. The question, then, is what costs prevent firms from taking the tax savings that come along with foreign tax holidays. We next develop hypotheses about such costs, along with hypotheses about the effects of tax holiday participation on worldwide, foreign, and domestic taxes in the short and long run, and firms' financial reporting decisions when participating in foreign tax holidays.

Firms face significant trade-offs when deciding whether to participate in a tax holiday. Tax holidays are often granted for investing in specific industries or in specific geographic regions in a country. However, the granting of tax exemption does not necessarily represent an instantaneous benefit. Rather, firms must make an initial capital outlay, then operate the business, over time earning profits that will be relatively free of foreign tax. Because these tax incentives are often based on investment in capital assets, we do not expect all industries to equally be able to benefit from tax holidays. Rather, because holidays usually require tangible business investments, we predict that firms will be more likely to participate in them if they are capital intensive. Further, as such capital intensity requires the ability to be able to invest in physical capital while still operating business elsewhere in the world, we predict that only firms with sufficient financial capital will be able to participate in tax holidays. As a result, we predict that firms will be less likely to take advantage of tax holidays if they are capital constrained.

Such large capital investments tend to be long-term in nature, with delays between upfront investment and eventual payoffs, and with significant start-up costs and large adjustment costs. Business must make a capital investment, then wait long periods of time between initial investment and ultimate financial reward. This elapsed time difference may induce CEOs with shorter term horizons to be less likely to participate in tax holidays. Similarly, Ladika and Sautner (2018) find that managers with short-term incentives cut long-term investment. Accordingly, we predict that firms will be less likely to participate in foreign tax holidays when their CEOs have a short career horizon, as reflected by their tenure and age (Jenter and Lewellen 2015). Finally, the potential tax benefits from tax holidays depend on those investments being profitable in the future. Therefore, we predict that firms will be more likely to participate in a foreign tax haven when their existing foreign operations are highly profitable.

### 3 Sample

We collect firm-level information about tax holiday participation from firms' 10-K filings with the SEC. Firms report 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 country names, and that references “tax” somewhere within 800 characters of the instance of “holiday” or

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<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.”

“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, at least to some extent, 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 could be driven by trend in the disclosure of tax holidays, rather than the tax holidays themselves. However, in later analysis we find that trends in reported tax holiday participation over time do not appear to be explained by general trends in disclosure over time.

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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 tax holidays that produce immaterial tax savings. 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.

We then combine our tax holiday data with firm-level data from Compustat and Audit Analytics. Table 1 describes the sample selection procedure. 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 from 3,187 unique firms. Our sample begins in 1995 because that is the year that EDGAR filings reliably include 10-Ks from the entire year, and ends in 2013 because that was the most recent year available when our extensive hand-collection of data began.<sup>10</sup> Of the sample, 1,597 firm-years (6.3 percent of all sample firm-years) disclose participating in a foreign tax holiday. In terms of distinct firms, 318 (8.64 percent of sample firms) disclose participating in a foreign tax holiday at some point during the sample period. Figure 1 shows the percentage of sample firms participating in foreign tax holidays across time. In 1995, 1.5 percent of sample firms participated in a foreign tax holiday. By 2000, this figure had nearly doubled, to 2.7 percent. After peaking in 2010, by 2013 9.6 percent of the sample firms reported participating 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 in our sample are offered by 31 countries, mainly from Asia, Europe, and South America, including Brazil, China, Costa Rica, India, Ireland, Israel, Malaysia, Philippines, Singapore, Switzerland, and Thailand. Of the countries in our sample, the most common grantor of tax holidays is China

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<sup>10</sup> 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.



(27.9 percent). Second is Singapore (22.9 percent). Note that firms may participate in tax holidays from more than one country in a given year. All of the countries in our sample offer broad-based income tax holidays, available to any firm that meets the required investment or employment criteria.<sup>11</sup>

Table 2 presents descriptive statistics for the firm-years in our sample, split based on whether the firm-year participates in a foreign tax holiday. The mean three-year cash and GAAP ETRs (*CASHETR3* and *GAAPETR3*) for the firm-years with a foreign tax holiday are 20.7 percent and 22.7 percent, respectively, while for the firm-years without a tax holiday the values are 27.3 percent and 29.6 percent, suggesting that, at least before controlling for other differences among these firm-years, participating in a tax holiday appears to be associated with substantial tax savings. The mean natural log of assets, *LNAT*, is slightly larger for holiday firm-years than for non-holiday firm-years (7.054 compared to 6.515, suggesting a difference, in unlogged dollars, of approximately \$480 million). The remaining descriptive statistics suggest that the characteristics of firm-years in our total sample 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. As expected, the correlations between *HOLIDAYYEAR* and both *CASHETR3* and *GAAPETR3* are negative, suggesting that tax holidays are associated with lower taxes.

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<sup>11</sup>We search the 2015/16 PwC Worldwide Tax Summaries for corporate taxes and confirm that all seventeen countries that we find are major providers of corporate tax holidays reference either a tax “holiday” or a tax “incentive” in the PwC guide.

## 4 Empirical Results

### 4.1 Characteristics of Countries Granting Tax Holidays

In Table 4 we examine the characteristics of countries that tend to grant the tax holidays in which our sample firms participate. The dependent variable, *TAX HOLIDAY*, is an indicator variable that 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 from Figure 2, which collectively account for the vast majority of foreign holiday participation. Using a linear probability model, 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.<sup>12</sup> *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 offering a tax holiday, suggesting little overlap between countries granting tax holidays and those classified as tax havens.

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. The probability of a country granting a tax holiday

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<sup>12</sup> We use a linear probability model (LPM) in this paper when estimating models with a binary dependent variable. LPM allows for ease in interpretation of coefficients, especially in the presence of interacted variables (Angrist and Pischke 2009; Greene 2011; Ai and Norton 2003).

is increasing in its population and decreasing in its area. Taken together, these results are consistent with densely populated countries using tax holidays to attract new business operations and their employment-enhancing effects.

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 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). These results make sense in that becoming a tax haven will attract foreign investment but at the cost of lost tax revenue on its existing domestic tax base. For a small country with little existing domestic tax base, the cost is minor, but for a large country the tax revenue loss from becoming tax haven is severe. Granting a tax holiday, however, remains a viable option for large countries, as it can serve to attract foreign investment but without reducing tax revenue from the existing domestic tax base.

#### *4.2 Firms' Decisions to Participate 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 11.97 percent of firm-years participating in a foreign tax holiday, followed by healthcare, medical equipment, and drugs (FF 10), with 6.82 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 be 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 firms' decisions 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>13</sup> Future repatriation holidays increase the value of tax rate optionality

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<sup>13</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).

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 0.002 and significant ( $p < 0.005$ ), 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.

In column 1, we also find a number of firm characteristics are associated with the choice to participate in a foreign tax holiday. 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*), and high capital intensity (*PPENT*). 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.

In column 2, we replace the dependent variable from column 1 with an indicator variable for if the firm discloses having a subsidiary in a tax haven. This allows us to contrast the decision to participate in a tax holiday, versus factors that lead firms to use a tax haven.<sup>14</sup> While the coefficient magnitudes are somewhat different across variables, many variables take on the same sign in explaining both tax haven usage, and tax holiday usage. There are two notable exceptions. First, *INTAN*, is negative and significant in explaining tax holiday participation, in Column 1, yet insignificant in Column 2 in explaining tax haven usage. This suggests that firms that participate in holidays are less likely to have intangible assets. This coincides with the finding that *PPENT*, a measure of the level of a firms' property, plant and equipment, i.e., *tangible* investment, is positively associated with tax holiday usage in Column 1, but negatively associated with tax haven usage in Column 2. These results suggest that firms with more physical investments are more likely to use tax holidays, while tax havens are favored by firms with more intangible investments.

