

Are Two Better than One? The Role of Country Pairs in Multinational Tax Planning

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Abstract: In this study, we examine the individual countries and pairs of countries where foreign subsidiaries have the most significant effect on U.S. multinational corporations' (MNCs) tax burdens. We hypothesize that locating subsidiaries in combinations of foreign countries results in incremental tax planning opportunities that may not be provided by locating subsidiaries in either country independently. First, we document that well-known tax haven countries, like Ireland, Singapore, and the Cayman Islands, are associated with lower cash ETRs. However, we also find that countries traditionally considered less tax-friendly, such as Australia, Japan, and Germany, are associated with lower cash ETRs. This is in line with the actual tax burdens of corporations being a complex combination of the statutory rate and various incentives. Next, we find that country pairs including both traditional tax havens and non-tax haven countries are also associated with lower cash ETRs. Consistent with our predictions, we find that the top country pairs yield approximately three times larger cash ETR impacts than the top individual countries on average. Finally, we document that the individual countries and country pairs associated with lower cash ETRs vary across time and vary based on where U.S. MNCs have most of their foreign sales. By directly considering the role of country pairs, we capture the effect of complex operational decisions where U.S. MNCs utilize existing rules and laws to strategically source different types of income across foreign subsidiaries in their organizational structures.

Keywords: Country pairs, multijurisdictional tax planning, subsidiary locations, tax avoidance, tax havens

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I. Introduction

During the 2010s, the “Double Irish with a Dutch Sandwich” tax strategy gained notoriety for allowing large U.S multinational corporations (MNCs) like Apple, Meta, and Alphabet to avoid paying tax on billions of profits (Wood, 2016). The strategy used two subsidiaries in Ireland, a relatively lower-tax jurisdiction, and one subsidiary in the Netherlands, a relatively higher-tax jurisdiction, to shift income within MNCs’ global organizational structures. This strategy is notable because it exploited the unique interactions of different tax rules and treaties in both low-tax and high-tax countries to lower their effective tax rates (Schechner and Fleisher, 2014). In this study, we examine which combinations of countries have the most significant effect on U.S. MNCs’ tax burdens and how the joint country effects compare to the individual country effects.

The motivation for this study comes from two main sources. First, despite widespread recognition that MNCs engage in multijurisdictional tax planning, little research to date directly examines whether having subsidiaries in combinations of countries influences tax outcomes. One exception is Dyreng, Lindsey, Markle, and Shackelford (2015), who find that U.S. MNCs use pairs of foreign countries with favorable dividend taxation laws to repatriate foreign earnings tax-efficiently. By directly examining country combinations (e.g., Ireland and the Netherlands), we capture the effect of complex operational decisions where U.S. MNCs utilize existing rules and laws to strategically source different types of income across foreign subsidiaries in their organizational structures.

Second, most research on foreign subsidiaries focuses on whether firms have at least one subsidiary located in a tax haven (e.g., Dyreng, Lindsey, and Thornock, 2013; Dyreng, Hanlon, and Maydew, 2019; Dyreng, Hoopes, Langetieg, and Wilde, 2020). As there is no universally accepted definition of a “tax haven,” academic researchers generally identify tax havens using lists

generated by regulatory bodies such as the Organization for Economic Cooperation and Development (OECD) (e.g., Hines and Rice 1994). While this research has yielded numerous takeaways for both academics and policymakers, list-based approaches may overlook the role that both haven and non-haven countries play in shaping MNCs' tax burdens. Building off Dyreng and Lindsey (2009)'s empirical approach (p. 1295), we directly measure the tax effects of subsidiaries in both individual countries and combinations of countries without imposing ex ante restrictions. In doing so, we 'let the data speak' regarding the identification of countries that are associated with lower tax burdens.

Our sample begins with U.S. firms in the Compustat Annual database between 1994 and 2023 with more than \$10 million in total assets. Because we are interested in the tax effects of global operations, we limit our sample to profitable firm-years to reduce the likelihood that the observed tax effects are being driven by firms' loss positions.¹ Figure 1 shows the composition of firms across time. We see a steady increase in the percentage of MNCs in the sample starting in 2000. In contrast, the percentage of MNCs with a subsidiary in a country traditionally defined as a tax haven increased rapidly during the late 1990s, remained relatively stable through the 2000s, and declined following the adoption of the Tax Cuts and Jobs Act (TCJA) in 2018.²

We use WRDS Exhibit 21 subsidiary data to create indicators for the individual countries and country combinations where firms locate at least one foreign subsidiary.³ We limit our analysis to combinations of two countries (hereafter country pairs), as opposed to combinations of three or

¹ Specifically, we drop observations where retained earnings are missing or negative or three-year cumulative pre-tax income is negative. We also drop observations with effective tax rates below zero or above one to avoid the influence of outliers and because effective tax rate measures below zero or above one are difficult to interpret.

² To help interpret our results in relation to prior literature, we classify countries in our analyses as tax havens based on the list from Law and Mills (2022) that was adapted from Dyreng and Lindsey (2009).

³ Prior research generally concludes that Exhibit 21 disclosures are an appropriate proxy for locations of significant subsidiaries (Dyreng et al. 2020). To account for differences in Exhibit 21 disclosure quality, we control for overall disclosure quality as proposed by Chen, Miao, and Shevlin (2015).

more countries, for several reasons. First, Dyreng et al. (2015) find that roughly 75 percent of MNCs using multiple subsidiaries to move equity within their organizational structures locate those subsidiaries in no more than two foreign countries, arguing that MNCs want to involve the same countries to avoid introducing additional withholding tax. Second, prominent examples of multijurisdictional tax planning also typically involve a maximum of two foreign countries (e.g., Double Irish, Single Malt, and LRD arrangements).⁴ Finally, limiting our analysis of country combinations to country pairs increases the tractability of our results.

Under this approach, each observation in our final dataset corresponds to a unique firm-year with indicators for each country and country pair. To minimize the likelihood that outlier firms or countries skew our results, we require that at least ten firms have subsidiaries in a specific country (country pair) every year between 1994 and 2023 for that country (country pair) to be included in our analysis. After imposing this restriction, we are left with 44 unique countries and 583 unique country pairs. Tables 1 and 2 present the most frequently appearing countries (haven countries) and country pairs (OECD-haven pairs), respectively.⁵ As expected, these lists are dominated by the largest market economies with high levels of trade with the U.S. The country pair list also highlights a pattern of European OECD countries (seven of the top ten) pairing with the Asian tax havens of Singapore and Hong Kong (nine of the top ten).

We begin our empirical tests by examining which countries are associated with lower tax burdens by regressing the country indicators on cash effective tax rates (cash ETRs). We rank the country indicators based on the smallest (i.e., most negative) t-statistics, so the top-ranked indicator

⁴ The “Single Malt” tax arrangement involves subsidiaries in Ireland and Malta (Coyle, 2017). A “LRD” or Limited Risk Distributor involves a subsidiary in a high-tax market country where the products are sold (e.g., Australia) and a subsidiary in a low-tax principal country (e.g., Singapore) (JCT, 2010).

⁵ A country pair is classified as an OECD-haven pair if one country in the pair is designated a tax haven per Law and Mills (2022), and the other country is an OECD member.

is the country with the largest negative association with firms' tax burdens.⁶ The top ten countries present a mix of expected and surprising results. We find that Ireland, Singapore, and the Cayman Islands have the most significant negative effect on cash ETRs. These countries are among the "Top 7" most used tax havens according to recent work by Murphy and Vernon (2025).⁷ However, the next two countries on the list are Australia and Japan, which have high statutory tax rates and are not known as overly tax-friendly jurisdictions. Expanding beyond the top ten, we note that other traditional havens appear further down the list with smaller cash ETR effects than many non-haven countries, with some even having a positive cash ETR effect.

Next, we examine which country pairs are associated with cash ETRs to understand the impact of multijurisdictional tax planning on firms' overall tax burdens. Following the same approach, we regress the country pair indicators on cash ETRs and rank the country pair indicators based on the smallest (i.e., most negative) t-statistics. Again, the results are a mix of intuitive and surprising. Across all country pairs, we find that the top three are Singapore-Taiwan, Australia-South Korea, and Belgium-Netherlands. Both Singapore and the Netherlands are classified as a "Top 7" tax haven. However, neither Australia nor South Korea is a tax haven by any definition. Australia also appears in two other top ten country pairs with the Cayman Islands and Malaysia, both tax havens, which may explain Australia's presence in the top ten single-country analysis. Notably, four of the top ten pairs are OECD-haven country pairs, suggesting a trend of large, market economies being paired with tax havens in U.S. MNCs' global structures.

⁶ Because we rank the indicators based on the t-statistic and not the reported coefficient, the coefficients are not necessarily ranked in order of magnitude. However, the rank of the t-statistic and the coefficient are usually aligned, with the most negative t-statistic corresponding to the most negative coefficient.

⁷ Murphy and Vernon (2025) modernize the Hines and Rice (1994) "Big 7" tax haven countries to be the "Top 7" havens of the Netherlands, Singapore, Cayman Islands, Luxembourg, Switzerland, Ireland, and Hong Kong.

Having identified the individual countries and country pairs most associated with lower cash ETRs, we can now compare the effect that country pairs have on MNCs' tax burdens relative to the individual country effect. Consistent with our predictions, we find that the top ten country pairs have roughly three times the impact on firms' cash ETRs relative to the top ten individual countries. Results are consistent when restricting the comparison to the top ten non-haven countries and non-haven country pairs. We emphasize that the lower tax rates associated with locating subsidiaries in these countries and country pairs may not stem directly from tax benefits attributable to the operations in those countries. We merely document that firms locating subsidiaries in those countries or pairs of countries achieve lower cash ETRs on average.

To further explore the country and country pair effects, we conduct two additional analyses. First, we repeat the country and country pair tests over three distinct time periods where U.S. MNCs' incentives to use foreign subsidiaries to reduce tax burdens likely varied. The first period, 1994 to 2003, is intended to capture the years in which tax shelters, which often did not involve foreign subsidiaries, were a prominent tax avoidance strategy among U.S. MNCs.⁸ The second period, 2004 to 2017, is intended to capture the years in which outbound income shifting among U.S. MNCs was popular because of the U.S.'s relatively high corporate tax rate. The third period, 2019 to 2023, covers the years after TCJA was effective and the U.S.'s corporate tax rate dropped significantly, potentially reducing firms' incentives to shift income out of the U.S.

For the single country results, we find that only one country has a significant negative cash ETR effect in the first period (1994-2003), consistent with U.S. MNCs using tax shelters during this period to reduce their tax burdens. However, in the second period (2004-2017), we find four

⁸ We chose 2003 as the endpoint of the tax shelter sample period because the legislative activity around tax shelters increased substantially in 2003 when KPMG individual income tax shelters came under scrutiny (PBS Frontline, 2004). Further, the criminal indictment against KPMG for tax shelter fraud covered the period from 1996 to 2003 (IRS, 2005).

countries with a significant negative cash ETR effect, two of which are havens. The increased number of significant countries is consistent with an increase in outbound income shifting by U.S. MNCs during this time. In the final period (2019-2023), we find five countries with a significant negative cash ETR effect, but only one is a tax haven, which is consistent with income shifting incentives changing in response to the reduced U.S. tax rate. For the country pair results, there is no discernible pattern within or between periods when looking across all country pairs. However, focusing on the OECD-haven pairs, we see that Switzerland is heavily represented in the first period (1994-2003) with diminishing significance in the latter periods. In contrast, Singapore's presence in the top OECD-haven pairs increases drastically in the latter periods, with it appearing in five of the top ten pairs in the final period (2019-2023).

Motivated by the significance of the OECD-haven pairs, our second additional analysis explores whether the cash ETR effect of haven countries and haven country pairs varies based on where U.S. MNCs have most of their foreign sales. For U.S. MNCs whose largest geographic segment by sales is Asia-Pacific, the single country results suggest that Singapore, the Cayman Islands, and Ireland have the most significant cash ETR effects. For the haven country pairs, Ireland is the only haven to appear in more than two pairs, with substantial variation in the havens across the remaining pairs. For U.S. MNCs whose largest geographic segment by sales is Europe, the single country results reveal that only Singapore has a significant negative cash ETR effect. However, for the haven country pairs, Switzerland appears in four of the top ten pairs, suggesting its unique importance for U.S. MNCs with large ties to the European region, despite not appearing on the single haven country list.

In this study, we take a deliberately broad and descriptive approach to fill gaps in our understanding of how U.S. MNCs' global organizational structures relate to their overall tax

burdens. It is nearly impossible to know in practice how different laws and incentives interact for every unique multinational, which is why we ‘let the data speak’ on what the observed total effect of structures, laws, and incentives is on overall tax burdens. Rather than testing a narrow set of causal mechanisms, our goal is to quantify and contextualize the impact that having subsidiaries in combinations of country pairs has on U.S. MNCs’ tax outcomes. In doing so, we aim to provide a foundation for future studies that can more narrowly explore the specific dynamics that make particular country combinations more or less advantageous for tax purposes. We also hope to provide new evidence for policymakers, in and outside of the U.S., attempting to structure tax policy to limit tax avoidance by multinational firms. Collectively, our analyses yield four main takeaways.

First, we find evidence consistent with U.S. MNCs’ tax outcomes being influenced more by country combinations than individual countries alone. On average, U.S. MNCs locate subsidiaries in over 15 different countries.⁹ However, except for Dyreng et al. (2015), empirical research on MNCs’ corporate structure predominantly focuses on whether firms have a subsidiary in at least one haven country, overlooking the effects of locating subsidiaries in additional haven and non-haven countries. Finding that the average cash ETR effect of a top ten country pair is approximately three times larger than the effect of a top ten country underscores the need to examine MNC corporate structures more holistically and explicitly consider how subsidiaries in different jurisdictions interact to shape tax outcomes.

