Can countries unilaterally mitigate tax haven usage?

Evidence from an Ecuadorian outflows tax

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Abstract

I study the impact of an Ecuadorian outflows tax on the reported income and personal income tax payments of individuals connected to tax havens. I identify Ecuadorian tax haven users from the Panama Papers and connect them to administrative data on annual earnings, cross-border transactions, and on beneficial ownership of businesses. I produce new descriptive evidence on tax haven users, finding that haven usage is highly serially correlated within individuals over time. The 5% outflows tax induced exposed individuals to increase their taxable income by 40% (20,000 USD) compared to unexposed high-earning taxpayers and pay 60% more in personal income taxes (PIT). This response was concentrated within the highest earners in the Ecuadorian population and resulted in an aggregate increase in annual PIT collections by around 4%. I characterize mechanisms and find that the increase in taxable income was driven by increases in independent labor and capital income as well as wage income flows. Corroborating this response, I document 1) an increase in labor payouts of the companies owned by exposed individuals, 2) a decrease in their outflows to tax havens, and 3) an increase in their inflows from tax havens. These results are consistent with a lasting reduction in offshore tax evasion and suggest that countries can indeed act unilaterally to mitigate tax haven use and increase tax collections.

JEL codes: H26, H22, H23, H31, H32, F38

Key words: Tax evasion, tax avoidance, tax havens, fiscal havens, offshore financial centers, tax evasion and inequality

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1 Introduction

Can countries take unilateral action to mitigate offshore tax haven usage and increase domestic tax collections? A substantial literature has identified offshore tax haven usage on part of both individuals and businesses as contributing to global trends in inequality and reductions in national tax collections (e.g. Guyton et al. (2023); T. Tørsløv, L. Wier, and Zucman (2022); Slemrod (2019); OECD (2015); Zucman (2013))). Moreover, such activities have been identified and attributed in large part to the highest-earning and wealthiest taxpayers in the income distribution (Londoño-Vélez and Ávila-Mahecha (2023); Alstadsæter, Johannesen, Le Guern Herry, et al. (2022); Alstadsæter, Johannesen, and Zucman (2019)). However, it is difficult to design policy that accomplishes this goal. Given the multinational and often illicit nature of tax haven usage, data limitations can pose a severe obstacle in enforcement and preventing taxpayer substitution to alternative strategies for tax haven usage (Londoño-Vélez and Ávila-Mahecha (2023); Alstadsæter, Johannesen, Le Guern Herry, et al. (2022); Bomaire and Le Guern Herry (2022)). For this reason conventional approaches to curbing offshore tax avoidance tend center around multinational coordination and information sharing (OECD (2015)). However, multilateral policies typically require international consensus-building that may impede policy implementation and even incorporate elements that undermine policy efficacy (Alstadsæter, Casi, et al. (2023); Menkhoff and Miethe (2019)). In this way, anti-tax haven policy sees a central conflict: how can policy successfully reduce tax haven usage in a more flexibly-implementable manner?

In this paper, I overcome the standard challenges of anti-tax haven policy design and evaluation by studying a novel policy that alters the pecuniary cost of tax haven usage using rich and unique administrative data in Ecuador. The Ecuadorian environment is characterized by several unique data and legislative features that allow me to study offshore tax haven use in relatively unprecedented detail and estimate taxpayer's behavioral responses to changes in the cost of tax haven usage. In 2008, the Ecuadorian government installed a foreign transaction tax at 0.5% that by 2011 was eventually increased to 5%, significantly altering the incentives of individuals to use offshore fiscal havens for tax strategic purposes. Comprehensive data infrastructure underpins this policy. First, the national tax authorities maintain a detailed database on the universe of transactions entering and exiting the Ecuadorian economy. Transaction-level data allow me to observe transaction amounts, the country of the foreign party, and broad transaction purpose, among many other details. Second, the tax authorities also maintain a beneficial business ownership registry that allows me to observe multiple chains of business ownership and identify the shareholders of companies directly and indirectly connected to tax havens. I combine this unique data and legal environment to produce new descriptive evidence of individual tax haven use and comprehensively characterize behavioral responses of tax haven users to a policy that changes the cost of tax haven use.