In columns 3 and 4, we include *TERCILE\_KZ*, the Kaplan and Zingales (1997) measure of financial constraints in the regressions to test our prediction on firms' financial constraints and foreign tax holiday participation.<sup>15</sup> As shown in column 3, the results reveal that financially constrained firms are less likely to use tax holidays, likely because they require upfront

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<sup>14</sup> We omit another variable of interest from column 1, *HAVENYEAR*, so that we can compare column 1 and 2 directly. In an untabulated regression we find that 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 firms that utilize tax haven subsidiaries are more likely to also participate in foreign tax holidays.

<sup>15</sup> We find similar results using the Altman's Z-score as an alternative proxy for financial constraints.

investments in countries in order to qualify for the holiday. However, in column 4, the coefficient on *TERCILE\_KZ* changes sign when explaining tax haven use, suggesting that financially constrained firms are actually *more* likely to use a tax haven (Law and Mills 2015; Edwards, Schwab, and Shevlin 2016). These findings are consistent with tax haven usage providing near-term tax savings, often without requiring additional capital outlays, with tax holidays providing tax savings only after substantial capital outlays.

While columns 1 to 4 focus on the decision to participate in a tax holiday or use a tax haven, in Columns 5 and 6, we also consider whether tax holidays are used by managers with longer time horizons. Tax holidays are generally offered to attract real investments in a country. As such, they require time to actually complete the physical investment, and time for taxable earnings to accrue against which the tax holiday may apply. As a result, short-term focused CEOs may not be as interested in pursuing tax holidays, relative to CEOs with longer-term horizons. We use two proxies for CEO time horizon. First, in columns 5 and 6, we use CEO tenure as a proxy for time horizon, where longer tenured CEOs are seen as having less short termism (Gibbons and Murphy 1992). In column 5, we find that CEOs with longer tenure are more likely to pursue tax holidays, consistent with tax holidays representing longer-term projects that may not realize quickly into quick gains. In contrast, in column 6, we find that CEOs with longer tenure are *less* likely to use tax haven subsidiaries, consistent with tax haven subsidiaries being used by more short-term focused CEOs.

Next, in columns 7 and 8, following Jenter and Lewellen (2015), we use CEO age as measure of short-termism. Jenter and Lewellen (2015) find that CEOs that are very close to retirement are more likely to cede to being acquisition targets. We use several age brackets, and find, in Column 7, that CEOs that are above 65 years are less likely to utilize tax holidays. Further,

CEOs that are between ages 60-65 also appear to be less likely to utilize tax holidays, and, as expected, the magnitude of the effect is less than for CEOs above age 65. In contrast, in Column 8, which examines tax haven usage, no CEO age variable reliably explains the use of a tax haven. These results suggest that tax holidays are used by firms led by CEOs with longer-time horizons, consistent with tax holidays requiring capital intensive physical investments, which often entail significant up-front costs and longer-term pay offs.

#### 4.3 *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 cash effective tax rate (*CASHETR3*) and the traditional GAAP effective tax rate (*GAAPETR3*). While we fully expect tax holidays to result in tax savings for income earned in the holiday country, the magnitude of the tax savings cannot be determined without empirical analysis.

Moreover, as previously explained, under the worldwide tax system used by the U.S. during the sample period, the tax consequences depend on the firm's repatriation decisions. For example, tax holidays that reduce the tax rate on foreign income would typically reduce the firm's cash effective tax rate, at least in the short run, assuming the firm did not repatriate the foreign earnings. However, if the firm repatriated the foreign earnings to the U.S. in the same year that it is earned, then the cash effective tax rate could be unaffected because under the U.S. worldwide tax system what was saved in foreign tax could 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. For financial reporting purposes, 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 (Dyreng, 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 *CASHETR3* or *GAAPETR3*, 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*), research & development expenditures (*XRD*), intangible assets (*INTAN*), capital intensity (*PPENT*), inventory intensity (*INVENTORY*), selling, general and administrative expenditures (*SG&A*), sales growth (*SALES\_GROWTH*), 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 *CASHETR3* reductions of 2.1 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 ETR3*. We find that foreign tax holidays are associated with lower *GAAP ETR3* of 3.3 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 *CASHETR3* and *GAAPETR3* of 1.7 and 1.9 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 Zueme 2018; 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 firms' 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 2.1 percentage point decrease in the *CASHETR3* and a 3.3 percentage point decrease in *GAAP ETR3*, which is substantially larger than the impact of the (statistically insignificant) 0.3 percentage point increase in *CASHETR3*, and a 1.1 percentage

point reduction in *GAAP ETR3* from having at least one tax haven subsidiary. These results suggest that in the case of *GAAP ETR3*, 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 ETR3* 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 observe a reduction in effective tax rates during the period the firm receives a foreign tax holiday. For example, the average three-year cash effective tax rate (*CASHETR3*) before receiving a tax holiday is 24%. During participation in a foreign tax holiday, the cash effective tax rate decreases to 20.9%. 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 23.9%, 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.

#### 4.4 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.<sup>16</sup> 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  $t=0, 5,$

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<sup>16</sup> To facilitate the interpretation of the results, we mean-centered the continuous variables before constructing the interaction terms.

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>17</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 ( $DLTT$ ), research & development expenditures ( $XRD$ ), intangible assets ( $INTAN$ ), capital intensity ( $PPENT$ ), inventory intensity ( $INVENORY$ ), selling, general and administrative expenditures ( $SG\&A$ ), sales growth ( $SALES\_GROWTH$ ), net operating loss ( $NOL$  and  $\Delta NOL$ ) (Dyreng et al. 2008; Chen, Chen, Cheng,

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<sup>17</sup> Results are robust to additionally requiring a positive sum of pre-tax foreign income ( $\Sigma PIFO > 0$ ).

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 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). The magnitudes are large. Our estimates suggest that foreign tax holiday participation reduces the foreign tax rates on foreign income by between 4% and 10.7%, 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.

Tax holidays also have the potential to increase certain taxes. In Panel B, we find that firms pay more in U.S. taxes on their foreign income during tax holiday years, with the effect increasing in magnitude as the time horizon lengthens. Specifically, the results indicate that foreign income earned during tax holiday years is associated with 1.5, 3.1, and 5.8 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., 1.5 percentage point increase over what they generally pay on foreign income, which, from the coefficient on *PIFO*, is 5.7 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 4.4 percent



tax on their foreign earnings (the coefficient on *PIFO* in Column 3). Over the long run, they pay an additional 5.8 percent if they participated in a foreign tax holiday, suggesting that their U.S. tax rate on foreign income more than doubles as a result of participating in 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 26.2% (the coefficient on  $\Sigma PIFO$  in column 3), but that this rate is 3.7% points lower during tax holiday years.

#### 4.5 *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*×*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 46.7 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 7.7 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 are consistent with firms obtaining 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 14.5 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.