Second, consistent with Dyreng and Lindsey (2009), we find that tax havens like Ireland, Singapore, and the Cayman Islands are associated with lower tax burdens. However, we also find non-tax havens like Australia, Japan, and South Korea are associated with lower tax burdens. In

⁹ For the period 1993 to 2023, the mean (median) number of countries is 15.43 (10) (untabulated).

fact, we find that many traditional tax havens (e.g., Bermuda, Switzerland) are less effective in reducing cash ETRs than other non-haven countries. Further, our country pair results suggest that traditional tax havens' effects are amplified when combined with non-haven countries. Specifically, we find that six of the top ten country pairs associated with reducing cash ETRs include a haven and a non-haven country, with the joint effect exceeding the haven's individual effect.¹⁰

Third, our findings shed light on the role of different countries in serving as tax planning 'hubs.' Earlier periods in our sample were dominated by European hubs such as Switzerland, particularly for firms with the majority of their foreign sales occurring in Europe. In recent years, Asian tax havens, notably Singapore and Hong Kong, have become increasingly important nodes in U.S. MNCs' global tax structures. Emphasizing this point, Singapore appears in 57 unique country pairs, far more than any other country, and is paired with an OECD country 79 percent of the time. These trends suggest the rising prominence of Asian jurisdictions as hubs for facilitating and coordinating cross-border tax-planning arrangements.

Finally, country pairs composed entirely of non-haven countries are also associated with lower cash ETRs, validating concerns that tax haven lists potentially miss the effects of foreign subsidiaries on MNCs' tax outcomes. The prevalence of these non-haven country pairs naturally raises the question of whether these pairs have a significant impact because of tax treaties between the countries.¹¹ Using bilateral treaty data from Pellegrino, Spolaore, and Wacziarg (2025), we find that tax treaties are extremely prevalent, with over 90 percent of country pairs having a treaty.

¹⁰ If we classify the Netherlands as a tax haven, as in Murphy and Vernon (2025), then seven of the top ten country pairs include a tax haven country.

¹¹ For instance, the country pair with the second largest negative cash ETR effect is Australia and South Korea, which maintain tax treaties with each other and with the U.S. that lower withholding taxes on repatriated profits, intercompany interest, and royalty payments (ADT, 2026; KNTS, 2026; USDT, 2025).

Further, our analysis suggests that the mere presence of a treaty is not sufficient to identify country pairs that generate large tax savings, reinforcing the notion that it is the interaction of multiple factors (e.g., treaties, credits, exemptions, trade agreements) across countries that can create beneficial tax outcomes that are not apparent when viewing one component of a tax system in isolation.

II. Hypothesis Development

The use of foreign jurisdictions to avoid paying taxes is an issue that spans multiple decades. In 1987, the OECD issued a report on International Tax Avoidance and Evasion that extensively discusses why tax avoidance through the use of tax havens is a concern to tax authorities and how legislation can combat it (OECD, 1987). The report acknowledges that there is no objective test to identify a country as a tax haven and attempts to do so are “bound to be unsuccessful” (p. 21). The report further states:

Clearly, any country might be a tax haven to a certain extent, and there are many instances where otherwise relatively ‘high tax’ countries provide opportunities or devise policies to attract, by means of incentives, economic activities of certain types or in certain locations. Another aspect of the situation is that tax savings frequently do not result from the use of tax havens only but rather from the combined effect of making use of tax havens and of certain features of the general tax provisions in relatively high tax countries (e.g., a participation exemption). Furthermore, ‘stepping stone’ strategies have been devised to take advantage of the tax treaty networks of highly taxed countries, ‘laundering’ by the same token the income flowing originally from tax havens.¹²

The report goes on to identify seven main characteristics of “classical” tax havens: none or low taxes on income and capital, bank and commercial secrecy, lack of exchange controls, relative importance of banking, communications, tax treaties, and other aspects like political and economic stability (p. 22-23). However, without a concrete definition of a tax haven, it is difficult, if not

¹² OECD (1987), p. 21.

impossible, to use legislative measures to curb tax haven usage. As such, the OECD member countries established a list of tax havens to clarify the application of laws on the issue.

This list-based approach for identifying tax havens, borne initially out of legislative necessity, quickly became the dominant empirical method beginning with Hines and Rice (1994) and Dyreng and Lindsey (2009). Tax haven lists have a long precedent in empirical research, producing numerous valuable insights and continuing to be used in recent work (e.g., DePaul, Murphy, and Vernon, 2025; Mayberry and Zakota, 2025; Murphy and Vernon, 2025).¹³ However, as the OECD acknowledged in 1987, no single list can capture the full dynamics of international tax planning. Lists by design freeze a jurisdiction's status at a moment in time, treating tax haven designations as static and homogenous. This "sticky" treatment overlooks changes in the characteristics originally used to identify tax havens (e.g., statutory tax rates, treaty networks, and economic stability) and does not allow researchers to observe variation across countries and time. Additionally, researchers often apply these point-in-time lists uniformly across their samples without explicitly considering whether every country included in the list was regarded as a tax haven for the entire sample period.¹⁴ Finally, recent studies find that U.S. MNCs locate subsidiaries in classical tax haven countries for non-tax purposes and their use of these havens does not necessarily generate tax benefits (Hepfer, Wilde, and Wilson, 2020; Hepfer, Wilde, and Wilson, 2025). We highlight these points not to suggest that inferences from studies using tax haven lists are incorrect, but to illustrate the need to expand research on foreign subsidiaries beyond point-in-time tax haven lists.

¹³ As of September 2025, Hines and Rice (1994) has been cited 1,987 times and Dyreng and Lindsey (2009) 878 times per Google Scholar.

¹⁴ For example, Dyreng and Lindsey (2009) construct their list based on data as of March 4, 2008, yet their sample covers 1995 to 2007. Despite covering different sample periods, many studies in both accounting and finance adopt this list without modification (e.g., Koester, Shevlin, and Wangerin, 2017; Balakrishnan, Blouin, and Guay, 2019; Lewellen, 2022). Law and Mills (2022) use a modified version of the Dyreng and Lindsey (2009) list based on data as of May 31, 2015, while their sample spans 1993 to 2014.

At the same time, international tax avoidance strategies have shifted beyond the isolated use of individual countries and often leverage combinations of jurisdictions to improve tax outcomes. One multijurisdictional strategy receiving notable attention is the Double Irish arrangement and its many variants (e.g., “Dutch Sandwich,” “Single Malt”). In this arrangement, MNCs use treaty networks and entity classification rules to source profits originating in a high-tax country (e.g., the U.S.) to a zero-tax jurisdiction (e.g., Bermuda) through two Irish subsidiaries (Samarakoon and Organ, 2025). Documenting another multijurisdictional strategy, Dyreng et al. (2015) find that U.S. MNCs use holding companies in one foreign jurisdiction to tax-efficiently move profits from operating subsidiaries in a different foreign jurisdiction to the ultimate U.S. parent company. Dyreng et al. (2015) find that roughly 75 percent of MNCs using multiple foreign subsidiaries to move equity within their organizational structures locate those subsidiaries in no more than two foreign countries, arguing that MNCs want to involve the same foreign countries within the equity chain to avoid introducing additional withholding tax (p. 200-201). They also find that the most frequent pairs of foreign holding companies and foreign operating subsidiaries include the Netherlands, U.K., Germany, Italy, Spain, and Poland, none of which are traditionally identified as tax havens (p. 199).

Other multijurisdictional tax strategies also appear in the media, often when under scrutiny from tax authorities. For example, Netflix recently came under investigation from Italian and French tax authorities for using a Dutch subsidiary to minimize taxation of European profits (Parodi and Pollina, 2022; Loeve and Kar-Gupta, 2024; Stroobants, 2024). Similarly, Starbucks owed over 30 million dollars in back taxes to U.K. tax authorities related to inter-company royalty payments made to its Dutch subsidiary (Barker, 2012; Murray, 2012). These examples are not unique to U.S. MNCs. For instance, BHP and Rio Tinto settled with the Australian Tax Office

(ATO) over their Singapore “marketing hub” structures (BHP, 2018; ATO, 2022). Mizuho Bank litigated against Japanese tax authorities over interest payments with its Cayman-domiciled subsidiary (Jackman and Uranaka, 2019). Collectively, these examples underscore the OECD’s concerns that tax savings from multijurisdictional tax planning often result from combining low-tax and high-tax jurisdictions. Further, they illustrate how involving both haven and non-haven countries can allow firms to reduce their global tax burdens more than a singular tax haven could alone. Collectively, this leads to our main hypothesis:

H1: Locating subsidiaries in pairs of countries will have a greater negative relation to cash effective tax rates than locating subsidiaries in individual countries.

III. Methodology

3.1 Sample Selection

The initial sample begins with U.S.-domiciled firms in Compustat Annual between 1994 and 2023, inclusive. First, we drop observations where total assets are less than \$10 million. Next, we limit our sample to profitable firm-years to reduce the likelihood that the observed tax avoidance and tax uncertainty effects are being driven by the subsidiary locations of loss firms whose tax outcomes are skewed by their loss position. Specifically, we drop observations where retained earnings are missing or negative or three-year cumulative pre-tax income is negative. We also drop observations where cash or GAAP effective tax rates are below zero or above one to avoid the influence of outliers and because effective tax rate measures below zero or above one are difficult to interpret. Finally, we drop observations missing historical SIC codes and control variables included in our main analyses. This results in 60,412 firm-years, with 38,974 (21,438)

being non-MNC (MNC) firm-years.¹⁵ We identify MNC firm-years as those with non-missing, non-negative pre-tax foreign income in Compustat.

3.2 Variable Construction

To identify firms' operations outside of the U.S., we use WRDS Exhibit 21 subsidiary data (Dyreng et al. 2020). Each observation corresponds to a unique country-firm-year. We drop observations for U.S. subsidiaries and create indicator variables for each remaining country. We also create indicator variables for each unique country pair. For example, if Firm A has subsidiaries in Ireland, the Netherlands, and Spain, then Firm A has three unique country pairs: (1) Ireland-Netherlands, (2) Ireland-Spain, and (3) Netherlands-Spain. Finally, we transform the data so that each observation corresponds to a unique firm-year and merge it with the Compustat dataset.¹⁶ To minimize the likelihood that outlier firms or countries skew our results, we require that at least ten firms have subsidiaries in a specific country (country pair) every year between 1994 and 2023 for that country (country pair) to be included in our analyses. After imposing this restriction, we are left with 44 unique countries and 583 unique country pairs.

Tables 1 and 2 present the most frequently appearing countries (haven countries) and country pairs (OECD-haven pairs), respectively. As expected, both lists are dominated by the largest market economies with high levels of trade with the U.S. The U.K., Canada, and Germany top the country-level list, with Singapore and Hong Kong appearing most frequently for haven countries. For the country pair-level list, the first four pairs include the U.K. in combination with Canada, Germany, the Netherlands, and France, respectively. The U.K. appears on the top ten list five times, and Canada appears on the list four times. The country pair list also highlights a pattern

¹⁵ See Appendix A for sample selection details.

¹⁶ Any observation missing Exhibit 21 data is treated as having no foreign subsidiary operations.

of European OECD countries (seven of the top ten countries) pairing with the Asian tax havens of Singapore and Hong Kong (nine of the top ten countries).

3.3 Research Design

Building off the empirical approach in Dyreng and Lindsey (2009), we identify which countries and country pairs are associated with lower tax burdens by regressing the country indicators (country pair indicators) on cash effective tax rates. This empirical strategy has two key advantages. First, each country's tax system includes tax rate-related and non-rate-related components that ultimately influence the taxes paid in that jurisdiction (e.g., credits, subsidies, loss offset rules). For example, both Estonia and Finland's current statutory tax rate is 20 percent. However, the 20 percent rate only applies to distributed earnings in Estonia, whereas in Finland, companies are taxed on their overall income (Mengden, 2024). Thus, all things equal, a firm operating in Estonia has a significantly lower effective tax rate than a firm operating in Finland, despite both countries having equivalent statutory tax rates. By directly examining the average effective tax rates achieved by U.S. MNCs with subsidiaries in each country and country pair, we account for the rate-related and non-rate-related components of these foreign tax systems.

Second, it is difficult, if not impossible, to know and quantify all the factors that make a jurisdiction or combination of jurisdictions attractive for tax purposes (e.g., treaties, credits, exemptions, subsidies, trade agreements). Additionally, prior research indicates that broader, non-country-specific factors also influence the tax advantages of locating in certain foreign jurisdictions. For example, Fox, Jacob, Wilde, and Wilson (2022) find that the anticipation of future tax enforcement by the European Commission, a supragovernmental regulatory body, influences U.S. MNCs' investment in otherwise attractive tax haven countries. Using indicators for each country and country pair allows us to capture the cumulative effect of both known and

unknown country-level and non-country-level factors that cause a country or country pair to be associated with lower effective tax rates without needing to specify the factors ex ante.

Thus, to examine which combinations of countries have the most significant effect on U.S. MNCs' tax burdens and how the joint country effects compare to the individual country effects, we estimate the following ordinary least squares (OLS) regressions:

$$Cash_ETR_{i,t} = \alpha + \sum Country_Indicators_{i,t} + \sum Controls_{i,t} + \varepsilon_{i,t} \quad (1)$$

$$Cash_ETR_{i,t} = \alpha + \sum Country_Pair_Indicators_{i,t} + \sum Controls_{i,t} + \varepsilon_{i,t} \quad (2)$$

Following Dyreng, Hanlon, and Maydew (2010), we measure *Cash_ETR* as cash taxes paid divided by pre-tax income less special items. *Country_Indicators* and *Country_Pair_Indicators* are vectors of firm-level indicator variables for each country and country pair appearing in Exhibit 21 data across the entire sample period.