I begin the analysis by leveraging the data from the Panama Papers, the cross-border transaction dataset, and the beneficial ownership registry to develop a series of measures of individual-level connection to tax havens. I use this comprehensive data environment to produce new descriptive evidence on tax haven users and on predicting tax haven usage. As in previous works, I find that tax haven use—measured as being named in the Panama Papers leaks, transacting with a tax haven, or owning a business in a tax haven—is concentrated among the highest earners in the income distribution (Londoño-Vélez and Ávila-Mahecha (2021); Alstadsæter, Johannesen, and Zucman (2019)). However, unlike past work that can only observe cross-sectional indications of tax haven usage, I can also leverage the panel structure of the data that longitudinally report interactions with tax havens, either through direct cross-border transactions, business shareholdership or ownership, or cross-border transactions of owned domestic firms. I find that controlling for individual fixed effects, income rank movements predict changes transactions with tax havens, with a movement from the top 5% to the top 0.1% of the income distribution increasing one's probability of sending money to a tax haven by 8 percentage points. On the other hand, after controlling for individual fixed effects. I find no significant relationship between income rank and serving as a $\geq 50\%$-owner of a business domiciled in a tax haven. I conduct an exercise aimed at maximizing prediction of tax haven usage over time: I find that individual $\times$ time varying earnings characteristics have negligible predictive power over contemporaneous tax haven usage. Rather, individual fixed effects explain 43% of the variation in whether an individual sends money to a tax haven; however, earnings characteristics averaged over time perform modestly, explaining 25% of this variation. These findings have important implications for tax administration audit targeting, implying that tax haven usage is serially correlated within individuals and purely cross-sectional earnings income composition perform poorly in predicting haven usage. Tax administrations may see better predictions of noncompliance or tax haven usage using individual characteristics averaged over time.

I proceed by developing my main quasiexperimental design to quantify the impact of the outflows tax on tax haven users' income reporting and tax payment behavior. I estimate a series of difference-in-differences designs that compares taxpayers named in the Panama Papers leaks against the universe of high-income Ecuadorian taxpayers with no observed connection to tax havens (taxpayers located in the complement of the union of all of the tax haven connection measures). I find that individuals connected to tax havens voluntarily increased their reported taxable income by around USD 20,000 per year (40%) following the increase of the outflows tax to 5% per transaction. Given the progressivity of the income tax schedule, personal income tax payments increase among this group by around 8000 USD per year (+60%), in line with the top marginal income tax rate. As a validation that taxpayers responded to changes in the pecuniary cost of sending money to tax havens, I find that taxable income increases commensurately during the period of intermittent outflows tax rate increases from its installation at 0.5% until the final 5% rate. I demonstrate the robustness of this response by 1) showing identical results using different independently generated definitions of tax haven usage (relying on the cross-border flows data or on the business ownership data), 2) studying specific "sub-reforms" of the outflows tax, and implementing a matching design that allows for comparison of exposure and control individuals with more similar income compositions. Considering this large response concentrated among the highest-earning taxpayers, a back-of-the-envelope calculation suggests that the outflows tax has large positive fiscal spillovers onto the personal income tax system, increasing aggregate personal income tax collections by around 3.7%-7.5% per year.