#### *4.6 Possible Effects of U.S. Tax Reform on Incentives to Participate in Foreign Tax Holidays*

In December of 2017, the U.S. enacted tax reform, known as the TCJA, which is generally effective starting in 2018. While the TCJA makes number of important changes to U.S. taxation, we believe it contains (at least) three changes that could influence the incentives for U.S. firms to

participate in foreign tax holidays in the future. First, it provides for certain foreign income to be effectively exempt from U.S. taxation. Specifically, the U.S. adopted what is called a participation exemption system, so that repatriated income from foreign subsidiaries will be eligible for a 100 percent dividend received deduction.<sup>18</sup> In isolation, this change should increase the attractiveness of foreign tax holidays to U.S. firms by making the foreign tax savings permanent. That is, the reduction in foreign tax from a holiday will no longer automatically be offset with an increase the future U.S. tax.

Second, the TCJA reduces the U.S. corporate tax rate from 35 percent to 21 percent and provides for immediate deductibility of much capital investment, both of which presumably increase the attractiveness of U.S. investment versus foreign investment in general. Conditional on a firm making foreign investment, however, the exemption of some foreign income mentioned earlier should still increase the incentive to structure foreign investment to be eligible for a tax holiday.

Finally, the TCJA imposes a minimum tax on a new category of foreign income called the Global Intangible Low Tax Income, which is usually referred to using its catchy acronym, GILTI. Despite having the word “intangibles” in its name, GILTI is quite broad and not limited to income from intangibles. The mechanics of the GILTI are complex, but it essentially imposes a minimum U.S. tax on foreign income (with the amount depending on the firm’s foreign taxes, foreign profitability, and the level and nature of the firm’s foreign investment). The minimum tax aspect of the GILTI should discourage participation in foreign tax holidays. However, the reduction in GILTI for increased foreign investment might encourage participation in foreign tax holidays,

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<sup>18</sup> There are exceptions, of course.

which typically involve foreign investment. How the countervailing effects of the TCJA play out in terms of U.S. firms' incentives to participate in foreign tax holidays, and firms' investment generally, is an important question and one we expect will be the subject of extensive research as data become available in the years to come.

## **5 Conclusion**

Tax holidays are temporary reductions of tax granted by governments to firms, usually contingent on the firm making new investments in the country. We undertake the first large-sample analysis of foreign tax holiday participation by U.S. corporations. We find that foreign tax holidays form an important (but previously neglected in the literature) part of multinational firms' investing and tax planning strategies. By the end of our sample period, 9.7 percent of U.S. multinationals report participating in at least one foreign tax holiday, with participation greatest among the largest firms. We find little overlap between countries that offer tax holidays and those that are tax havens. The results show that the probability of a country granting a tax holiday is increasing in its population and decreasing in its area, consistent with tax holidays being used by densely populated countries to attract employment-increasing business operations.

At the firm level, we test several predictions about the trade-offs that firms face when deciding whether to participate in a tax holiday. Tax holidays usually require firms to make tangible business investments in the country. We predict and find that firms are more likely to participate in tax holidays if they are capital intensive and less likely to participate if they are capital constrained. Moreover, such investments tend to be long-term and have significant up-front costs. We predict and find that firms are less likely to participate in foreign tax holidays when their CEOs have a short career horizon, as reflected by their tenure and age. Finally, because the tax

benefits from tax holidays depend on being profitable in the future, we predict that firms will be more likely to participate in a foreign tax haven when their existing foreign operations are already highly profitable. The results are generally consistent with this prediction.

We next examine the impact of foreign tax holidays on firms' worldwide taxes, foreign taxes, and domestic (i.e., U.S.) taxes. For our sample firms, we find that the tax savings from participating in foreign tax holidays is large, at least in the short run. To gauge the economic significance of foreign tax holidays, we compare them to another phenomenon that has received substantial attention in the literature—the use of tax havens. Our evidence indicates that participating in a tax holiday has, if anything, a larger effect on firms' effective tax rates than using a tax haven. 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.

Finally, we test whether firms alter their designation of foreign income as permanently reinvested when they participate in foreign tax holidays. 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.

Until now, research on foreign tax holiday use by U.S. firms has been hampered by a lack of data. We find that tax holidays are an important, specific tax planning mechanism used by multinational firms, answering calls for research on specific tax strategies and business activities that span different jurisdictions (Dyreng and Maydew 2018). 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 / Sources
<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>CASHETR3</i>	Three-year average cash effective tax rates	The sum of the firm's TXPD over three years divided by the sum of $(\text{PI} - \text{SPI})$ over the same period. Observations with a negative denominator are set to missing. This variable truncated at $[0, 1]$ .
<i>GAAPETR3</i>	Three-year average traditional worldwide effective tax rate	The sum of the firm's TXT over three years divided by the sum of $(\text{PI} - \text{SPI})$ over the same period. Observations with a negative denominator are set to missing. This variable truncated at $[0, 1]$ .
$\Delta\text{PRE}$	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	PI/AT
<i>ROA_PIDOM</i>	Pre-tax domestic income scaled by total assets	PIDOM/AT
<i>ROA_PIFO</i>	Pre-tax foreign income scaled by total assets	PIFO/AT
<i>MB</i>	Market-to- book ratio	PRCC_F*CSHO/CEQ
<i>DLTT</i>	Total long-term debt	DLTT/AT, missing values of DLTT set to zero
<i>XRD</i>	Research and development expense	XRD/AT, missing values of XRD set to zero
<i>INTAN</i>	Intangible assets	INTAN/AT, missing values of INTAN set to zero
<i>PPENT</i>	Property, plant, and equipment	PPENT/AT, missing value of PPENT set to zero
<i>INVENTORY</i>	Inventory intensity	INVT/AT, missing values of INVT set to zero
<i>SG&amp;A</i>	Sales, general, and administrative expenses	XSGA/AT, missing values of INVT set to zero
<i>SALES_GROWTH</i>	Annual growth in sales	$(SALE_t - SALE_{t-1})/SALE_{t-1}$ , missing values of SALE set to missing.
<i>NOL</i>	Indicates a net operating loss at beginning of year	Indicator for positive $TLCF_{t-1}$
$\Delta NOL$	Change in tax loss carried forward	$(TLCF_t - TLCF_{t-1})/AT_t$ , missing values of TLCF set to zero
<i>WORDCOUNT10K</i>	Natural log of the number of words used in the firm's 10-K of year t.	$\ln(\text{Word Count in 10-K}_t)$
<i>TERCILE_KZ</i>	Tercile rank of the KZ index (Kaplan and Zingales 1997). KZ Index is constructed following Lamont, Polk, and Saa-Requejo (2001). Higher values indicate more financially constrained.	$-1.0019 \times [(IB + DP)/PPENT_{t-1}] + 0.2826 \times [(AT + PRCC\_F \times CSHO - CEQ - TXDB)/AT] + 3.1392 \times [(DLTT + DLC)/(DLTT + DLC + SEQ)] - 39.3678 \times [(DVC + DVP)/PPENT_{t-1}] - 1.3148 \times [CHE/PPENT_{t-1}]$
<i>CEO_TENURE</i>	Number of years as CEO.	Calculated from Execucomp data
<i>CEO_AGE</i>	CEO's age on fiscal year t.	Execucomp data