We use cash ETR to proxy for firms' overall tax burdens instead of GAAP ETR for two key reasons. First, cash ETRs capture the effects of both temporary and permanent book-tax differences arising from non-conforming tax planning activities (e.g., income shifting to low-tax jurisdictions, foreign and domestic tax credits). GAAP ETRs ignore temporary differences (Law and Mills 2022), which is problematic when studying MNCs, which often exploit timing-based tax planning strategies. Second, GAAP ETRs reflect changes in the reserve for unrecognized tax benefits and the valuation allowance of a deferred tax asset. Changes in these tax-related accounts are not necessarily driven by tax planning, which potentially biases inferences when using GAAP ETR as a proxy for a firm's tax burden (Drake, Hamilton, and Lusch, 2020). Cash ETRs are not

directly influenced by changes in these tax-related accounts, making them a better measure of MNCs' overall tax burden in our setting.¹⁷

We also include firm-level control variables that prior literature identifies as determinants of tax avoidance (e.g., Law and Mills, 2022). First, to account for differences in firm size and growth, we include controls for firm size (*SIZE*) and market-to-book ratio (*MTB*). Second, in addition to imposing profitability-related sample restrictions (e.g., positive retained earnings), we also include controls for firm profitability: return on assets (*ROA*), leverage (*LEV*), tax loss carry-forward (*NOL*), change in tax loss carry-forward (*CHANGE_NOL*), deferred revenue (*DEFINC*), other comprehensive income (*OCI*), and stock compensation expense (*STOCK*). Third, differences in book and tax reporting environments affect a firm's potential range of tax outcomes. As such, we control for items that capture these differences: property, plant, and equipment (*PPE*), intangible assets (*INTAN*), research and development (*RD*), equity in earnings (*EQ*), and use of mezzanine finance (*MEZZ*). Fourth, U.S. MNCs vary in their global footprint, which impacts their ability to influence tax outcomes through foreign operations. As such, we control for foreign income (*FI*) and the number of foreign countries they have subsidiaries in (*NUM_COUNTRIES*). Finally, while prior research generally concludes that Exhibit 21 disclosures are an appropriate proxy for locations of significant subsidiaries, there is some evidence of strategic disclosure (Dyreg et al. 2020). As such, we include a control for overall disclosure quality (*DQ*) as proposed by Chen, Miao, and Shevlin (2015) to account for potential differences in Exhibit 21 disclosure quality across firms. See Appendix B for detailed variable definitions.

¹⁷ As discussed in Drake et al. (2020), a valuation allowance release does not directly impact cash ETR. However, the circumstances that lead to a valuation allowance release (i.e., expectations of positive future taxable income) are often accompanied by the use of the related tax loss carryforwards. Because using tax loss carryforwards does impact cash ETR, we include controls for the presence of and change in net operating loss (NOL) carryforwards in our regression analyses.

IV. Results

4.1 Descriptives

Before conducting our country and country pair analyses, we descriptively examine U.S. firms across time. Figure 1 shows the composition of U.S. firms with total assets greater than \$10 million between 1994 and 2023. There is a steady increase in the percentage of MNCs in the sample starting in 2000. In contrast, the percentage of MNCs with a tax haven or a dot haven subsidiary increases rapidly during the late 1990s and then flattens out through the 2000s with a steady decline following the adoption of TCJA in 2018.¹⁸

Figure 2 shows the average cash and GAAP ETRs for U.S. firms meeting all sample restrictions between 1994 and 2023. For the majority of the sample period, U.S. MNCs achieved a lower cash ETR than their domestic counterparts. However, following TCJA, non-MNC firms experienced a significant decline in cash ETR, almost double that of MNC firms, and continue to have lower cash ETR than MNC firms through 2023. Consistent with Dyreng, Hanlon, Maydew, and Thornock (2017), average cash ETRs declined through 2004, increased through 2008, and then declined again through 2012, which ended their sample period. As noted in Dyreng et al. (2017), these spikes and drops are consistent with the American Jobs Creation Act (AJCA) repatriation tax holiday in 2004-2005 and accelerated bonus depreciation rules in effect during 2001-2004 and after 2008. We can see that cash ETRs remained stable from 2012 until 2018, when there was a large decrease attributable to TCJA. When looking at GAAP ETRs, U.S. MNCs achieved a lower GAAP ETR than their domestic counterparts for the majority of the sample period. There is a steady decline in GAAP ETR for both U.S. MNCs and non-MNCs starting in the early 2000s, with a sharp decrease in 2018 following TCJA.

¹⁸ We follow Law and Mills (2022) and treat all tax havens as dot havens except for Hong Kong, Ireland, Lebanon, Liberia, Panama, Singapore, and Switzerland.

Figure 3 shows the average cash and GAAP ETRs for only U.S. MNCs meeting all sample restrictions between 1994 and 2023. Interestingly, MNC firms with at least one haven (haven MNCs) have a higher average cash ETR than MNC firms without a haven (non-haven MNCs) for the majority of the sample period. Turning to GAAP ETRs, there is a similar declining trend for both haven and non-haven MNCs. In 2017, there is a large increase in GAAP ETRs for haven MNCs and a concurrent decrease in GAAP ETRs for non-haven MNCs. The increase in haven MNCs' GAAP ETRs is likely related to TCJA's deemed repatriation tax, which firms had to record in current tax expense in 2017 for financial statement purposes. The increase in GAAP ETR for haven MNCs then reverses in 2018 and continues to decline through 2020.

4.2 Main Results

4.2.1 Countries with the Largest Negative Cash ETR Effect

We begin our analysis by identifying the countries that are most associated with lower tax burdens. Table 3 presents the countries with the largest negative cash ETR effect based on the country indicator regression results. The country indicators are ranked based on the smallest (i.e., most negative) t-statistics. Panel A (Panel B) presents the results for all countries (haven countries). In Panel A, we find that Ireland, Singapore, and the Cayman Islands have the most significant negative effect on cash ETRs. These three countries are among the "Top 7" most used tax havens according to recent work by Murphy and Vernon (2025). However, the next two countries with the largest effect on cash ETRs are Australia and Japan. These two countries have relatively high statutory tax rates and are not known as tax-friendly jurisdictions. Further, the final five countries on our list, Hungary, Israel, Thailand, the Philippines, and Italy, are also not known as tax havens.

In Panel B, we expand beyond the top ten country indicators and report the rankings and cash ETR effects for the haven country indicators. Outside of the tax havens that top the list in

Panel A, the other traditional haven countries appear further down the list with smaller cash ETR effects than many non-haven countries. Further, some of these haven countries even report a positive cash ETR effect, suggesting higher tax burdens when locating a subsidiary in that jurisdiction. Again, we emphasize that the lower cash ETRs associated with operating in these countries may not stem directly from tax benefits attributable to the operations in those countries. We are just documenting that firms that operate in these countries achieve lower cash ETRs on average.

4.2.2 Country Pairs with the Largest Negative Cash ETR Effect

Next, we identify which country pairs are most associated with lower tax burdens. As with the country indicator analyses, the country pair indicators are ranked based on the smallest (i.e., most negative) t-statistics. Table 4 presents the results, which are again a mix of intuitive and surprising. Panel A (Panel B) presents the results for all country pairs (OECD-haven country pairs).

In Panel A, the top three country pairs are Singapore-Taiwan, Australia-South Korea, and Belgium-Netherlands. Finding Singapore-Taiwan and Belgium-Netherlands in the top spots is relatively intuitive given the countries' geographic proximity, Singapore's well-known status as a tax haven, and the Netherlands' more recent tax haven identification (e.g., Murphy and Vernon, 2025). However, neither Australia nor South Korea is a tax haven by any definition. Australia also appears in two other top ten country pairs with the Cayman Islands and Malaysia, both tax havens, which potentially explains Australia's presence in the top ten country analysis in Table 3. We note that six of the top ten pairs include a tax haven per Law and Mills (2022) or a "Top 7" tax haven per Murphy and Vernon (2025).

In Panel B, Australia-Cayman Islands has the most significant negative effect on cash ETRs. Among the tax havens, the Cayman Islands, Singapore, and Hong Kong each appear in two

pairings. For the OECD countries, both Germany and Australia appear twice. Notably, the top four OECD-haven pairs also appear in the top ten for all country pairs in Panel A, supporting the notion that large market economies operate alongside tax havens within U.S. MNCs' global structures to reduce overall tax burdens.

4.2.3 Comparing the Average Country and Country Pair Cash ETR Effect

Having identified the individual countries and country pairs most associated with lower cash ETRs, we can now estimate the effect that country pairs have on MNCs' tax burdens relative to the individual country effect. To do this, we compare the average cash ETR effect for the ten countries with the largest cash ETR effect per Table 3 and the ten country pairs with the largest cash ETR effect per Table 4. Table 5 presents the results. Panel A uses the overall top ten countries and country pairs, and Panel B uses the top ten non-haven countries and non-haven country pairs.

In Panel A, we find that the average cash ETR effect for a top country pair is approximately three times larger than the average cash ETR for a top single country, consistent with our predictions. Specifically, the average top ten country has a negative 0.97 percentage point effect on cash ETR, while the average top ten country pair has a negative 2.9 percentage point effect on cash ETR. We find similar results in Panel B when we limit the comparison to the top ten non-haven countries and non-haven country pairs. In this subset, the average top ten country has a negative 0.72 percentage point effect on cash ETR, while the average top ten country pair has a negative 2.86 percentage point effect on cash ETR.

In Figure 4A, we compare the distributions of the cash ETR coefficient estimates for the single country and country pair indicators. The single country coefficients are tightly centered around zero, indicating that most single country effects are small in magnitude. In contrast, the distribution for the country pair coefficients is broader and noticeably flatter, reflecting greater

variability in the magnitude of the tax effects associated with specific country pairs. In addition, the country pair distribution exhibits a slightly heavier left tail, suggesting that negative cash ETR effects occur more frequently among country pairs than single countries.

In Figure 4B, we report the mean and median absolute values of the cash ETR coefficient estimates for the single country and country pair indicators. Both the mean and median absolute cash ETR effects for country pairs are approximately two times larger than for the single countries. These figures suggest that country pairs not only produce more dispersed tax effects (as shown in Figure 4A) but also systematically generate larger effects on firms' cash tax burdens (Figure 4B). Collectively, these results are consistent with our prediction that locating subsidiaries in combinations of countries generates larger effects on MNCs' tax burdens than locating a subsidiary in a singular haven or non-haven country.

4.3 Supplemental Results: Time Period Analysis

The tax landscape for U.S. firms significantly changed during our sample period. As such, we next estimate the country and country pair regressions over three unique sample periods to explore which countries and country pairs are associated with lower cash ETRs when incentives and opportunities for tax avoidance vary.

The first period, 1994 to 2003, is intended to capture the years in which tax shelters were a prominent tax avoidance strategy among U.S. MNCs.¹⁹ A corporate tax shelter is broadly defined as any plan or arrangement primarily designed to avoid or evade federal income tax without exposure to economic risk or loss (Wilson, 2009). While tax shelters can involve foreign subsidiaries, many abusive tax shelters were purely domestic or used offshore entities in name

¹⁹ We chose 2003 as the endpoint of the tax shelter sample period because the legislative activity around tax shelters increased substantially in 2003 when KPMG tax shelters came under scrutiny (PBS Frontline, 2004). Further, the criminal indictment against KPMG for tax shelter fraud covered the period from 1996 to 2003 (IRS, 2005).

only to create artificial tax benefits (Wilson, 2009; Lisowsky, 2010). Additionally, during much of this period, the U.S. statutory tax rate was lower than that of many foreign countries, and some firms may even have had an incentive to shift profits into the U.S. Thus, we anticipate that U.S. MNCs' use of foreign subsidiaries to reduce tax burdens differs during this first period.

The second period, 2004 to 2017, is intended to capture the years in which outbound income shifting among U.S. MNCs was a popular tax avoidance strategy. During this period, the top corporate statutory rate in the U.S. was 35 percent, making it one of the highest in the world.²⁰ This high rate created both the opportunity and the incentive for U.S. firms to shift income outside of the U.S to reduce their overall tax burden, which we expect increases the importance of foreign subsidiaries for tax avoidance.

The third period, 2019 to 2023, covers the years after the Tax Cuts and Jobs Act (TCJA) was effective. We exclude 2018 from the post-TCJA period because U.S. MNCs' effective tax rates were distorted due to the one-time transition tax on previously untaxed foreign earnings.²¹ Because TCJA reduced the top corporate tax rate in the U.S. to 21 percent, it became more comparable with the rest of the world. As such, we expect that U.S. MNCs' incentives to shift income out of the U.S. changed during this period, which may change their use of foreign subsidiaries to reduce their overall tax burdens.

4.3.1 Countries with the Largest Negative Cash ETR Effect by Time Period

First, we re-estimate the country indicator regression across the three specific time periods. Table 6 presents the results for the 1994-2003 period in Panel A, the 2004-2017 period in Panel B, and the 2019-2023 period in Panel C.

²⁰ In 2017, the U.S. had the fourth-highest marginal corporate income tax rate in the world at 38.91 percent while the worldwide average at the time was 22.96 percent (Jahnsen and Pomerleau, 2017).

²¹ Other studies in finance and accounting that examine the effects of TCJA exclude 2018 from the post-TCJA period (e.g., Crawford and Markarian, 2024).