I elaborate on the observed response by characterizing mechanisms. I disaggregate reported income by source. I find that the increase in taxable income was driven by increases in independently generated labor income and capital income flows that are less subject to third party verification and were previously silently flowing abroad, aligning with previous findings (e.g. Kleven et al. (2011)). However, I also document increases in wage income. While this result contrasts with previous findings on the composition of underreported income (Ibid.), it is possible that wage income is not subject to as-comprehensive third party reporting mechanisms in Ecuador as in higher-income settings. Additionally, I focus in on the firms owned by individuals in my sample, documenting a noisy increase in worker payouts on part of the firms owned by exposed individuals relative to those owned by control individuals, suggesting that increases in wage income may reflect income re-shifting directed through owned-firms. I also find that increases in taxable income are not driven by increases in reported foreign income. Rather, I study changes in cross border flows of exposed and control individuals (and their owned-companies), and I find a significant *decrease* in outflows from exposed individuals to tax havens and a significant *increase* in inflows and repatriations originating *from* tax havens both on the order of several thousand USD per year.

I conclude on a policy discussion that aggregates responses and weighs the fiscal benefits of increased tax compliance among tax haven users against the potential negative properties associated with the tariff-like properties of the outflows tax (elaborating more formally on this tradeoff in Section E using a model based on Piketty and Saez (2013) that also considers information constraints of the tax authorities that results in the outflows tax affecting the price of consumption from tradable sectors). I document a high-level of responsiveness of tax haven users to the outflows tax, which is set around an order of magnitude lower than typical tariff rates (Broda, Limao, and Weinstein (2008)), so that the outflows tax generates a substantial increase in tax collections at the top end of the income distribution, at likely relatively little cost to imports or input distortion of domestic production. I conclude with a discussion on the different formulations of that an outflows tax could take to mitigate tax haven usage, from a unilaterally-implemented policy enacted on most outflows, to a multilaterally-coordinated policy of sanctioned outflows to tax havens and non-cooperating countries. Moreover, it is possible that a promising avenue for policy design in the realm of tax evasion and tax administration could place similar focus on the "directly pecuniary" dimension of taxpayers' incentives.

1.1 Contribution and related literature

I view the contribution of this paper as substantial and several-fold. First and foremost, to my knowledge, this paper presents evidence of the first policy that results in compelling identification of a simultaneous decrease in tax havens usage and a *lasting* and substantial *increase* in tax collection among high-earning individual tax haven users, considering the substitution responses to other avoidance/evasion margins. Related work studying other anti-haven use policies—namely the Common Reporting Standard (CRS), Tax Information Exchange Agreements (TIEAs), Automatic Exchange of Information (AEoI)—tend to find that sophisticated taxpayers have adapted to recent multilateral information-sharing reforms by substituting to alternate avoidance/evasion strategies (Menkhoff and Miethe (2019), Bomaire and Le Guern Herry (2022)); other works that demonstrate decreases in haven use in response to policy do not necessarily demonstrate commensurate increases in tax collections (Alstadsæter, Casi, et al. (2023); Alstadsæter, Johannesen, Le Guern Herry, et al. (2022)), or find increases in tax compliance largely among upper-middle income taxpayers (e.g. Fejerskov Boas et al. (2024)). I argue that the policy I study owes its effectiveness to two broad qualities that distinguish the outflows tax from other anti-haven policies: first, as opposed to most policies which focus on information sharing and reporting, the outflows tax targets the "direct pecuniary" incentive to engage in offshore tax sheltering; second, the breadth of the outflows tax largely prevents substitution to other offshore avoidance/evasion margins. The empirical evidence I produce demonstrates the relevance of these characteristics in both decreasing tax haven usage and increasing tax collections.