<i>TAX HAVEN</i>	Indicator variable coded to equal one for countries identified as tax havens.	Dharmapala and Hines (2009)
<i>TAX HOLIDAY</i>	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.	
<i>CORP TAX RATE</i>	The highest marginal tax rate for corporations in the country in 2014.	Tax Foundation ( <a href="https://files.taxfoundation.org/legacy/docs/world-corporate-tax-rates-2014.xlsx">https://files.taxfoundation.org/legacy/docs/world-corporate-tax-rates-2014.xlsx</a> ).
<i>ISLAND</i>	Indicator variable equal to one for countries which are also islands.	<a href="https://en.wikipedia.org/wiki/List_of_island_countries">https://en.wikipedia.org/wiki/List_of_island_countries</a> .
<i>UK LEGAL ORGIN</i>	<i>UK LEGAL ORGIN</i> is an indicator variable equal to one for countries with a legal original based on the United Kingdom.	La Porta et al. (2008)
<i>LANDLOCKED</i>	Indicator variable equal to one if the country is landlocked.	<a href="http://www.cepii.fr/cepii/en/bdd_modele/bdd.asp">http://www.cepii.fr/cepii/en/bdd_modele/bdd.asp</a> .
<i>ENGLISH</i>	Indicator variable equal to one if any of the countries three official languages are English.	<a href="http://www.cepii.fr/cepii/en/bdd_modele/bdd.asp">http://www.cepii.fr/cepii/en/bdd_modele/bdd.asp</a> .
<i>UN MEMBER STATE</i>	Indicator variable equal to one if the country is a member of the United Nations as of 2010.	<a href="http://www.un.org/en/member-states/">http://www.un.org/en/member-states/</a> .
<i>LN_AREA</i>	The natural log of the area of the country.	<a href="http://www.cepii.fr/cepii/en/bdd_modele/bdd.asp">http://www.cepii.fr/cepii/en/bdd_modele/bdd.asp</a> .
<i>LN_POPULATION</i>	The natural log of the population of the country in 2010.	<a href="http://data.worldbank.org/data-catalog/">http://data.worldbank.org/data-catalog/</a> , indicator code SP.POP.TOTL.
<i>LN_GDP_PER_CAPITA</i>	GDP per capita in 2010.	<a href="http://data.worldbank.org/data-catalog/">http://data.worldbank.org/data-catalog/</a> , indicator code NY.GDP.PCAP.PP.CD
<i>POLITICAL STABILITY</i>	The rank of the country based on the country's political stability in 2010.	<a href="http://info.worldbank.org/governance/wgi/wgidataset.xlsx">http://info.worldbank.org/governance/wgi/wgidataset.xlsx</a> .
<i>REGULATORY QUALITY</i>	The rank of the regulatory quality of the country in 2010.	<a href="http://info.worldbank.org/governance/wgi/wgidataset.xlsx">http://info.worldbank.org/governance/wgi/wgidataset.xlsx</a> .
<i>CORRUPTION</i>	The rank of the country based on its control of corruption.	<a href="http://info.worldbank.org/governance/wgi/wgidataset.xlsx">http://info.worldbank.org/governance/wgi/wgidataset.xlsx</a> .

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

**Example 1.** 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.

**Example 2.** The year-to-date ETR and non-GAAP ETR deviate from the statutory U.S. federal income tax rate, mainly due to the taxing jurisdictions in which we generate taxable income or loss, the favorable impact of our tax holidays in Malaysia, and judgments as to the realizability of our deferred tax assets. A significant portion of our pre-tax income is not subject to tax as a result of our tax holidays in Malaysia, subject to our satisfaction of certain conditions that we expect to continue to satisfy. Unless extended or otherwise renegotiated, our existing tax holidays in Malaysia will expire December 31, 2021...the Company applied for and received final approval to modify the terms of its main tax holiday in Malaysia, reducing the rate to 7.2% versus the statutory rate of 24.0%, effective January 1, 2017 through December 31, 2021.

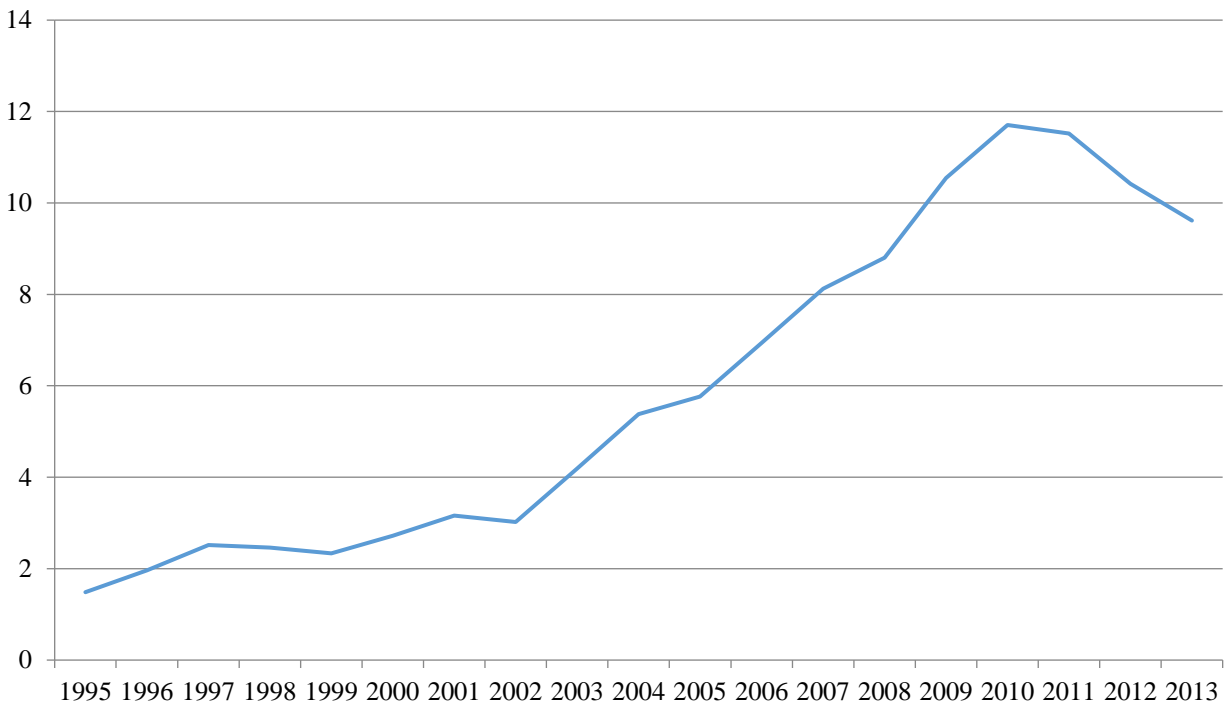
**Example 3.** The Company was granted a five year tax holiday upon its entry into China by the Chinese taxing authority/government... Effective January 1, 2008, a change in the Chinese tax law required that all tax holidays not active begin to take effect as of January 1, 2008, and remains in effect 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 4.** 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 5.** 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.