In Panel A, we find that Israel is the only country with a significant negative cash ETR effect. Two tax havens, Ireland and Costa Rica, appear in the top ten during this period, but their coefficients are statistically insignificant. The lack of significant results here is consistent with U.S. MNCs using tax shelters to reduce their tax burdens, which often did not involve foreign subsidiaries. In Panel B, we find that Ireland has the most significant negative cash ETR effect. We also document a significant negative cash ETR effect for Australia, Hong Kong, and Italy. The increase in the number of significant country indicators from Panel A is consistent with U.S. MNCs using foreign subsidiaries, specifically tax havens (i.e., Ireland and Hong Kong), to shift income out of the U.S. when the domestic tax rate was high. The rest of the top ten are a mix of the “Top 7” most used tax havens (Singapore and the Netherlands) and non-haven countries (Thailand, India, Belgium, and Argentina).

Finally, turning to the period post-TCJA in Panel C, we see that Ireland and Hong Kong fall out of the top ten completely. During this period, the only tax havens appearing on the list are Singapore and the Cayman Islands. Interestingly, Israel returns to the top of the list, followed by Chile, France, and Portugal. Notably, Hungary, Japan, Australia, and the Cayman Islands, which all appeared with statistically significant coefficients in Table 3, are in the top ten for the post-TCJA period, but with statistically insignificant coefficients. Collectively, these results illustrate how operating in different countries has a different effect on U.S. MNCs’ tax burdens across time.

4.3.2 Country Pairs with the Largest Negative Cash ETR Effect by Time Period

Next, we re-estimate the country pair regressions across three specific periods. Table 7 presents the results for the 1994-2003 period in Panel A, the 2004-2017 period in Panel B, and the 2019-2023 period in Panel C.

Across all country pairs, the top pair in Panel A is the U.K.-Israel, followed by Austria-Ireland and Indonesia-Mexico. In addition to Austria-Ireland, two other haven pairs are in the top ten for the 1994 to 2003 period: Hong Kong-Sweden and Switzerland-Netherlands. In Panel B, Belgium-Netherlands tops the list, followed by Austria-Italy and Ireland-Philippines. The only other haven pair in the top ten during the 2004 to 2017 period is Germany-Singapore. Finally, in Panel C, the top three pairs are Canada-Norway, U.K.-Thailand, and Chile-Singapore. The two other haven pairs are Spain-Ireland and Malaysia-Taiwan. Interestingly, when looking at all country pairs, there is no overlap in the top ten pairs across all three periods.

Among the subset OECD-haven country pairs in Panel A, Switzerland appears in four of the top ten pairs with the Netherlands, Chile, Japan, and Portugal. Ireland and Hong Kong appear in two pairs, while Singapore only appears in one pair. In contrast, Switzerland appears just once in Panels B and C, suggesting a decrease in importance for reducing cash ETRs over time. Meanwhile, Singapore's importance in reducing cash ETRs appears to increase as it appears in three of the top ten OECD-haven pairs in Panel B and jumps to five of the top ten OECD-haven pairs in Panel C. Singapore is the only haven to appear more than once in Panel C, suggesting its continued usefulness even after the U.S. tax rate decreased post-TCJA. Additionally, none of the top OECD-haven pairs in Panel A repeat. However, four of the OECD-haven pairs overlap between Panels B and C: Germany-Singapore, Malaysia-Netherlands, Portugal-Singapore, and Belgium-Switzerland.

4.4 Supplemental Results: Primary Geographic Sales Segment Analysis

Motivated by the significance of the OECD-haven pairs, for our second supplemental analysis, we explore whether the cash ETR effect of haven countries and haven country pairs varies based on where U.S. MNCs have most of their foreign sales. To do this, we use the Compustat

Historical Segments file, which reports sales by geographic segment. Because firms have discretion in reporting geographic segments, we first aggregate their reported segments into six continent-level segments: Asia-Pacific, Australia-Oceania, Europe, Middle East/Africa, North America, and South America. Then, we identify which continent-level segment has the largest aggregate sales for each firm-year observation. Unsurprisingly, the majority of U.S. MNC firm-years report the largest number of foreign sales in the Asia-Pacific and European segments (untabulated).

As we are interested in the potential interaction between foreign OECD-haven pairs, we do not examine the North American subset. Additionally, we do not have enough firm-year observations for the other continent-level segments (i.e., Australia-Oceania, Middle East/Africa, and South America) to reliably estimate the country and country pair effects. As such, we only present the country indicator and country pair indicator regression results for MNCs whose primary geographic segments by sales are in Asia-Pacific or Europe.

4.4.1 Haven Countries with the Largest Negative Cash ETR Effect

Table 8 presents the results when re-estimating the country indicator regression for the sample of MNCs with the majority of foreign sales in Asia-Pacific (Panel A) and Europe (Panel B). In Panel A, the tax havens with the most significant negative cash ETR effect are Singapore, the Cayman Islands, and Ireland. Hong Kong also has a negative but statistically insignificant cash ETR effect. In Panel B, the only tax haven with a significant negative cash ETR effect is Singapore. Ireland, Bermuda, Malaysia, and the Cayman Islands also have negative but statistically insignificant cash ETR effects. This analysis suggests that Singapore plays an important role in lowering U.S. MNCs' overall tax burdens, regardless of where the majority of their foreign sales

occur. This contrasts with the other tax havens, which vary in significance across the two geographic segment groups.

4.4.2 Haven Country Pairs with the Largest Negative Cash ETR Effect

Table 9 presents the results when re-estimating the country pair indicator regression for the sample of MNCs with the majority of foreign sales in Asia-Pacific (Panel A) and Europe (Panel B). In Panel A, the top three haven pairs are Canada-Hong Kong, Chile-Ireland, and Malaysia-New Zealand. Ireland also appears in the top ten with the Philippines and Austria. Singapore appears twice, with Australia and with Switzerland. Interestingly, Singapore-Switzerland is the only double haven country pair appearing in the top ten for any of our analyses. In Panel B, the top three haven pairs are Malaysia-Netherlands, Belgium-Malaysia, and Brazil-Switzerland. Switzerland also appears in three additional pairs with Australia, India, and Austria. In contrast to the Asia-Pacific subset, Singapore only appears once in a pair with Canada. The only overlap in the top ten haven pairs across the two subsets is Chile-Ireland.

4.5 Additional Descriptive Results

4.5.1 Industry Affiliation of Top 10 Country Pairs by Cash ETR Effect

To provide more insight into country pairs with the largest cash ETR effects per Table 4, we examine their Fama-French 10 industry affiliation. Table 10 presents the results. Across the full sample period, manufacturing and high-tech are the most common industry affiliations for firms with country pairs or OECD-haven pairs in the top ten by cash ETR. These descriptives are consistent with foreign countries often providing manufacturing and research and development-related tax incentives to boost investment in their jurisdiction. For example, Singapore offers a “Pioneer Tax Incentive” for corporations manufacturing high-technology products, a “Development and Expansion Incentive” for corporations engaging in high-value-added projects,

and an “Intellectual Property Development Incentive” for intellectual property arising from research and development activities, among a multitude of others (PwC, 2025).

4.5.2 Top 10 Most Frequently Appearing Countries across All Country Pairs

Finally, we identify which countries appear most frequently across all country pairs and explore the characteristics of the countries they are paired with. Specifically, we calculate the percentage of times each of these countries appears in a pair with a haven country, a dot haven country, and an OECD country. We also calculate the percentage of times these countries appear in pairs with a significant negative cash ETR effect per Table 4. Table 11 presents these results for all countries (Panel A) and only tax haven countries (Panel B).

In both Panels A and B, Singapore tops the list, appearing in 57 unique country pairs. Notably, Singapore appears 12 percent of the time with another haven country, but 79 percent of the time with an OECD country. Across all countries, the two countries following Singapore are Thailand and the Netherlands, which appear in 54 and 52 unique country pairs, respectively. Consistent with firms using the Netherlands in conjunction with tax havens to shift income, the Netherlands has the highest percentage of appearances with a tax haven country at 23 percent and a dot haven country at 12 percent.

However, the Netherlands only appears in a pair with a significant negative cash ETR effect four percent of the time, which is the lowest rate among the top ten. The next two countries with the highest percentage of appearances with a tax haven country are Taiwan (21 percent) and New Zealand (18 percent). Interestingly, these two countries appear in pairs with a significant cash ETR effect 21 and 20 percent of the time, respectively, which are the highest rates among the top ten. This contrast between the Netherlands and Taiwan or New Zealand highlights the nuanced relationship between tax haven usage and lower tax burdens.

When only looking at tax haven countries in Panel B, the top three countries across the full sample period are Singapore, Malaysia, and Hong Kong. Again, this analysis highlights the importance of Asian tax havens in the corporate structure of U.S. MNCs. Another notable result is related to the Cayman Islands, which only appear in 13 unique country pairs. A staggering 38 percent of the country pairs with the Cayman Islands have a significant negative cash ETR effect. The next largest rates among the tax haven countries are Ireland at 13 percent and Hong Kong at 11 percent. This illustrates the continued use of the Cayman Islands in reducing tax burdens despite appearing less frequently than other tax havens.

4.5.3 Prevalence of Tax Treaties Among Country Pairs with Cash ETR Effect

The prevalence of non-haven country pairs among the pairs with the largest negative impact on firms' Cash ETRs is somewhat surprising and naturally raises the question of whether these pairs have this impact because of tax treaties between the countries. We investigate whether this is the case using cross-sectional bilateral treaty data from Pellegrino et al. (2025), which report treaties in existence as of 2017. These treaties offer reduced withholding tax rates on dividends or interest that can be one- or two-sided within the country pair. For example, if Country A provides Country B with a reduced withholding rate, but Country B does not provide Country A with a reduced withholding rate, we denote the pair of Country A and Country B as having a "single" treaty. If Country B also provides Country A with a reduced withholding rate, then we denote the pair of Country A and Country B as having a "dual" treaty. We summarize the number of country pairs with single or dual tax treaties by significant cash ETR effect and treaty type (i.e., reduced dividend and/or interest withholding rates) in Table 12.

In Panel A, we summarize country pairs by single tax treaty status. First, we note that the prevalence of treaties in general is quite high. Of the 583 country pairs in our full sample analysis,

539 country pairs (approximately 92.5 percent) have at least a single treaty for either dividends or interest. Among the 51 country pairs with a significant negative effect on cash ETRs, 45 of them have a single dividend or interest treaty, representing 88.2 percent of the significant pairs. However, among the 532 pairs that are not negatively associated with cash ETRs, 92.9 percent have a single dividend or interest treaty.

In Panel B, we summarize country pairs by dual tax treaty status. We find that 392 of the 583 country pairs (approximately 67.2 percent) have a dual dividend or interest treaty in place. Of the 51 pairs with a significant, negative cash ETR effect, 28 have a dual dividend or interest treaty, representing 54.9 percent of the significant pairs. However, among the 532 pairs that are not negatively associated with cash ETRs, 68.4 percent have a dual dividend or interest treaty. Thus, like the single treaty analysis, there appears to be a higher percentage of tax treaties among country pairs that are *not* associated with lower tax rates than country pairs that are associated with lower tax rates.

Because most country pairs have a tax treaty between them, this distinction is likely not useful for researchers or tax authorities. However, we acknowledge that some treaties may be sufficiently advantageous, or associated with other tax benefits, such that they are the cause of some country pairs' association with lower tax rates. As such, we conduct a similar analysis (untabulated), partitioning the country pairs on the most tax advantageous treaties based on the percentage of tax savings provided by the treaty. Consistent with the results in Table 12, we find that these “super” treaties are not disproportionately present among the country pairs that have a significant, negative association with cash ETRs. Collectively, this analysis suggests that the mere existence of a tax treaty is likely not an indication that operating in a particular combination of countries will generate significant tax savings.

V. Conclusion

In this study, we take a deliberately broad and descriptive approach to ‘let the data speak’ about how the global organizational structures of U.S. MNCs are associated with their overall tax burdens. Rather than imposing ex ante classifications of tax havens or focusing on a narrow set of causal channels, we quantify and contextualize how the presence of subsidiaries in individual countries and pairs of countries relates to U.S. MNCs’ cash effective tax rates. By directly examining both single-country and country pair effects, we provide evidence that the tax benefits of foreign operations extend beyond traditional tax havens and are amplified when foreign jurisdictions are considered jointly rather than in isolation.

When comparing our country and country pair results, we find that having a subsidiary in a top country pair lowers cash ETRs by three times more than having a subsidiary in a top country. Additionally, our country pair results suggest that non-tax haven countries' effect on tax burdens often occurs in firms that concurrently locate subsidiaries in tax haven countries. However, we also find that country pairs involving two large, non-haven countries are significantly associated with lower cash effective tax rates. Our analyses demonstrate that the cumulative effects of treaties, credits, exemptions, and trade agreements across countries can create tax outcomes that are not apparent when each jurisdiction is viewed in isolation. At the same time, the prevalence of tax treaties among country pairs not associated with lower tax burdens implies that no single institutional feature is sufficient to identify country pairs that generate large tax savings.

Additionally, our analyses highlight the importance of analyzing the corporate structures of U.S. MNCs without restricting attention to a pre-determined set of “tax haven” countries. While our country-level results confirm the importance of these well-known tax haven countries, like Ireland, Singapore, and the Cayman Islands, in reducing cash effective tax rates, our results also

suggest that less tax-friendly countries, like Australia, Japan, and Germany, are also associated with lower cash effective tax rates. These findings emphasize the importance of looking beyond pre-determined tax haven countries when examining the tax outcomes of U.S. MNCs.