In this way, this work directly contributes to the empirical literature that uses quasiexperiments to characterize individual (as opposed to business/corporate) behavioral responses associated with tax haven use and tax evasion more broadly. I study how both individuals and businesses alter their activity in response to changes in incentives to locate funds in offshore fiscal centers. To this end, the most closely related papers to this work are Alstadsæter, Casi, et al. (2023) and Alstadsæter, Johannesen, Le Guern Herry, et al. (2022). The former combines individual-transaction-level bank transfer data in Norway and country peer evaluations of how well each country enforces the OECD's common reporting standards to study the impact of the OECD's financial transparency and information sharing initiatives on tax haven usage. The paper shows strong negative effects of directly detectable tax haven usage in countries with strong enforcement and little effect in non-compliant countries, but do not show an increase in tax receipts. The paper also demonstrates the importance of state capacity in determining whether countries are able to make use of the new information made available by multilateral policy innovation. I similarly demonstrate in here that high state capacity in the form of comprehensive data infrastructure are key in implementing the outflows tax I study. The latter paper studies a voluntary offshore wealth disclosure amnesty in Norway using the bank transfer data, and finds substantial repatriations from tax havens, but no significant increases in tax receipts. The key innovation of these works lie in their combination of granular transaction-level data on tax haven usage with quasiexperiments that alter the costs and incentives to locate money offshore. My work also features this combination, but makes use of unique data on direct and indirect shareholdership linkages with offshore entities and a novel quasiexperiment that directly alters the cost of haven usage. Similar work includes Londoño-Vélez and Ávila-Mahecha (2021) that combines a Colombian wealth tax quasiexperiment (increasing the incentive for tax haven usage) with cross-sectional data on tax haven association via the Panama Papers leaks (see also Bomaire and Le Guern Herry (2022) and Johannesen et al. (2020)).

I also contribute to the related literature on descriptively characterizing the environment of tax haven usage and tax noncompliance (Brounstein, ⓡ Bachas, and ⓡ Bajaña (2025); Guyton et al. (2023); Kleven et al. (2011)). Tax haven usage can often reflect illicit activity that agents deliberately conceal; that is, tax haven usage is difficult to observe in a systematized data setting. Researchers have made wide use of leaks of offshore haven usage (e.g. the Panama Papers or the Luxembourg Leaks) that report names of implicated individuals processed into national tax data (e.g. Bomaire and Le Guern Herry (2022); Londoño-Vélez and Ávila-Mahecha (2021); Alstadsæter, Johannesen, and Zucman (2019)). The Ecuadorian administrative data environment features two unique datasets that allows me to describe tax haven usage in a relatively novel perspective: namely, Ecuador maintains a dataset on the universe of cross-border transactions as well as a dataset on beneficial ownership of businesses. I combine these data with leaks data from the Panama Papers to yield a richly-informed perspective on tax haven usage. In addition to describing tax haven usage throughout the income distribution, the panel structure of the transaction data allows me to describe how tax haven use varies within individuals over time; for instance, I show that—for a fixed individual—the probability of tax haven usage increases monotonically with income rank. My data also permit me to characterize the owners of businesses with close tax haven linkages.

Lastly, I contribute to the literature on business usage of tax havens as well as on the intersection of tax haven usage and corporate finance. A large body of work has documented how multinational corporations strategically locate their profits in low tax jurisdictions to minimize their global corporate income tax substantial corporate shifting of profits to low tax jurisdictions (T. Tørsløv, L. Wier, and Zucman (2022); Bilicka (2019); Hines and Rice (1994)), and a considerable multinational initiative has emerged to mitigate this activity (Bustos et al. (2022); L. Wier (2020); OECD (2015)). In my setting, I granularly observe firm usage of tax havens as well as their behavioral responses to changes in incentives to use tax havens (Langenmayr and Liu (2023); L. Wier (2020); Liu, Schmidt-Eisenlohr, and Guo (2020); Huizinga and Laeven (2008)). I link firms to their Ecuadorian owners and study how firm responses absorb or accommodate their owner's responses to changes their incentives (Leite (2024)); I also characterize the responses of firm post-profit accounting activity (dividend payments/profit distributions, retained earnings, reinvestment, etc.) to changes in the cost of transacting with tax havens (Yagan (2015)).