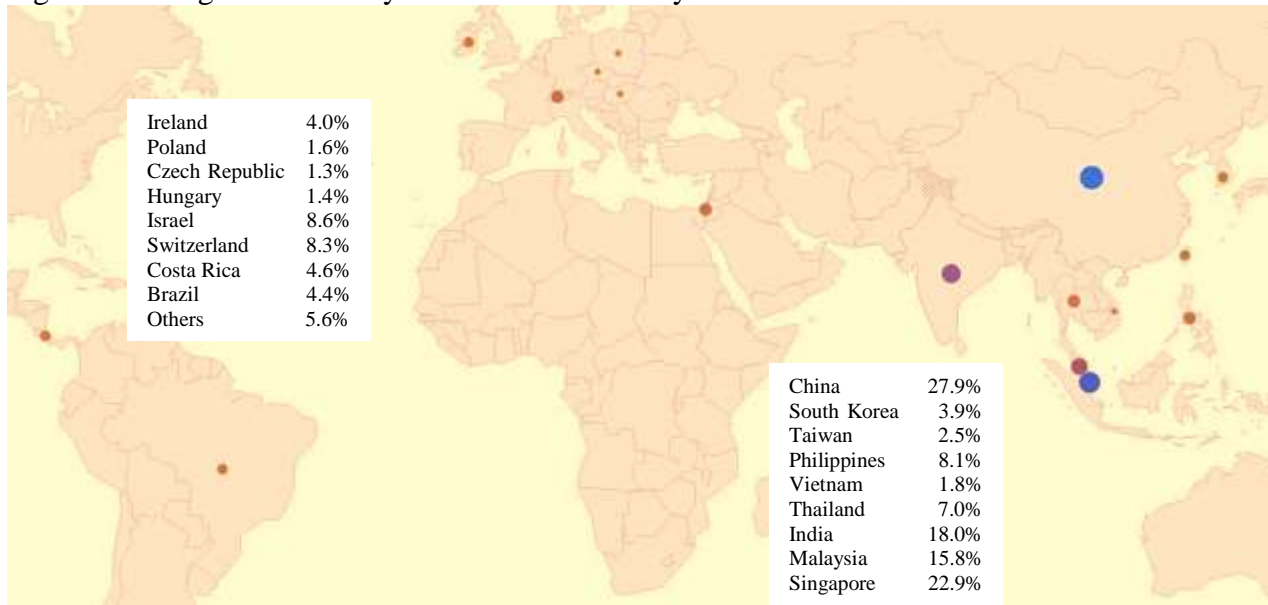
**Example 6.** We currently operate under tax holidays and favorable tax incentives in certain foreign jurisdictions. For instance, in Singapore we operate under tax holidays that reduce our taxes in that country on certain non- investment income. Such tax holidays and incentives often require us to 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.

Figure 1. Percentage of Firms with Foreign Tax Holidays over Time



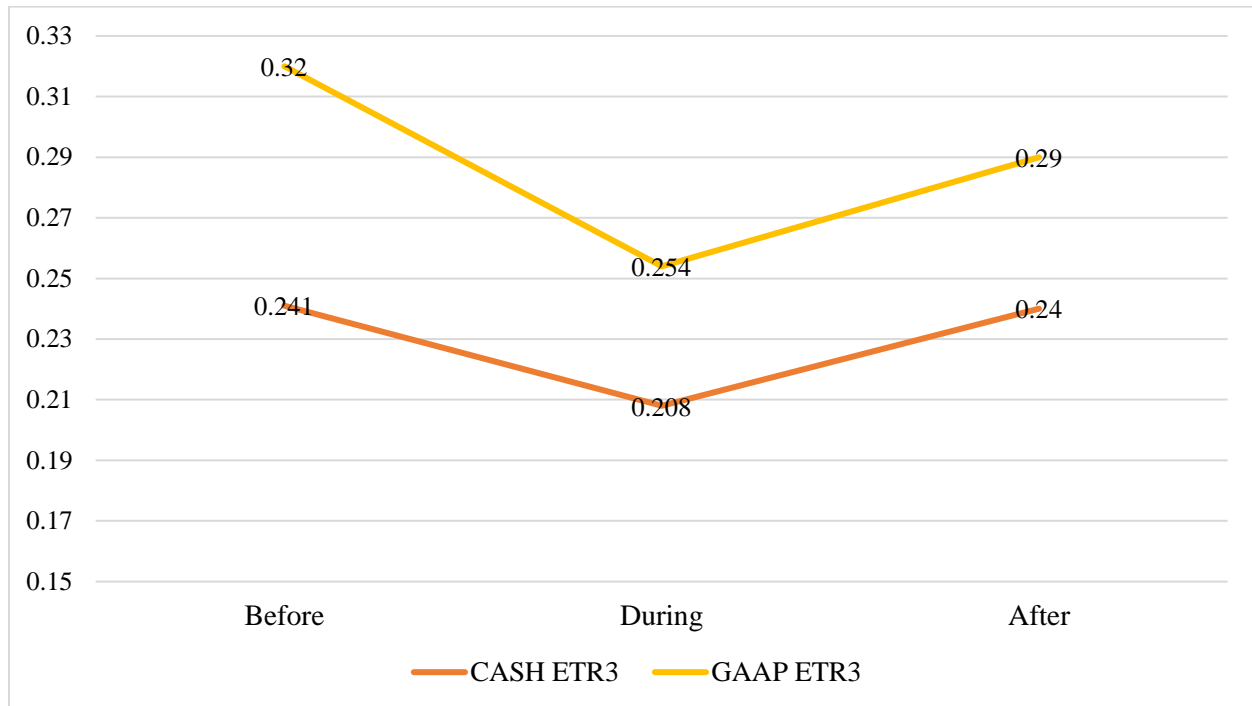
Notes. This figure illustrates the percentage of firms with at least one foreign tax holiday during the sample period.

Figure 2. Foreign Tax Holiday-Year Observations by Jurisdiction



Notes. This figure illustrates the percentage of holiday-year observations by jurisdiction. Other jurisdictions include Algeria, Argentina, Barbados, Belarus, Egypt, Guatemala, Guyana, Honduras, Sri Lanka, the Netherlands, Pakistan, Serbia, South Africa, and Trinidad and Tobago.

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>
Firm-years reporting tax holiday participation	<u>1,597</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>	1,597	1.000	0.000	1.000	1.000	1.000	23,825	0.000	0.000	0.000	0.000	0.000
<i>HOLIDAYFIRM</i>	1,597	1.000	0.000	1.000	1.000	1.000	23,825	0.074	0.261	0.000	0.000	0.000
<i>HAVENYEAR</i>	1,597	0.816	0.388	1.000	1.000	1.000	23,825	0.585	0.493	0.000	1.000	1.000
<i>HAVENFIRM</i>	1,597	0.944	0.229	1.000	1.000	1.000	23,825	0.787	0.409	1.000	1.000	1.000
<i>TXWW</i>	1,597	0.019	0.024	0.004	0.013	0.027	23,825	0.022	0.027	0.003	0.015	0.034
<i>TXFED</i>	1,580	0.010	0.020	0.000	0.002	0.016	23,443	0.014	0.023	0.000	0.005	0.023
<i>TXFO</i>	1,580	0.009	0.009	0.002	0.006	0.012	23,443	0.008	0.010	0.001	0.004	0.011
<i>PI</i>	1,597	0.040	0.165	-0.002	0.061	0.118	23,825	0.021	0.191	-0.011	0.056	0.112
<i>PIDOM</i>	1,597	0.001	0.130	-0.021	0.013	0.055	23,825	0.005	0.157	-0.022	0.028	0.076
<i>PIFO</i>	1,597	0.039	0.066	0.008	0.037	0.076	23,825	0.017	0.058	0.000	0.013	0.038
<i>CASHETR3</i>	1,296	0.207	0.179	0.093	0.180	0.266	18,073	0.273	0.198	0.151	0.252	0.344
<i>GAAPETR3</i>	1,296	0.227	0.203	0.103	0.203	0.291	18,073	0.296	0.202	0.191	0.292	0.360
<i>ΔPRE</i>	685	0.032	0.062	0.003	0.027	0.063	4,023	0.019	0.045	0.000	0.011	0.035
<i>LNAT</i>	1,597	7.054	1.652	5.887	6.981	8.140	23,825	6.515	1.891	5.146	6.452	7.795
<i>ROA</i>	1,597	0.040	0.165	-0.002	0.061	0.118	23,825	0.021	0.191	-0.011	0.056	0.112
<i>MB</i>	1,571	2.864	4.125	1.354	2.197	3.699	23,029	2.864	4.968	1.263	2.077	3.515
<i>DLTT</i>	1,597	0.139	0.169	0.000	0.089	0.218	23,825	0.181	0.200	0.004	0.134	0.282
<i>XRD</i>	1,597	0.066	0.075	0.008	0.047	0.099	23,825	0.050	0.084	0.000	0.015	0.071
<i>INTAN</i>	1,597	0.191	0.211	0.030	0.125	0.292	23,825	0.196	0.237	0.015	0.114	0.296
<i>PPENT</i>	1,597	0.199	0.152	0.088	0.161	0.274	23,825	0.252	0.231	0.091	0.185	0.337
<i>INVENTORY</i>	1,597	0.120	0.110	0.038	0.099	0.170	23,825	0.136	0.134	0.022	0.110	0.201
<i>SG&amp;A</i>	1,597	0.258	0.175	0.137	0.224	0.331	23,825	0.328	0.338	0.136	0.259	0.429
<i>SALES_GROWTH</i>	1,597	0.119	0.300	-0.028	0.075	0.217	23,825	0.118	0.310	-0.023	0.073	0.190
<i>NOL</i>	1,597	0.579	0.494	0.000	1.000	1.000	23,825	0.485	0.500	0.000	0.000	1.000
<i>ΔNOL</i>	1,597	-0.003	0.309	-0.004	0.000	0.006	23,825	-0.009	0.316	0.000	0.000	0.000
<i>WORDCOUNT10K</i>	1,597	11.010	0.718	10.516	10.907	11.579	23,825	10.679	0.786	10.187	10.636	11.189