Collectively, our findings suggest new avenues for research and policy. For academics, our results provide a foundation for future research that can more narrowly examine the specific legal, institutional, and strategic mechanisms through which particular country combinations generate tax savings for multinational firms. For policymakers, our results offer new evidence on the combinations of jurisdictions that amplify tax planning opportunities, enabling more informed international tax policy and enforcement. By documenting the observed total effects of U.S. MNCs' global organizational structures on tax burdens, our study makes a first step toward a more comprehensive understanding of how multinational firms exploit the global tax system to shift profits and reduce taxes.

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Appendix A
Sample Selection

Compustat firm-years between 1994 and 2023	242,639
Less:	
Observations for Non-U.S. Firms	(33,737)
Observations where Total Assets is less than \$10 million	(30,685)
Observations with missing or negative Retained Earnings	(79,560)
Observations where 3-year cumulative pre-tax income is negative	(14,688)
Observations where Cash & GAAP ETR are below zero or above 1	(18,862)
Observations missing historical SIC code	(902)
Observations missing control variables	(3,793)
Number of firm-years for main analyses	<u>60,412</u>
Non-multinational firm-years	38,974
Multinational firm-years	21,438

Appendix B
Variable Definitions
Definition

Variable

Source

Dependent Variables

<i>Cash_ETR</i>	Cash taxes paid, divided by pretax income minus special items (TXPD / (PI - SPI)). It is truncated at [0, 1].	Compustat
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Independent Variables

<i>Country Indicators</i>	A vector of indicator variables equal to 1 if the firm has subsidiary operations in that country that year, and 0 otherwise.	WRDS Exhibit 21 Subsidiary Data
<i>Country-Pair Indicators</i>	A vector of indicator variables equal to 1 if the firm has subsidiary operations in that country-pair that year, and 0 otherwise.	WRDS Exhibit 21 Subsidiary Data

Control Variables

<i>Change_NOL</i>	Change in tax loss carried forward (TLCF) from prior year divided by lagged total assets (AT). Missing values for TLCF are set to zero. It is winsorized at the 1st and 99th percentiles.	Compustat
<i>DEFINC</i>	An indicator variable equal to 1 if deferred revenue (DRC + DRLT) is non-zero, and 0 otherwise.	Compustat
<i>DQ</i>	The number of (non-missing) items in Compustat per Chen, Miao, and Shelvin (2015).	Compustat
<i>EQ</i>	The absolute value of equity in earnings (loss) (ESUB) divided by the absolute value of income (IB). Missing values are set to zero. It is winsorized at the 1st and 99th percentiles.	Compustat
<i>FI</i>	Foreign pretax income (PIFO) divided by total sales (SALE). Missing values are set to zero. It is winsorized at the 1st and 99th percentiles.	Compustat
<i>INTAN</i>	Intangible assets (INTAN) divided by lagged total assets (AT). Missing values are set to zero. It is winsorized at the 1st and 99th percentiles.	Compustat
<i>LEV</i>	Long-term debt (DLTT) divided by total assets (AT). Negative values and missing values for DLTT are set to zero. It is winsorized at the 1st and 99th percentiles.	Compustat
<i>MEZZ</i>	Convertible debt and preferred stock (DCPSTK) divided by lagged total assets (AT). Missing values are set to zero. It is winsorized at the 1st and 99th percentiles.	Compustat
<i>MTB</i>	The natural logarithm of the ratio of market capitalization (PRCC_F * CSHO) to cost of equity (CEQ).	Compustat
<i>NOL</i>	An indicator variable equal to 1 if tax loss carry-forward (TLCF) is non-zero, and 0 otherwise. Missing values for TLCF are set to zero.	Compustat
<i>NUM_COUNTRIES</i>	The natural logarithm of one plus the number of countries included in Exhibit 21.	WRDS Exhibit 21 Subsidiary Data
<i>ROA</i>	Pre-tax income (PI) divided by lagged total assets (AT). It is winsorized at the 1st and 99th percentiles.	Compustat
<i>SIZE</i>	The natural logarithm of total assets (AT).	Compustat
<i>STOCK</i>	An indicator variable equal to 1 if stock compensation expense (STKCO) is non-zero, and 0 otherwise.	Compustat

Figure 1
Sample Distribution of U.S. Firms by Multinational Status and Tax Haven Usage

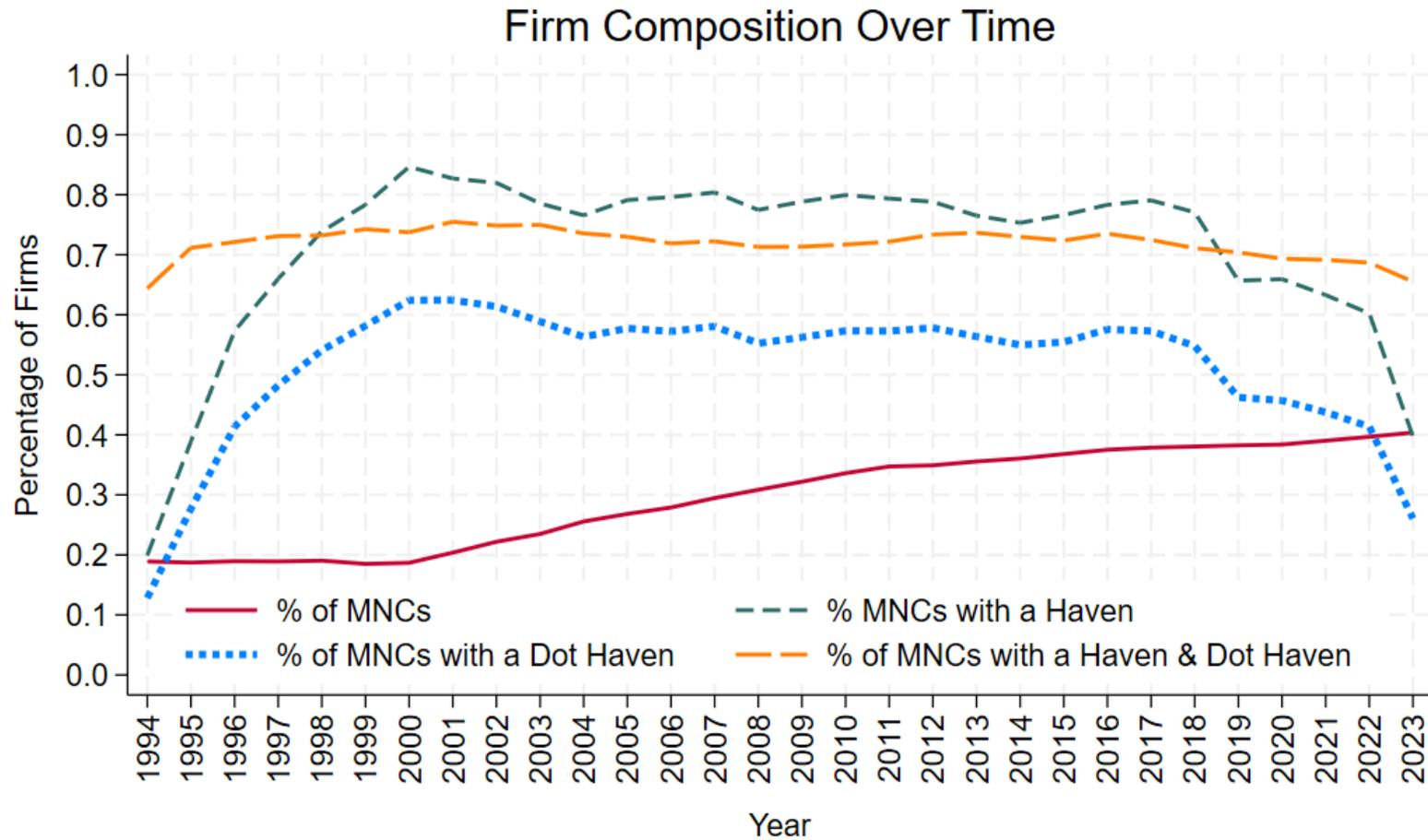


Figure 1 displays the composition of U.S. firms with total assets greater than \$10 million between 1994 and 2023. The solid (red) line shows the percentage of U.S. firms we identified as multinational corporations (MNCs). We identify MNC firm-years as those with non-missing, non-negative pre-tax foreign income in Compustat. The medium-dash (green) line shows the percentage of MNC firms that report a tax haven per Law and Mills (2022) in Exhibit 21 of their annual 10-K report. The short-dash (blue) line shows the percentage of MNC firms that report a dot haven per Law and Mills (2022) in Exhibit 21 of their annual 10-K report. The long dash (orange) line shows the percentage of MNC firms that report both a tax haven and a dot haven per Law and Mills (2022) in Exhibit 21 of their annual 10-K report.

Figure 2
Effective Tax Rate Trends for U.S. Firms by Multinational Status

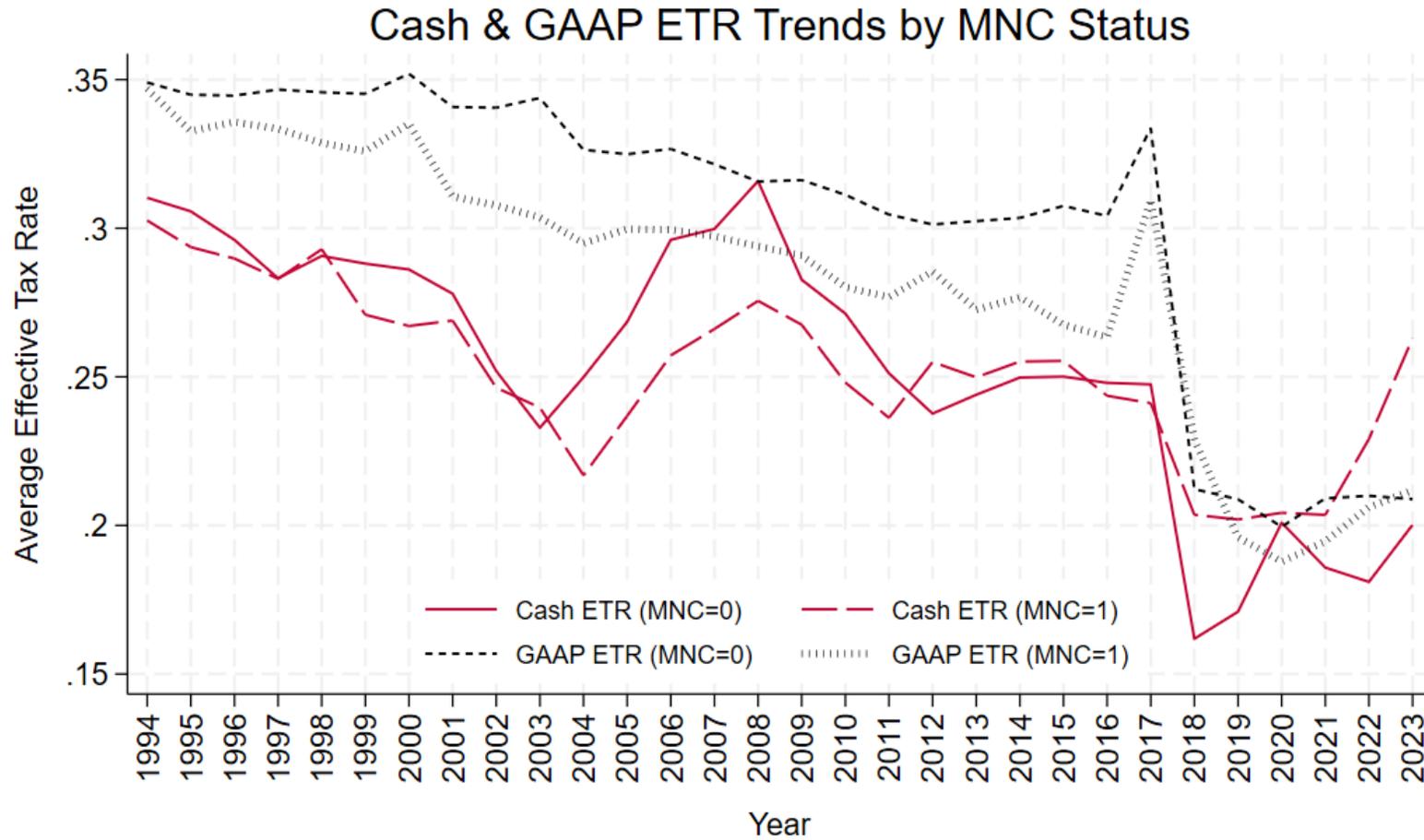


Figure 2 displays the average cash and GAAP effective tax rates (ETRs) for U.S. firms meeting all sample restrictions from 1994 and 2023 by their multinational status. Cash ETR is calculated as cash taxes paid, divided by pretax income minus special items and is truncated at [0, 1]. GAAP ETR is calculated as total tax expense, divided by pretax income minus special items and is truncated at [0, 1]. We identify MNC firm-years as those with non-missing, non-negative pre-tax foreign income in Compustat. The solid (red) line shows average Cash ETR for non-MNC firms. The long-dash (red) line shows average Cash ETR for MNC firms. The short-dash (black) line shows average GAAP ETR for non-MNC firms. The dotted (black) line shows average GAAP ETR for MNC firms.