On a high-level, I demonstrate a novel result that this unilateral policy had a substantial and lasting effect, decreasing the use of tax havens and increasing tax collections among tax haven users. This finding contrasts somewhat with the more recently predominating consensus that only multilateral policy effort can effectively mitigate tax haven usage (OECD (2015)). While the Ecuadorian policy itself, an outflows tax, may generate negative impacts on trade through its behavior as a tariff, there are several upshots for external validity and other policy lessons. For instance, the policy can be interpreted as an extension of Most Favored Nation tariff rates to *all* outflows, not only explicit imports; this framing suggests that such a policy may not be entirely unreasonable to implement in other settings. Alternatively, the policy could also see greater focus on targeting in the form of coordinated similarly-small-in-magnitude sanctions on outflows to tax havens and non-cooperating nations. Second, through the policy's focus on the pecuniary cost of tax haven usage, the results imply that other policies that target the "direct pecuniary" cost (as opposed to the composite expected or actuarial cost) of tax haven usage may find more success than those that have typically targeted information reporting and sharing.

2 Background and data

2.1 Fiscal and legislative background

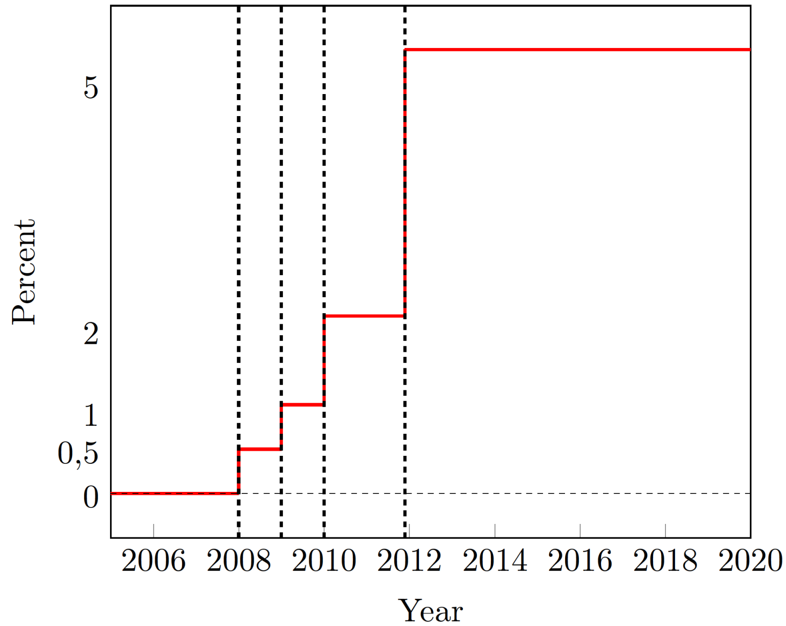
Ecuador, a lower-middle income South American country, Dollarized in January 2000 following a period of hyperinflation and financial instability. However, as the global financial crisis emerged at the end of 2007, the Ecuadorian government anticipated widespread flight of US Dollars from the economy. In the absence of conventional monetary policy tools due to having Dollarized, the government ratified the *Impuesto a la Salida de Divisas* (ISD, literally *Currency Exit Tax*), a tax on all currency outflows abroad. This tax operated as a quasi-monetary policy, aimed to limit the flight of US Dollars from the Ecuadorian economy. The tax was not initially designed with the purpose of curbing offshore tax haven use, but rather to operate as a quasi-monetary policy.

Initially introduced at a 0.5% tax per transaction for all currency exits from Ecuador, the outflows tax has seen several modifications to the tax base and rate. Since the ISD's installation in late December 2007, the Ecuadorian government incrementally raised the outflows tax rate in an **unanticipated** manner[1] until eventually reaching a statutory ad valorem rate of 5% per transaction in November 2011, where the tax remained until 2021.[2] Figure 1 shows the evolution in the statutory outflows tax rate over time; Figure B.2 shows that the statutory rate is indeed borne out empirically. Additionally, the tax authorities have modified the outflows tax base in several instances depending on the transaction amount, purpose of transaction, and destination

[1] During the period from 2007 to 2017, Ecuador was characterized by a highly centralized governance and legislative environment under the presidency of Rafael Correa. Scholars in political science have studied the Correa regime under the lens of authoritarianism (Conaghan (2016)); the result of the centralization of power and streamlining of the legislative process was the ability of the government to ratify tax policy relatively quickly which, importantly for the purpose of causal identification, largely precluded anticipatory effects.