Table 3. Correlation Matrix

Panel A. Foreign Tax Holiday, Firm Characteristics, and CEO Horizons

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.
1. <i>HOLIDAYYEAR</i>																
2. <i>HOLIDAYFIRM</i>	0.66															
3. <i>HAVENYEAR</i>	0.11	0.13														
4. <i>HAVENFIRM</i>	0.09	0.14	0.62													
5. <i>LNAT</i>	0.07	0.07	0.37	0.35												
6. <i>PIDOM</i>	-0.01	0.01	0.07	0.10	0.25											
7. <i>PIFO</i>	0.09	0.11	0.14	0.15	0.24	0.25										
8. <i>XRD</i>	0.05	0.06	-0.04	-0.06	-0.32	-0.38	-0.18									
9. <i>INTAN</i>	-0.01	-0.03	0.09	0.06	0.20	0.06	0.01	-0.12								
10. <i>PPENT</i>	-0.04	-0.02	-0.03	-0.02	0.20	0.10	0.06	-0.27	-0.17							
11. <i>INVENTORY</i>	-0.03	-0.01	-0.08	-0.07	-0.13	0.12	0.05	-0.13	-0.11	0.00						
12. <i>SG&amp;A</i>	-0.05	-0.04	-0.09	-0.09	-0.36	-0.09	-0.06	0.31	0.02	-0.14	0.14					
13. <i>SALES_GROWTH</i>	0.00	0.02	-0.04	-0.02	-0.03	0.12	0.07	0.01	0.18	0.16	0.11	0.21				
14. <i>TERCILE_KZ</i>	-0.06	-0.06	-0.04	-0.05	0.04	-0.24	-0.17	-0.17	-0.08	0.41	0.11	-0.20	-0.11			
14. <i>CEO_TENURE</i>	0.01	-0.01	-0.04	-0.01	-0.08	0.05	0.00	0.02	-0.02	-0.02	0.00	0.03	0.04	-0.03		
15. <i>CEO_AGE</i>	-0.02	-0.01	-0.03	0.00	0.08	0.05	0.02	-0.13	-0.03	0.07	0.07	-0.14	-0.04	0.06	0.41	
16. $(CEO\_AGE)^2$	-0.02	-0.01	-0.04	0.00	0.07	0.05	0.02	-0.12	-0.03	0.06	0.06	-0.13	-0.04	0.05	0.43	0.99

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 3. Correlation Matrix

Panel B. Foreign Tax Holiday, Taxes, and Income

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.
1. <i>HOLIDAYYEAR</i>											
2. <i>HOLIDAYFIRM</i>	0.66										
3. <i>HAVENYEAR</i>	0.11	0.13									
4. <i>HAVENFIRM</i>	0.09	0.14	0.62								
5. <i>CASHETR3</i>	-0.08	-0.08	-0.03	-0.02							
6. <i>GAAPETR3</i>	-0.08	-0.07	-0.04	-0.02	0.42						
7. <i>TXWW</i>	-0.03	0.00	0.05	0.10	0.07	0.08					
8. <i>TXFED</i>	-0.04	-0.02	0.00	0.05	0.02	0.06	0.88				
9. <i>TXFO</i>	0.03	0.06	0.17	0.16	0.10	0.05	0.43	0.03			
10. <i>PIDOM</i>	-0.01	0.01	0.07	0.10	-0.13	-0.01	0.48	0.52	0.09		
11. <i>PIFO</i>	0.09	0.11	0.15	0.15	-0.10	-0.09	0.32	0.12	0.53	0.25	
12. $\Delta$ <i>PRE</i>	0.10	0.12	0.10	0.07	-0.16	-0.14	0.17	0.07	0.24	0.09	0.42

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>
<i>TAX HAVEN</i>	0.004 (0.098)	
<i>TAX HOLIDAY</i>		0.004 (0.098)
<i>CORP TAX RATE</i>	-0.235 (0.152)	-0.369** (0.180)
<i>ISLAND</i>	-0.001 (0.075)	-0.009 (0.071)
<i>UK LEGAL ORIGIN</i>	-0.004 (0.082)	0.075 (0.065)
<i>LANDLOCKED</i>	0.034 (0.057)	-0.015 (0.054)
<i>ENGLISH</i>	0.046 (0.090)	0.084 (0.068)
<i>UN MEMBER STATE</i>	0.040 (0.120)	0.075 (0.106)
<i>LN_AREA</i>	-0.040*** (0.015)	-0.073*** (0.015)
<i>LN_POPULATION</i>	0.103*** (0.028)	-0.002 (0.020)
<i>LN_GDP_PER_CAPITA</i>	0.019 (0.023)	0.050 (0.028)
<i>POLITICAL STABILITY</i>	0.001 (0.002)	0.001 (0.001)
<i>REGULATORY QUALITY</i>	0.003 (0.002)	0.002 (0.002)
<i>CORRUPTION</i>	-0.002 (0.002)	-0.001 (0.002)
N	177	177
Adjusted R <sup>2</sup>	0.197	0.485

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.