Figure 3

Effective Tax Rate Trends for U.S. Multinational Firms by Tax Haven Use

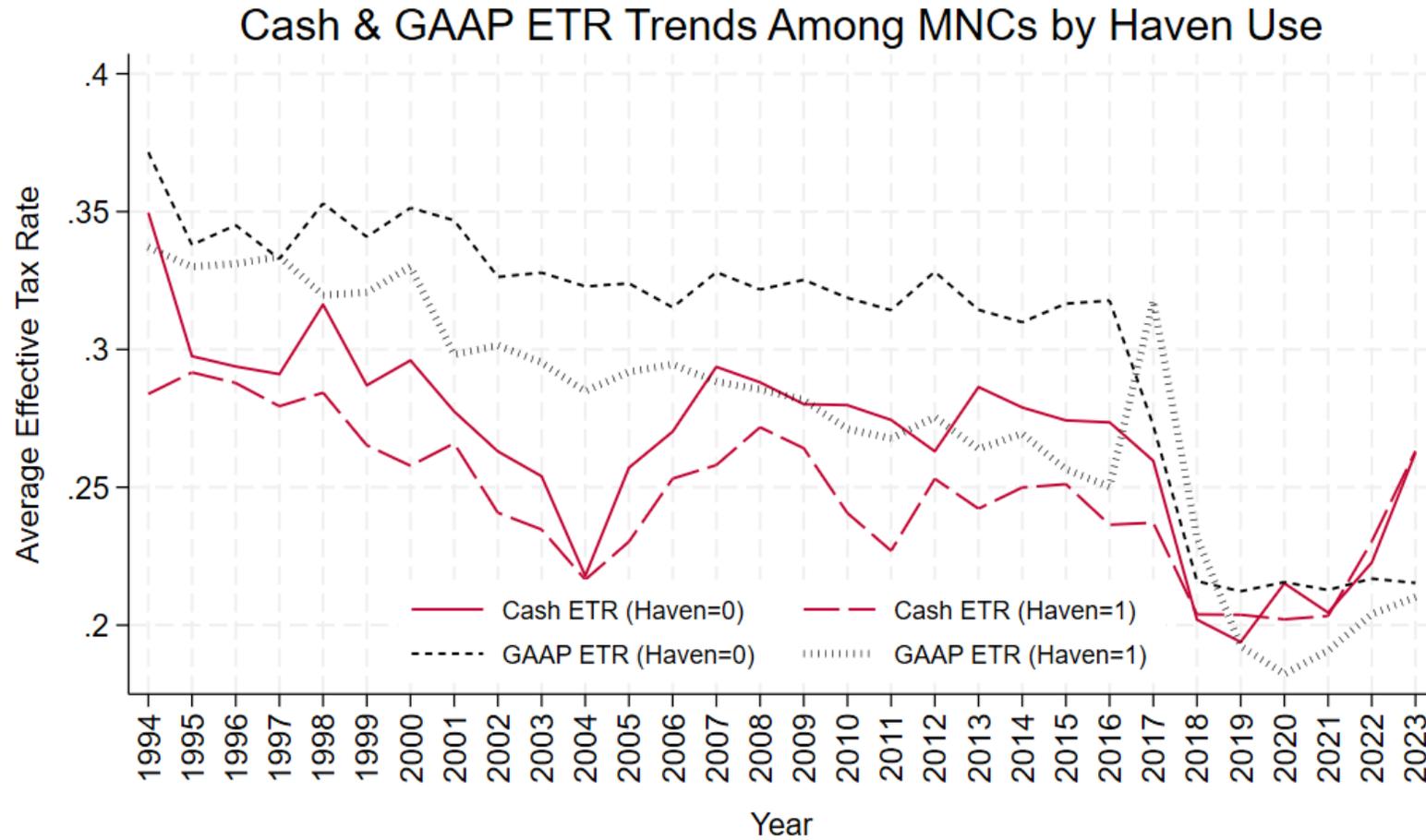
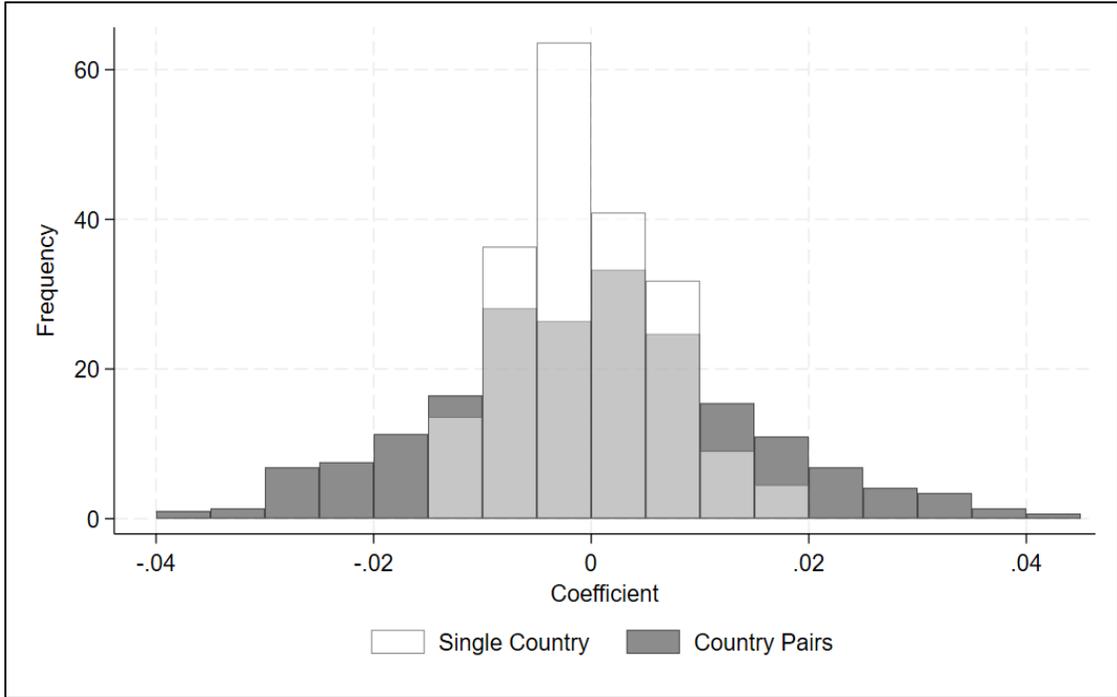


Figure 3 displays the average cash and GAAP effective tax rates (ETRs) for U.S. multinational firms meeting all sample restrictions from 1994 and 2023 by reported use of tax havens. Cash ETR is calculated as cash taxes paid, divided by pretax income minus special items and is truncated at [0, 1]. GAAP ETR is calculated as total tax expense, divided by pretax income minus special items and is truncated at [0, 1]. We identify MNC firm-years as those with non-missing, non-negative pre-tax foreign income in Compustat. We identify MNCs as users of tax havens if they report a tax haven country per Law and Mills (2022) in Exhibit 21 of their annual 10-K report. The solid (red) line shows average Cash ETR for non-haven MNC firms. The long-dash (red) line shows average Cash ETR for haven MNC firms. The short-dash (black) line shows average GAAP ETR for non-haven MNC firms. The dotted (black) line shows average GAAP ETR for haven MNC firms.

Figure 4
Country vs Country Pair Cash ETR Effect Size (1994-2023)

4A: Distribution of Country and Country Pair Cash ETR Effect Size



4B: Mean (Median) Country and Country Pair Cash ETR Effect Size

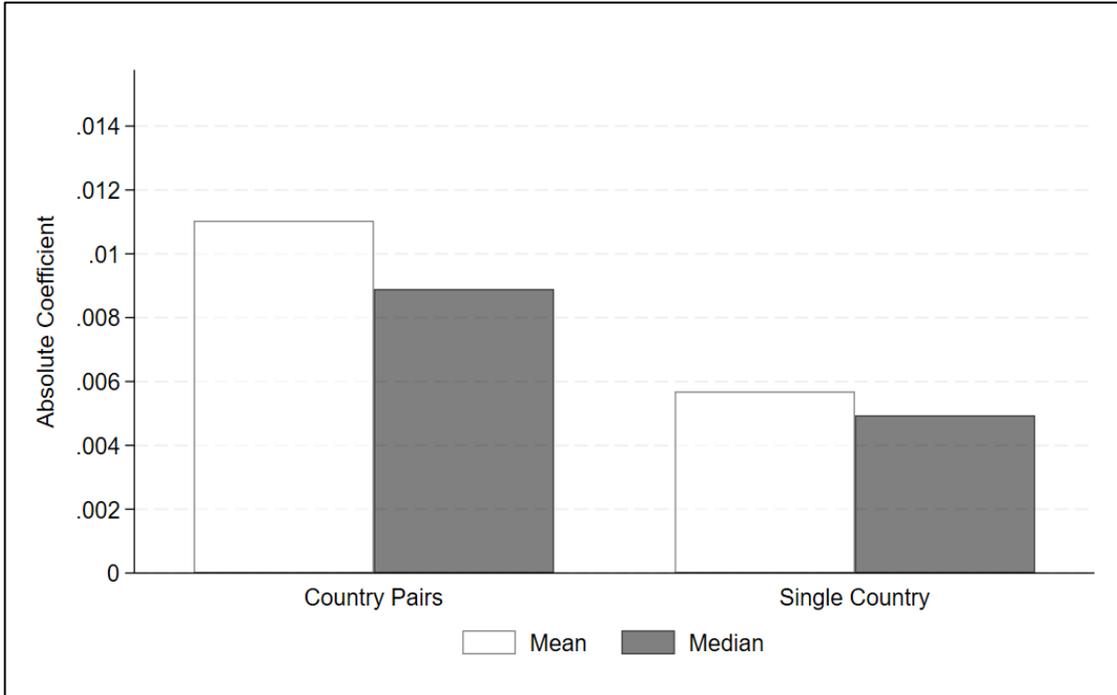


Figure 4A presents the distributions of the cash ETR effects for single countries and country pairs using the signed coefficients from the country and country pair regressions summarized in Tables 3 and 4, respectively. Figure 4B presents the mean and median cash ETR effect for single countries and country pairs using the absolute value of the coefficients from the country and country pair regressions summarized in Tables 3 and 4, respectively.

Table 1
Top 10 Most Frequently Appearing Countries (1994-2023)

Panel A: All Countries

Rank	Country	Total Frequency	Average Yearly Frequency
1	UNITED KINGDOM	12,814	427
2	CANADA	11,538	385
3	GERMANY	9,329	311
4	NETHERLANDS	9,031	301
5	FRANCE	8,501	283
6	CHINA	8,010	267
7	MEXICO	7,649	255
8	AUSTRALIA	7,508	250
9	† SINGAPORE	7,189	240
10	† HONG KONG	6,961	232

Panel B: Haven Countries

Rank	Country	Total Frequency	Average Yearly Frequency
1	SINGAPORE	7,189	240
2	HONG KONG	6,961	232
3	SWITZERLAND	5,668	189
4	IRELAND	4,917	164
5	MALAYSIA	4,039	135
6	LUXEMBOURG	3,788	126
7	CAYMAN ISLANDS	3,269	109
8	BERMUDA	2,783	93
9	BARBADOS	2,147	72
10	MAURITIUS	1,561	52

Table 1 reports the ten countries with the highest total and average yearly frequency. The sample period is from 1994 to 2023. Panel A reports the top ten countries across all countries. Panel B reports the top ten countries among a subset of haven countries. A country is classified as a haven country if it is designated a tax haven per Law and Mills (2022). † Denotes a tax haven country pair per Law and Mills (2022).

Table 2
Top 10 Most Frequently Appearing Country Pairs (1994-2023)

Panel A: All Country Pairs

Rank	Country Pair	Total Frequency	Average Yearly Frequency
1	CANADA-UNITED KINGDOM	9,433	314
2	GERMANY-UNITED KINGDOM	8,580	286
3	UNITED KINGDOM-NETHERLANDS	8,103	270
4	FRANCE-UNITED KINGDOM	7,895	263
5	CANADA-GERMANY	7,490	250
6	GERMANY-FRANCE	7,348	245
7	CANADA-NETHERLANDS	7,294	243
8	CHINA-UNITED KINGDOM	7,056	235
9	CANADA-FRANCE	7,012	234
10	GERMANY-NETHERLANDS	6,958	232

Panel B: OECD-Haven Country Pairs

Rank	Country Pair	Total Frequency	Average Yearly Frequency
1	† UNITED KINGDOM-SINGAPORE	6,661	222
2	† UNITED KINGDOM-HONG KONG	6,208	207
3	† CANADA-SINGAPORE	5,813	194
4	† GERMANY-SINGAPORE	5,769	192
5	† CANADA-HONG KONG	5,570	186
6	† NETHERLANDS-SINGAPORE	5,561	185
7	† FRANCE-SINGAPORE	5,386	180
8	† SWITZERLAND-UNITED KINGDOM	5,289	176
9	† GERMANY-HONG KONG	5,200	173
10	† AUSTRALIA-SINGAPORE	5,005	167

Table 2 reports the ten country-pairs with the highest total and average yearly frequency. The sample period is from 1994 to 2023. Panel A reports the top ten country pairs across all country pairs. Panel B reports the top ten country pairs among a subset of OECD-haven country pairs. A country pair is classified as an OECD-haven pair if one country in the pair is designated a tax haven per Law and Mills (2022), and the other country is an OECD member. † Denotes a tax haven country pair per Law and Mills (2022).