[2] The Ecuadorian government has since introduced two decreases to the ISD rate; as of January 2024, the ISD taxes exiting transactions at an ad valorem rate of 3.75%.

Figure 1: Evolution of the outflows tax rate



Note: This figure displays the evolution of the statutory outflows tax (ISD) rate. This illustration does not take into account smaller base modifications, such as exemptions for small amounts and select imports.

country. Today, the outflows tax features an exemption regime intended to avoid penalizing certain kinds of economic activities such as foreign direct investment into Ecuador from non-havens or the import of primary materials for manufacturing purposes. The difference outflows tax base and rate changes are useful for identifying difference taxpayer behavioral responses.

Starting in 2011, the Ecuadorian government began to reshape the outflows tax for the explicit purpose of mitigating offshore tax haven use. The central piece of these reforms involved an exemption on dividend payments and profit distributions to unaffiliated entities domiciled in non-havens, as well as a rate increase on profit distributions to tax havens.[3]

The Ecuadorian income tax environment closely resembles those of high income and OECD countries. Personal income is taxed on a worldwide basis and features a progressive gradation with a top marginal rate of 35%. Corporate income is taxed on a territorial basis at 25%, with small rate differences by industry.

[3]Subsequent reforms explicitly targeted other financial flows toward tax havens, such as foreign credit amortization payments. However, these transactions are much less frequently observed in the transaction data.

2.2 Data sources

Cross-border transaction data. To facilitate the collection and enforcement of the outflows tax and the exemption system, the tax authorities installed comprehensive data infrastructure monitoring the universe of transactions that result in US Dollars entering or exiting the Ecuadorian economy, including a high level of detail on each transaction. The dataset reporting these transactions, the *Anexo - Movimiento Internacional de Divisas ("MID")* represents the central piece of data architecture underlying the enforcement of the outflows tax.

The MID contains considerable information of interest on its own; the approximately 250 million observations since the MID's installation in 2008 until the end of 2019 report precise information from each individual transaction on the involved parties[4], amounts, date and time of transaction, purpose/nature of transaction (e.g. deposit in savings/checking account, capital investment, education payment, etc.),[5] and country of the foreign transacting party, among many other objects of interest. These data are denominated on the transaction level and can be tied to other administrative tax datasets using national identifiers.[6]

Personal and corporate income tax data. I use annual personal income tax and corporate income tax declarations from 2005 to 2019 and 2007 to 2019 respectively. Table B.1 and Table B.2 displaysdescriptive statistics of filing individuals and companies, respectively, as according to their corresponding income tax declaration forms.[7] The Ecuadorian tax authorities maintain detailed annual-level data on taxpayers, featuring detailed income diaggregations for individual taxpayers

[4]The MID data report both currency exits and entries. However, given that currency entries generate no tax revenues per the outflows tax, there is little incentive for the tax authorities to ensure accuracy of entry-transactions. This said, the data for entrances and exits are generated in similar manner by the intermediating Ecuadorian bank. For currency exits, the Ecuadorian intermediary arguably has greater facility in completing the information reporting requirements than for currency entrances, where the foreign intermediating entity is also required to provide information to the Ecuadorian intermediary. Additionally, there *do* exist means of engaging in transactions that evade detection in the MID dataset and therefore the outflows tax. In particular, the Ecuadorian tax authorities identify physical transport of cash as a possible source of ISD evasion, although the tax authorities do not cite specific amounts of evasion by such means nor have they expressed significant concern over the prevalence of this form of evasion. Moreover, the legal mandate of the ISD does target physical transport of cash beyond a certain threshold, but enforcement is likely limited by screening devices at borders.