Table 5. Foreign Tax Holiday Use by Industry

Fama-French 12 Industries	Number of firm- years in an industry with <i>HOLIDAYYEAR=1</i>	Percentage of firm- years in an industry with <i>HOLIDAYYEAR=1</i>
<i>FF1 CONSUMER NONDURABLES</i>	37	2.12%
<i>FF2 CONSUMER DURABLES</i>	73	6.70%
<i>FF3 MANUFACTURING</i>	234	4.84%
<i>FF4 ENERGY</i>	12	1.17%
<i>FF5 CHEMICALS AND APPLIED PRODUCTS</i>	32	2.42%
<i>FF6 BUSINESS EQUIPMENT</i>	968	11.97%
<i>FF7 TELECOMMUNICATION</i>	0	0.00%
<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>	149	6.82%
<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) <i>HOLIDAY</i> <i>YEAR</i>	(2) <i>HAVEN</i> <i>YEAR</i>	(3) <i>HOLIDAY</i> <i>YEAR</i>	(4) <i>HAVEN</i> <i>YEAR</i>	(5) <i>HOLIDAY</i> <i>YEAR</i>	(6) <i>HAVEN</i> <i>YEAR</i>	(7) <i>HOLIDAY</i> <i>YEAR</i>	(8) <i>HAVEN</i> <i>YEAR</i>
<i>HAVENYEAR</i>	0.034*** (0.003)		0.034*** (0.003)		0.034*** (0.005)		0.035*** (0.005)	
<i>HOLIDAYYEAR</i>		0.104*** (0.010)		0.103*** (0.010)		0.073*** (0.012)		0.072*** (0.012)
<i>TERCILE_KZ</i>			-0.005** (0.002)	0.010** (0.005)				
<i>CEO_TENURE</i>					0.001** (0.000)	-0.002** (0.001)	0.001** (0.000)	-0.002** (0.001)
<i>CEO_AGE</i>					-0.001 (0.003)	0.005 (0.005)		
$(CEO\_AGE)^2$					-0.000 (0.000)	-0.000 (0.000)		
<i>CEO_AGE (&gt;65)</i>							-0.025** (0.011)	-0.026 (0.018)
<i>CEO_AGE (60-65)</i>							-0.016* (0.008)	-0.019 (0.012)
<i>CEO_AGE (50-55)</i>							-0.001 (0.007)	0.004 (0.010)
<i>CEO_AGE (&lt;50)</i>							0.009 (0.008)	0.005 (0.011)
<i>POST2004</i>	-0.011 (0.015)	0.137*** (0.025)	-0.019 (0.015)	0.129*** (0.026)	-0.033 (0.029)	0.142*** (0.052)	-0.031 (0.029)	0.144*** (0.052)
<i>TREND</i>	0.003*** (0.001)	0.008*** (0.002)	0.003*** (0.001)	0.008*** (0.002)	0.005** (0.003)	0.006 (0.005)	0.005** (0.003)	0.006 (0.005)
<i>POST2004</i> × <i>TREND</i>	0.002** (0.001)	-0.013*** (0.002)	0.003*** (0.001)	-0.012*** (0.002)	0.004 (0.003)	-0.012** (0.006)	0.004 (0.003)	-0.012** (0.006)
<i>LNAT</i>	0.009*** (0.001)	0.109*** (0.002)	0.009*** (0.001)	0.109*** (0.002)	0.008*** (0.002)	0.075*** (0.003)	0.009*** (0.002)	0.075*** (0.003)
<i>ROA_PIDOM</i>	-0.033***	-0.027**	-0.043***	-0.030	-0.045*	-0.155***	-0.039	-0.156***

	(0.012)	(0.022)	(0.011)	(0.023)	(0.024)	(0.034)	(0.024)	(0.035)
<i>ROA_PIFO</i>	0.308***	0.408***	0.310***	0.431***	0.554***	0.920***	0.452***	0.922***
	(0.033)	(0.054)	(0.034)	(0.055)	(0.076)	(0.086)	(0.073)	(0.086)
<i>XRD</i>	0.029	0.097**	0.043*	0.085*	0.365***	0.224**	0.363***	0.224**
	(0.025)	(0.048)	(0.026)	(0.049)	(0.077)	(0.097)	(0.077)	(0.097)
<i>INTAN</i>	-0.054***	-0.020	-0.016***	-0.004	-0.033***	0.054***	-0.035***	0.055***
	(0.008)	(0.014)	(0.005)	(0.014)	(0.012)	(0.019)	(0.012)	(0.019)
<i>PPENT</i>	0.022**	-0.118***	0.033***	-0.135***	0.034*	-0.137***	0.035*	-0.137***
	(0.009)	(0.018)	(0.009)	(0.019)	(0.018)	(0.030)	(0.018)	(0.030)
<i>INVENTORY</i>	-0.037***	0.012	-0.037**	-0.009	0.000	0.019	0.001	0.018
	(0.014)	(0.040)	(0.015)	(0.031)	(0.032)	(0.052)	(0.032)	(0.052)
<i>SG&amp;A</i>	-0.036***	0.078***	-0.039***	0.079***	-0.090***	0.080***	-0.087***	0.079***
	(0.004)	(0.012)	(0.005)	(0.012)	(0.013)	(0.027)	(0.013)	(0.027)
<i>SALES_GROWTH</i>	0.020***	-0.051***	0.015***	-0.051***	0.022**	-0.039**	0.022**	-0.039**
	(0.003)	(0.010)	(0.005)	(0.010)	(0.001)	(0.018)	(0.001)	(0.018)
<i>WORDCOUNT10K</i>	0.002	0.038***	0.002	0.034***	0.005	0.024***	0.005	0.024***
	(0.003)	(0.005)	(0.003)	(0.005)	(0.005)	(0.007)	(0.005)	(0.007)
Fixed Effects	Industry	Industry	Industry	Industry	Industry	Industry	Industry	Industry
N	25,422	25,422	24,552	24,552	11,569	11,569	11,569	11,569
Adjusted R <sup>2</sup>	0.09	0.21	0.09	0.21	0.10	0.15	0.10	0.15



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

## Panel A. Regression Analysis

Variables:	(1) <i>CASHETR3</i>	(2) <i>GAAPETR3</i>	(3) <i>CASHETR3</i>	(4) <i>GAAPETR3</i>
<i>HOLIDAYYEAR</i>	-0.021*** (0.004)	-0.033*** (0.004)	-0.017** (0.008)	-0.019** (0.009)
<i>HOLIDAYFIRM</i>	-0.017*** (0.003)	-0.010*** (0.003)		
<i>HAVENYEAR</i>	0.003 (0.002)	-0.011*** (0.002)	0.008 (0.005)	0.003 (0.005)
<i>HAVENFIRM</i>	0.013*** (0.003)	0.011*** (0.003)		
<i>LNAT</i>	0.002*** (0.001)	0.008*** (0.001)	-0.008* (0.004)	-0.007 (0.005)
<i>MB</i>	-0.001*** (0.000)	0.000*** (0.000)	-0.001*** (0.000)	-0.001* (0.000)
<i>DLTT</i>	-0.034*** (0.006)	-0.055*** (0.005)	0.047*** (0.016)	0.043** (0.019)
<i>XRD</i>	-0.312*** (0.020)	-0.314*** (0.021)	0.317*** (0.077)	0.180** (0.085)
<i>INTAN</i>	0.024*** (0.004)	0.024*** (0.004)	-0.001 (0.011)	-0.024* (0.012)
<i>PPENT</i>	-0.045*** (0.005)	0.003 (0.005)	-0.054*** (0.016)	-0.012 (0.020)
<i>INVENTORY</i>	0.103*** (0.009)	0.032*** (0.009)	-0.108*** (0.031)	-0.084** (0.034)
<i>SG&amp;A</i>	0.037*** (0.004)	0.012*** (0.005)	-0.013 (0.011)	-0.033** (0.015)
<i>SALES_GROWTH</i>	-0.073*** (0.004)	-0.020*** (0.004)	-0.053*** (0.008)	0.001 (0.009)
<i>PIFO</i>	-0.038* (0.019)	-0.023 (0.019)	-0.535*** (0.052)	-0.368*** (0.059)
<i>NOL</i>	-0.024*** (0.002)	-0.020*** (0.002)	0.008* (0.004)	0.004 (0.005)
$\Delta NOL$	0.048*** (0.008)	0.036*** (0.008)	-0.005 (0.013)	0.020 (0.017)
<i>WORDCOUNT10K</i>	-0.013*** (0.002)	-0.022*** (0.001)	0.007*** (0.003)	0.000 (0.003)
Fixed Effects	Industry + Year	Industry + Year	Firm + Year	Firm + Year
N	19,369	19,369	18,939	18,939
Adj. R <sup>2</sup>	0.192	0.194	0.445	0.284

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

		Before	During	After
<i>CASHETR3</i>	Mean	0.240	0.209	0.239
	Std. Dev.	0.191	0.176	0.199
	N	1,072	729	143
<i>GAAPETR3</i>	Mean	0.318	0.255	0.291
	Std. Dev.	0.211	0.218	0.212
	N	984	648	128

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. Holiday firms that enter the sample with a tax holiday participation (left-truncation in tax holiday participation) are excluded from the “before” and “during” subsamples; Holiday firms whose sample periods conclude before their tax holidays are terminated (right-truncation in tax holiday participation) are excluded in the “after” subsample. We require firms to have at least three years of observations to be included in each of the subsample calculation.