Table 3

Top 10 Countries with Largest Negative Cash ETR Effect (1994-2023)

Panel A: All Countries

Rank	Country	Cash ETR Effect	T-Stat
1	† IRELAND	-1.36% ***	-3.36
2	† SINGAPORE	-1.35% ***	-3.29
3	† CAYMAN ISLANDS	-1.18% ***	-2.61
4	AUSTRALIA	-1.00% **	-2.35
5	JAPAN	-0.90% **	-2.06
6	HUNGARY	-0.97% *	-1.77
7	ISRAEL	-0.90%	-1.62
8	THAILAND	-0.77%	-1.55
9	PHILIPPINES	-0.68%	-1.34
10	ITALY	-0.62%	-1.31

Panel B: Haven Countries

Rank	Country	Cash ETR Effect	T-Stat
1	† IRELAND	-1.36% ***	-3.36
2	† SINGAPORE	-1.35% ***	-3.29
3	† CAYMAN ISLANDS	-1.18% ***	-2.61
15	† HONG KONG	-0.32%	-0.84
16	† COSTA RICA	-0.49%	-0.76
24	† BERMUDA	-0.14%	-0.30
33	† MALAYSIA	0.32%	0.69
35	† SWITZERLAND	0.45%	1.02

Table 3 reports a summary of the country indicator regression results. Panel A reports the country indicators with the top ten most negative t-statistics when regressing the cash effective tax rate on the country indicator variables. Panel B reports the ranking for all the haven country indicators in order of the smallest (i.e., most negative) t-statistic. The sample period is from 1994 to 2023. The amounts reported under "Cash ETR Effect" are the resulting ordinary least squares coefficient estimates multiplied by 100. Each observation is at the firm-year level. Standard errors are clustered at the firm level. † Denotes a tax haven country per Law and Mills (2022). ***, **, * Indicate statistical significance at the 1 percent, 5 percent, and 10 percent levels for two-tailed tests, respectively.

Table 4
Top 10 Country Pairs with Largest Negative Cash ETR Effect (1994-2023)

Panel A: All Country Pairs

Rank	Country Pair	Cash ETR Effect	T-Stat
1	† SINGAPORE-TAIWAN	-3.83% ***	-3.37
2	AUSTRALIA-SOUTH KOREA	-2.76% ***	-2.82
3	BELGIUM-NETHERLANDS	-2.54% ***	-2.75
4	BELGIUM-FINLAND	-3.84% ***	-2.74
5	† AUSTRALIA-CAYMAN ISLANDS	-2.59% ***	-2.71
6	ARGENTINA-SOUTH AFRICA	-2.73% ***	-2.70
7	† CHILE-IRELAND	-2.59% ***	-2.67
8	† IRELAND-PHILIPPINES	-2.88% ***	-2.66
9	† AUSTRALIA-MALAYSIA	-2.79% ***	-2.64
10	† GERMANY-SINGAPORE	-2.50% ***	-2.62

Panel B: OECD-Haven Country Pairs

Rank	Country Pair	Cash ETR Effect	T-Stat
1	† AUSTRALIA-CAYMAN ISLANDS	-2.59% ***	-2.71
2	† CHILE-IRELAND	-2.59% ***	-2.67
3	† AUSTRALIA-MALAYSIA	-2.79% ***	-2.64
4	† GERMANY-SINGAPORE	-2.50% ***	-2.62
5	† DENMARK-HONG KONG	-2.25% **	-2.18
6	† MALAYSIA-NEW ZEALAND	-1.94% *	-1.84
7	† UNITED KINGDOM-IRELAND	-1.57% *	-1.77
8	† FINLAND-HONG KONG	-2.29% *	-1.76
9	† GERMANY-CAYMAN ISLANDS	-1.92% *	-1.71
10	† HUNGARY-SINGAPORE	-1.75%	-1.63

Table 4 reports a summary of the country pair regression results. Panel A (Panel B) reports the country pairs (OECD-haven country pairs) with the top ten most negative t-statistics when regressing the cash effective tax rate on the country pair indicator variables. A country pair is classified as an OECD-haven pair if one country in the pair is designated a tax haven per Law and Mills (2022), and the other country is an OECD member. The sample period is from 1994 to 2023. The amounts reported under "Cash ETR Effect" are the resulting ordinary least squares coefficient estimates multiplied by 100. Each observation is at the firm-year level. Standard errors are clustered at the firm level. † Denotes a tax haven country pair per Law and Mills (2022). ***, **, * Indicate statistical significance at the 1 percent, 5 percent, and 10 percent levels for two-tailed tests, respectively.

Table 5

Top 10 Countries vs Top 10 Country Pairs Average ETR Effect (1994-2023)

Panel A: All Countries to All Country Pairs

Rank	Country		Country Pair	
1	† IRELAND	-1.36%	† SINGAPORE-TAIWAN	-3.83%
2	† SINGAPORE	-1.35%	AUSTRALIA-SOUTH KOREA	-2.76%
3	† CAYMAN ISLANDS	-1.18%	BELGIUM-NETHERLANDS	-2.54%
4	AUSTRALIA	-1.00%	BELGIUM-FINLAND	-3.84%
5	JAPAN	-0.90%	† AUSTRALIA-CAYMAN ISLANDS	-2.59%
6	HUNGARY	-0.97%	ARGENTINA-SOUTH AFRICA	-2.73%
7	ISRAEL	-0.90%	† CHILE-IRELAND	-2.59%
8	THAILAND	-0.77%	† IRELAND-PHILIPPINES	-2.88%
9	PHILIPPINES	-0.68%	† AUSTRALIA-MALAYSIA	-2.79%
10	ITALY	-0.62%	† GERMANY-SINGAPORE	-2.50%
Average Cash ETR Effect		-0.97%	Average Cash ETR Effect	-2.90%

Panel B: Non-Haven Countries to Non-Haven Country Pairs

Rank	Country		Country Pair	
1	AUSTRALIA	-1.00%	AUSTRALIA-SOUTH KOREA	-2.76%
2	JAPAN	-0.90%	BELGIUM-NETHERLANDS	-2.54%
3	HUNGARY	-0.97%	BELGIUM-FINLAND	-3.84%
4	ISRAEL	-0.90%	ARGENTINA-SOUTH AFRICA	-2.73%
5	THAILAND	-0.77%	ARGENTINA-MEXICO	-3.09%
6	PHILIPPINES	-0.68%	BELGIUM-MEXICO	-2.57%
7	ITALY	-0.62%	AUSTRIA-NEW ZEALAND	-2.64%
8	SWEDEN	-0.52%	SPAIN-THAILAND	-2.88%
9	PORTUGAL	-0.50%	NEW ZEALAND-SOUTH AFRICA	-2.53%
10	INDIA	-0.39%	CANADA-NEW ZEALAND	-3.00%
Average Cash ETR Effect		-0.72%	Average Cash ETR Effect	-2.86%

Table 5 reports the average cash effective tax rate effect for the top ten countries with the largest negative cash ETR effect per Table 3 and the top ten country pairs with the largest negative cash effective tax rate effect per Table 4. Panel A compares all top ten countries to all top ten country pairs. Panel B compares only the top ten non-haven countries to the top ten non-haven country pairs. The sample period is from 1994 to 2023. † Denotes a tax haven country or tax haven country pair per Law and Mills (2022).

Table 6

Top 10 Countries with Largest Negative Cash ETR Effect by Time Period

Panel A: Tax Shelter Period (1994 to 2003)

Rank	Country	Cash ETR Effect	T-Stat
1	ISRAEL	-2.08% *	-1.66
2	BRAZIL	-0.92%	-1.17
3	† IRELAND	-0.85%	-1.14
4	THAILAND	-1.08%	-1.11
5	† COSTA RICA	-1.64%	-1.10
6	TAIWAN	-1.04%	-1.08
7	POLAND	-0.95%	-0.97
8	AUSTRALIA	-0.64%	-0.92
9	FRANCE	-0.65%	-0.78
10	UNITED KINGDOM	-0.58%	-0.72

Panel B: Outbound Income Shifting Period (2004 to 2017)

Rank	Country	Cash ETR Effect	T-Stat
1	† IRELAND	-1.94% ***	-3.73
2	AUSTRALIA	-1.37% **	-2.43
3	† HONG KONG	-1.11% **	-2.18
4	ITALY	-1.16% *	-1.95
5	† SINGAPORE	-0.85%	-1.55
6	THAILAND	-1.04%	-1.49
7	INDIA	-0.77%	-1.41
8	NETHERLANDS	-0.70%	-1.34
9	BELGIUM	-0.82%	-1.31
10	ARGENTINA	-0.84%	-1.28

Panel C: Post U.S. Tax Rate Cut Period (2019 to 2023)

Rank	Country	Cash ETR Effect	T-Stat
1	ISRAEL	-2.77% ***	-3.27
2	† SINGAPORE	-2.06% ***	-2.72
3	CHILE	-2.21% **	-2.34
4	FRANCE	-1.39% *	-1.78
5	PORTUGAL	-1.55% *	-1.73
6	HUNGARY	-1.50%	-1.58
7	JAPAN	-1.22%	-1.49
8	AUSTRALIA	-1.01%	-1.34
9	† CAYMAN ISLANDS	-1.00%	-1.33
10	RUSSIA	-1.05%	-1.20

Table 6 reports the country indicators with the top ten most negative t-statistics when regressing the cash effective tax rate on the country indicator variables. The sample period for Panel A is from 1994 to 2003. The sample period for Panel B is from 2004 to 2017. The sample period for Panel C is from 2019 to 2023. The amounts reported under "Cash ETR Effect" are the resulting ordinary least squares coefficient estimates multiplied by 100. Each observation is at the firm-year level. Standard errors are clustered at the firm level. † Denotes a tax haven country per Law and Mills (2022). ***, **, * Indicate statistical significance at the 1 percent, 5 percent, and 10 percent levels for two-tailed tests, respectively.

Table 7

Top 10 Country Pairs with Largest Negative Cash ETR Effect by Time Period

Panel A: Tax Shelter Period (1994 to 2003)

Rank	Country Pair	Cash ETR		Rank	OECD-Haven Country Pair	Cash ETR	
		Effect	T-Stat			Effect	T-Stat
1	UNITED KINGDOM-ISRAEL	-4.45% ***	-4.50	1	† AUSTRIA-IRELAND	-8.48% ***	-4.18
2	† AUSTRIA-IRELAND	-8.48% ***	-4.18	2	† HONG KONG-SWEDEN	-5.49% ***	-3.27
3	INDONESIA-MEXICO	-12.62% ***	-3.80	3	† SWITZERLAND-NETHERLANDS	-5.98% ***	-3.03
4	† HONG KONG-SWEDEN	-5.49% ***	-3.27	4	† SWITZERLAND-CHILE	-7.58% ***	-2.79
5	INDIA-SWEDEN	-7.51% ***	-3.22	5	† SWITZERLAND-JAPAN	-4.55% **	-2.42
6	AUSTRIA-TAIWAN	-7.15% ***	-3.12	6	† HUNGARY-SINGAPORE	-5.60% **	-2.34
7	† SWITZERLAND-NETHERLANDS	-5.98% ***	-3.03	7	† CHILE-IRELAND	-5.04% **	-2.07
8	UNITED KINGDOM-NEW ZEALAND	-8.49% ***	-2.93	8	† SWITZERLAND-PORTUGAL	-5.80% **	-2.04
9	AUSTRIA-NORWAY	-6.81% ***	-2.92	9	† BELGIUM-HONG KONG	-3.71% **	-2.01
10	SOUTH KOREA-THAILAND	-6.58% ***	-2.91	10	† JAPAN-MALAYSIA	-3.83% *	-1.84

Panel B: Outbound Income Shifting Period (2004 to 2017)

Rank	Country Pair	Cash ETR		Rank	OECD-Haven Country Pair	Cash ETR	
		Effect	T-Stat			Effect	T-Stat
1	BELGIUM-NETHERLANDS	-4.28% ***	-3.37	1	† GERMANY-SINGAPORE	-3.80% ***	-3.09
2	AUSTRIA-ITALY	-5.21% ***	-3.35	2	† AUSTRALIA-MALAYSIA	-3.42% **	-2.55
3	† IRELAND-PHILIPPINES	-4.45% ***	-3.35	3	† AUSTRALIA-CAYMAN ISLANDS	-3.07% **	-2.37
4	NEW ZEALAND-SOUTH AFRICA	-4.44% ***	-3.17	4	† NORWAY-SINGAPORE	-3.48% **	-2.11
5	† GERMANY-SINGAPORE	-3.80% ***	-3.09	5	† UNITED KINGDOM-HONG KONG	-2.09% **	-2.05
6	BELGIUM-FINLAND	-4.93% ***	-2.86	6	† MALAYSIA-NETHERLANDS	-2.51% *	-1.92
7	BRAZIL-NORWAY	-5.51% ***	-2.77	7	† PORTUGAL-SINGAPORE	-2.95% *	-1.81
8	AUSTRIA-UNITED KINGDOM	-5.75% ***	-2.76	8	† IRELAND-MALAYSIA	-1.91% *	-1.77
9	SPAIN-PORTUGAL	-5.36% ***	-2.68	9	† SOUTH KOREA-MALAYSIA	-2.17% *	-1.76
10	SPAIN-ITALY	-3.37% ***	-2.64	10	† BELGIUM-SWITZERLAND	-2.13% *	-1.75

Table 7 (continued)
 Top 10 Country Pairs with Largest Negative Cash ETR Effect by Time Period

Panel C: Post U.S. Tax Rate Cut Period (2019 to 2023)

Rank	Country Pair	Cash ETR		Rank	OECD-Haven Country Pair	Cash ETR	
		Effect	T-Stat			Effect	T-Stat
1	CANADA-NORWAY	-21.62% ***	-4.40	1	† CHILE-SINGAPORE	-13.31% ***	-3.79
2	UNITED KINGDOM-THAILAND	-15.64% ***	-3.93	2	† SPAIN-IRELAND	-7.45% ***	-2.96
3	† CHILE-SINGAPORE	-13.31% ***	-3.79	3	† PORTUGAL-SINGAPORE	-9.82% **	-2.49
4	CANADA-HUNGARY	-16.75% ***	-3.37	4	† UNITED KINGDOM-SINGAPORE	-4.24% **	-2.49
5	SPAIN-TAIWAN	-12.44% ***	-3.21	5	† FRANCE-CAYMAN ISLANDS	-5.73% **	-2.34
6	DENMARK-ITALY	-10.82% ***	-3.00	6	† DENMARK-SINGAPORE	-6.81% **	-2.26
7	SPAIN-PHILIPPINES	-13.04% ***	-3.00	7	† MALAYSIA-NETHERLANDS	-6.38% **	-2.23
8	† SPAIN-IRELAND	-7.45% ***	-2.96	8	† SPAIN-HONG KONG	-6.20% **	-2.12
9	CANADA-CHILE	-7.01% ***	-2.88	9	† BELGIUM-SWITZERLAND	-5.25% **	-2.12
10	† MALAYSIA-TAIWAN	-6.86% ***	-2.85	10	† GERMANY-SINGAPORE	-4.45% **	-2.08

Table 7 reports the country pair indicators and OECD-haven country pair indicators with the top ten most negative t-statistics when regressing the cash effective tax rate on the country pair indicator variables. A country pair is classified as an OECD-haven country pair if one country in the pair is designated a tax haven per Law and Mills (2022), and the other country is an OECD member. The sample period for Panel A is from 1994 to 2003. The sample period for Panel B is from 2004 to 2017. The sample period for Panel C is from 2019 to 2023. The amounts reported under "Cash ETR Effect" are the resulting ordinary least squares coefficient estimates multiplied by 100. Each observation is at the firm-year level. Standard errors are clustered at the firm level. † Denotes a tax haven country pair per Law and Mills (2022). ***, **, * Indicate statistical significance at the 1 percent, 5 percent, and 10 percent levels for two-tailed tests, respectively.

Table 8

Haven Countries with Largest Negative Cash ETR Effect by Primary Geographic Segment (1994-2023)

Panel A: Asia-Pacific

Rank	Haven Country	Cash ETR Effect	T-Stat
1	SINGAPORE	-3.02% ***	-3.05
2	CAYMAN ISLANDS	-2.48% ***	-2.95
3	IRELAND	-2.48% ***	-2.87
4	HONG KONG	-0.09%	-0.10
5	SWITZERLAND	0.01%	0.01
6	BERMUDA	1.10%	0.97
7	MALAYSIA	1.09%	1.21
8	COSTA RICA	2.13% *	1.76

Panel B: Europe

Rank	Haven Country	Cash ETR Effect	T-Stat
1	SINGAPORE	-1.95% ***	-2.95
2	IRELAND	-0.77%	-1.15
3	BERMUDA	-0.51%	-0.67
4	MALAYSIA	-0.37%	-0.53
5	CAYMAN ISLANDS	-0.23%	-0.28
6	HONG KONG	0.02%	0.03
7	COSTA RICA	0.06%	0.06
8	SWITZERLAND	1.09% *	1.69

Table 8 reports the tax haven country indicators by the largest negative t-statistics when regressing the cash effective tax rate on the country indicator variables. The sample for Panel A (Panel B) is non-multinational firms-years and multinational firm-years where the majority of sales are attributable to geographic segments in the Asia-Pacific (Europe). We aggregate this data from the Compustat Historical Segments file. The sample period is from 1994 to 2023. The amounts reported under "Cash ETR Effect" are the resulting ordinary least squares coefficient estimates multiplied by 100. Each observation is at the firm-year level. Standard errors are clustered at the firm level. Tax haven countries are identified per Law and Mills (2022). ***, **, * Indicate statistical significance at the 1 percent, 5 percent, and 10 percent levels for two-tailed tests, respectively.

Table 9

Haven Country Pairs with Largest Negative Cash ETR Effect by Primary Geographic Segment (1994-2023)

Panel A: Asia-Pacific

Rank	Haven Country Pair	Cash ETR Effect	T-Stat
1	CANADA-HONG KONG	-5.74% ***	-3.42
2	CHILE-IRELAND	-7.33% ***	-3.09
3	MALAYSIA-NEW ZEALAND	-6.64% ***	-2.90
4	AUSTRALIA-CAYMAN ISLANDS	-4.99% ***	-2.90
5	BELGIUM-HONG KONG	-3.92% ***	-2.66
6	AUSTRALIA-SINGAPORE	-4.94% ***	-2.63
7	UNITED KINGDOM-MALAYSIA	-5.30% ***	-2.56
8	IRELAND-PHILIPPINES	-6.01% **	-2.54
9	AUSTRIA-IRELAND	-4.18% **	-2.10
10	SWITZERLAND-SINGAPORE	-4.38% **	-2.05

Panel B: Europe

Rank	Haven Country Pair	Cash ETR Effect	T-Stat
1	MALAYSIA-NETHERLANDS	-4.41% ***	-3.08
2	BELGIUM-MALAYSIA	-5.15% ***	-3.02
3	BRAZIL-SWITZERLAND	-3.81% ***	-2.98
4	AUSTRALIA-SWITZERLAND	-3.54% ***	-2.82
5	CHILE-IRELAND	-4.23% ***	-2.58
6	SWITZERLAND-INDIA	-3.05% **	-2.51
7	HONG KONG-PHILIPPINES	-3.19% **	-2.07
8	AUSTRIA-SWITZERLAND	-2.86% **	-1.98
9	CANADA-SINGAPORE	-2.91% *	-1.94
10	IRELAND-SOUTH AFRICA	-2.92% *	-1.94

Table 9 reports the haven country pair indicators with the largest negative t-statistics when regressing the cash effective tax rate on the haven country pair indicator variables. The sample for Panel A (Panel B) is non-multinational firms-years and multinational firm-years where the majority of sales are attributable to geographic segments in the Asia-Pacific (Europe). We aggregate this data from the Compustat Historical Segments file. The sample period is from 1994 to 2023. The amounts reported under "Cash ETR Effect" are the resulting ordinary least squares coefficient estimates multiplied by 100. Each observation is at the firm-year level. Standard errors are clustered at the firm level. Haven country pairs are country pairs that contain at least one tax haven country identified per Law and Mills (2022). ***, **, * Indicate statistical significance at the 1 percent, 5 percent, and 10 percent levels for two-tailed tests, respectively.

Table 10

Fama-French 10 Industry Affiliation of Top 10 Country Pairs by Cash ETR Effect (1994-2023)

Panel A: All Country-Pairs

Rank	Country Pair	1-NoDur	2-Durbl	3-Manuf	4-Enrgy	5-HiTec	6-Telcm	7-Shops	8-Hlth	9-Utills	10-Other	Total
1	† SINGAPORE-TAIWAN	139	58	724	-	692	14	78	235	-	326	2,266
2	AUSTRALIA-SOUTH KOREA	260	136	983	3	870	28	118	409	-	445	3,252
3	BELGIUM-NETHERLANDS	369	178	1,293	30	1,088	31	280	668	-	474	4,411
4	BELGIUM-FINLAND	107	35	490	7	524	17	92	354	-	171	1,797
5	† AUSTRALIA-CAYMAN ISLANDS	161	64	397	106	401	33	99	202	4	443	1,910
6	ARGENTINA-SOUTH AFRICA	171	55	702	27	364	26	79	208	1	240	1,873
7	† CHILE-IRELAND	185	30	504	8	353	17	99	241	-	377	1,814
8	† IRELAND-PHILIPPINES	133	21	415	2	345	10	38	187	-	276	1,427
9	† AUSTRALIA-MALAYSIA	283	73	969	77	707	31	119	360	4	480	3,103
10	† GERMANY-SINGAPORE	306	220	1,773	72	1,810	47	283	540	-	718	5,769
Total		2,114	870	8,250	332	7,154	254	1,285	3,404	9	3,950	27,622

Panel B: OECD-Haven Country Pairs

Rank	Country Pair	1-NoDur	2-Durbl	3-Manuf	4-Enrgy	5-HiTec	6-Telcm	7-Shops	8-Hlth	9-Utills	10-Other	Total
1	† AUSTRALIA-CAYMAN ISLANDS	161	64	397	106	401	33	99	202	4	443	1,910
2	† CHILE-IRELAND	185	30	504	8	353	17	99	241	-	377	1,814
3	† AUSTRALIA-MALAYSIA	283	73	969	77	707	31	119	360	4	480	3,103
4	† GERMANY-SINGAPORE	306	220	1,773	72	1,810	47	283	540	-	718	5,769
5	† DENMARK-HONG KONG	192	85	596	24	803	31	153	309	-	242	2,435
6	† MALAYSIA-NEW ZEALAND	209	12	648	25	352	31	87	285	-	256	1,905
7	† UNITED KINGDOM-IRELAND	372	103	1,092	47	1,202	27	363	525	-	794	4,525
8	† FINLAND-HONG KONG	116	52	462	2	598	25	80	298	-	165	1,798
9	† GERMANY-CAYMAN ISLANDS	192	70	503	74	607	37	117	227	-	331	2,158
10	† HUNGARY-SINGAPORE	141	61	556	24	539	38	153	217	4	296	2,029
Total		2,157	770	7,500	459	7,372	317	1,553	3,204	12	4,102	27,446

Table 10 reports the Fama-French 10 industry affiliation frequency by firm-year for the top ten country pairs by largest negative cash effective tax rate effect per Table 4. The sample period is from 1994 to 2023. Panel A reports the top ten country pairs across all country pairs per Table 4. Panel B reports the top ten country pairs among a subset of OECD-haven country pairs per Table 4. A country pair is classified as an OECD-haven pair if one country in the pair is designated a tax haven per Law and Mills (2022), and the other country is an OECD member. † Denotes a tax haven country pair per Law and Mills (2022). The highlighted cells represent the the highest pair-counts per industry.

Table 11
Top 10 Most Frequently Appearing Countries across Country Pairs (1994-2023)

Panel A: All Countries

Rank	Country	Unique Pair Frequency	Haven Pair Percent	Dot Haven Pair Percent	OECD Pair Percent	Significant Negative Cash ETR Pair Percent
1	† SINGAPORE	57	12%	4%	79%	9%
2	THAILAND	54	17%	4%	72%	11%
3	NETHERLANDS	52	23%	12%	69%	4%
4	SWEDEN	51	16%	4%	76%	6%
5	MEXICO	49	16%	4%	71%	8%
6	NEW ZEALAND	49	18%	8%	76%	20%
7	TAIWAN	48	21%	4%	79%	21%
8	SOUTH AFRICA	48	17%	0%	77%	13%
9	† MALAYSIA	44	14%	0%	75%	9%
10	ITALY	43	14%	0%	72%	9%

Panel B: Haven Countries

Rank	Country	Unique Pair Frequency	Haven Pair Percent	Dot Haven Pair Percent	OECD Pair Percent	Sig Neg CETR Pair Percent
1	† SINGAPORE	57	12%	4%	79%	9%
2	† MALAYSIA	44	14%	0%	75%	9%
3	† HONG KONG	35	17%	6%	74%	11%
4	† IRELAND	32	9%	0%	75%	13%
5	† CAYMAN ISLANDS	13	23%	0%	92%	38%
6	† SWITZERLAND	11	0%	0%	64%	0%
7	† BERMUDA	4	25%	0%	75%	0%
8	† COSTA RICA	2	0%	0%	100%	0%

Table 11 reports the top ten most frequently appearing countries and haven countries across all country pairs (Unique Pair Frequency). Haven Pair Percent, Dot Haven Pair Percent, and OECD Pair Percent are the percentage of firm-years in the sample that each listed country appears in a pair with a tax haven country, dot haven country, or OECD country, respectively. We designate tax haven countries and dot haven countries per Law and Mills (2022). We designate OECD countries per the OECD member list. Sig Neg CETR Pair Percent is the percentage of firm-years in the sample that each listed country appears in a country pair that has a significant negative cash effective tax rate effect per the country pair regression results summarized in Table 4. The sample period is from 1994 to 2023. Panel A examines all countries. Panel B is limited to tax haven countries per Law and Mills (2022). † Denotes a tax haven country per Law and Mills (2022).

Table 12

Prevalence of Tax Treaties Among Country Pairs with Significant and Non-Significant Cash ETR Effects

Panel A: Single Treaty 2x2 Summary

	Significant = 0	Significant = 1	Total
Single Dividend Treaty = 0	84	16	100
Single Dividend Treaty = 1	448	35	483
Total	532	51	583
Dual Interest Treaty = 0	78	10	88
Dual Interest Treaty = 1	454	41	495
Total	532	51	583
Single Dividend and Interest Treaty = 0	144	22	166
Single Dividend and Interest Treaty = 1	388	29	417
Total	532	51	583
Single Dividend or Interest Treaty = 0	38	6	44
Single Dividend or Interest Treaty = 1	494	45	539
Total	532	51	583

Panel B: Dual Treaty 2x2 Summary

	Significant = 0	Significant = 1	Total
Dual Dividend Treaty = 0	264	36	300
Dual Dividend Treaty = 1	268	15	283
Total	532	51	583
Dual Interest Treaty = 0	306	30	336
Dual Interest Treaty = 1	226	21	247
Total	532	51	583
Dual Dividend and Interest Treaty = 0	382	41	423
Dual Dividend and Interest Treaty = 1	150	10	160
Total	532	51	583
Dual Dividend or Interest Treaty = 0	168	23	191
Dual Dividend or Interest Treaty = 1	364	28	392
Total	532	51	583

Table 12 summarizes the number of country pairs with single or dual tax treaties by significance of cash ETR effect and treaty type (i.e., reduced dividend and/or interest withholding rate). We identify the significance of the country pairs cash ETR effect based on the regression results for the full sample period (1994 to 2023) summarized in Table 4. In Panel A, we classify country pairs as having a treaty if at least one country in the pair provides reduced withholding rates for the other country in the pair (denoted as a single tax treaty). In Panel B, we classify country pairs as having a treaty if both countries in the pair provides reduced withholding rates within the pair (denoted as a dual tax treaty). We identify treaties using the cross-sectional bilateral treaty data from Pellegrino et al. (2025).