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) <i>TXFO</i>	(2) $\Sigma$ <i>TXFO</i>	(3) $\Sigma$ <i>TXFO</i>
<i>Summation window:</i>	<i>Annual</i>	<i>Over 5 years</i>	<i>Throughout the firm's sample period</i>
$\Sigma$ <i>PIDOM</i>	0.005*** (0.001)	0.002 (0.002)	0.003 (0.002)
$\Sigma$ <i>PIFO</i>	0.245*** (0.002)	0.233*** (0.002)	0.245*** (0.003)
$\Sigma$ ( <i>PIDOM</i> × <i>HOLIDAYYEAR</i> )	0.008*** (0.002)	0.009 (0.007)	0.004 (0.005)
$\Sigma$ ( <i>PIFO</i> × <i>HOLIDAYYEAR</i> )	-0.075*** (0.003)	-0.040*** (0.006)	-0.107*** (0.007)
$\Sigma$ ( <i>PIDOM</i> × <i>HOLIDAYFIRM</i> )	0.001 (0.001)	0.001 (0.002)	0.005 (0.003)
$\Sigma$ ( <i>PIFO</i> × <i>HOLIDAYFIRM</i> )	-0.023*** (0.002)	-0.049*** (0.005)	0.022*** (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>	0.849	0.920	0.952

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

Variables:	(1) <i>TXFED</i>	(2) $\Sigma$ <i>TXFED</i>	(3) $\Sigma$ <i>TXFED</i>
<i>Summation window:</i>	<i>Annual</i>	<i>Over 5 years</i>	<i>Throughout the firm's sample period</i>
$\Sigma$ <i>PIDOM</i>	0.338*** (0.003)	0.380*** (0.005)	0.355*** (0.005)
$\Sigma$ <i>PIFO</i>	0.057*** (0.004)	0.064*** (0.006)	0.044*** (0.006)
$\Sigma$ ( <i>PIDOM</i> × <i>HOLIDAYYEAR</i> )	-0.027*** (0.008)	-0.004 (0.009)	-0.013 (0.012)
$\Sigma$ ( <i>PIFO</i> × <i>HOLIDAYYEAR</i> )	0.015** (0.006)	0.031* (0.016)	0.058*** (0.015)
$\Sigma$ ( <i>PIDOM</i> × <i>HOLIDAYFIRM</i> )	0.001 (0.003)	-0.004 (0.006)	0.009 (0.007)
$\Sigma$ ( <i>PIFO</i> × <i>HOLIDAYFIRM</i> )	0.001 (0.005)	-0.024* (0.013)	-0.027** (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>	0.844	0.919	0.940

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

Variables:	(1) <i>TXWW</i>	(2) $\Sigma TXWW$	(3) $\Sigma TXWW$
<i>Summation window:</i>	<i>Annual</i>	<i>Over 5 years</i>	<i>Throughout the firm's sample period</i>
$\Sigma PIDOM$	0.386*** (0.003)	0.384*** (0.005)	0.367*** (0.005)
$\Sigma PIFO$	0.310*** (0.004)	0.285*** (0.007)	0.262*** (0.007)
$\Sigma(PIDOM \times HOLIDAYYEAR)$	0.012 (0.098)	0.004 (0.010)	-0.019 (0.014)
$\Sigma(PIFO \times HOLIDAYYEAR)$	-0.068*** (0.008)	-0.116*** (0.018)	-0.037** (0.018)
$\Sigma(PIDOM \times HOLIDAYFIRM)$	-0.019*** (0.005)	-0.009 (0.007)	0.002 (0.008)
$\Sigma(PIFO \times HOLIDAYFIRM)$	0.001 (0.007)	0.021 (0.014)	0.012 (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>	0.840	0.934	0.945

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  $TXWW_{it} = \alpha_0 + \alpha_1 PIDOM_{it} + \beta_1 PIFO_{it} + \alpha_2 PIDOM_{it} \times HOLIDAYYEAR_{it} + \beta_2 PIFO_{it} \times HOLIDAYYEAR_{it} + \alpha_3 PIDOM_{it} \times HOLIDAYFIRM_{it} + \beta_3 PIFO_{it} \times HOLIDAYFIRM_{it} + \sum_k \gamma_k PI_{it} \times Control_{it}^k + \mu_i$ .  $PI_{it} \times Control_{it}^k$  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  $\Sigma TXWW_{it} = \alpha_0 + \alpha_1 \Sigma PIDOM_{it} + \beta_1 \Sigma PIFO_{it} + \alpha_2 \Sigma(PIDOM_{it} \times HOLIDAYYEAR_{it}) + \beta_2 \Sigma(PIFO_{it} \times HOLIDAYYEAR_{it}) + \alpha_3 \Sigma(PIDOM_{it} \times HOLIDAYFIRM_{it}) + \beta_3 \Sigma(PIFO_{it} \times HOLIDAYFIRM_{it}) + \sum_k \gamma_k PI_{it} \times Control_{it}^k + \mu_i$ .

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) $\Delta PRE$	(2) $\Delta PRE$
<i>PIFO</i>	0.467*** (0.007)	0.521*** (0.026)
<i>PIFO</i> × <i>HOLIDAYYEAR</i>	0.077** (0.036)	0.085** (0.036)
<i>PIFO</i> × <i>HOLIDAYFIRM</i>	0.116*** (0.024)	0.109*** (0.024)
<i>HOLIDAYYEAR</i>	-0.002 (0.002)	-0.002 (0.002)
<i>HOLIDAYFIRM</i>	0.000 (0.002)	0.000 (0.002)
<i>PIFO</i> × <i>HAVENYEAR</i>		0.145*** (0.024)
<i>PIFO</i> × <i>HAVENFIRM</i>		-0.188*** (0.037)
<i>HAVENYEAR</i>		-0.000 (0.001)
<i>HAVENFIRM</i>		0.002 (0.002)
Control Variables?	Yes	Yes
Fixed Effects	Industry + Year	Industry + Year
N	4,708	4,708
Adjusted R <sup>2</sup>	0.620	0.623

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:  $\Delta PRE_{it} = \alpha_0 + \alpha_1 PIFO_{it} + \alpha_2 PIFO_{it} \times HOLIDAYYEAR_{it} + \alpha_3 PIFO_{it} \times HOLIDAYFIRM_{it} + \sum_k \gamma_k Control_{it}^k + \mu_{it}$ .  $Control_{it}^k$  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).