[5]The MID transaction purposes field contains nearly 70 distinct categories that are listed in Table B.3. In absence of conventional monetary tools, the Ecuadorian central bank fulfills a statistical and financial monitoring role. As part of legal mandate, the central bank monitors the activity of financial intermediaries and enforces automatic reporting of cross-border transactions and other activities. Financial transactions and investments are universally automatically registered with the Central Bank of Ecuador to ensure accurate reporting and compliance with other financial and tax regulations (such as profit distribution and business ownership rules and transfer pricing regulations).

[6]Section B and Section D illustrate various metadata and descriptive results on the data environment and the MID universal transactions dataset. See also Brounstein, ⓡ Bachas, and ⓡ Bajaña (2025) for additional discussion and use of these data and the business ownership data.

[7]I express all real annualized monetary values in units of USD 2020; I express all transaction-level and monthly monetary values in units of USD January 2020. All variables are winsorized on below the 0.5% level and above 99.5% level within each year.

as well reporting on financial, intra-group, and tax haven activity on part of businesses.

Importantly, while the business income tax dataset covers the universe of formally incorporated business activity, the personal income tax declarations do not cover the entire Ecuadorian population within the formal labor market. The personal income tax declarations I use cover the universe of manual filers, generally excluding lower earners through exclusion of individuals that 1) have only ever reported wage income 2) pay their taxes entirely through automatic withholding (only eligible for exclusive wage earnings below USD 1000 per month), or 3) earn less than approximately twice the minimum wage (around twice 400 USD per month). Approximately 1 million taxpayers file the manual personal income tax (form F102) every year. Because manual filing is required of individuals with salaried wage income greater than USD 1000 per month or ever having reported ownership connections to businesses, capital income, asset or liability ownership, I construe this population of manual filers as a strictly higher income/wealth demographic than automatic filers. Indeed, Table B.1 reports that the mean income of the manual PIT filers is between three and five times the national average according to aggregate statistics from other sources. Moreover, the Ecuadorian labor market is characterized by high levels of informality, where the formal labor market only employs approximately 40% of workers (Canelas (2019)). Finally, Ecuador sees a labor market participation rate of around 45%, so that the manual personal income tax filer dataset can be understood to capture the activity of—coarsely—the top 5% of Ecuadorian citizens. However, I view these data as wholly sufficient for the purposes of capturing the behavior of the highest earners who likely account for the overwhelming share of tax haven activity (Alstadsæter, Johannesen, and Zucman (2019)).

Ecuadorian firms vary considerably in size given the simplified business regime compared to other countries. All formalized businesses feature the same legal form of organization for tax purposes. I observe around 100,000 businesses per year, although it is unclear how this figure compares to the number of "informal businesses" (in Ecuador, largely informal self-employment). Additionally, the Ecuadorian economy is relatively unfinancialized. Two official stock exchanges operate in Ecuador, representing around 2.5% of operating formalized firms, but share trade transactions number in the single digits per day, and very few firms feature complicated shareholdership structures (Brounstein, ⓡ Bachas, and ⓡ Bajaña (2025)).

Firm-shareholder ownership linkages data. The Ecuadorian tax authorities maintain a unique dataset on annualized firm-shareholder linkages. This datasets features both direct and indirect, multi-tiered ownership flows along with direct and indirect ownership proportions. The data — the *Anexo de accionistas, partícipes, socios, miembros de directorio y administradores ("APS")* — report the beneficial ownership flows of all Ecuadorian individuals and companies (CIT-filers and both manual and automatic PIT filers) as well as foreign entities with business ownership ties with Ecuadorian entities. While the data *de jure* report beneficial ownership of all Ecuadorian companies, Brounstein, ⓡ Bachas, and ⓡ Bajaña (2025) document some limitations including the presence of noncompliance with beneficial ownership reporting standards at the Shareholder data are collected by independent auditors and reported on the annual level at an end-of-year snapshot basis for firms and individuals against penalty of a 3 percentage point additional income tax penalty.

I mainly use these data to identify the individual Ecuadorian shareholders of small businesses demonstrating various kinds of ownership linkages and financial relationships with tax havens in the reform pre-period. These data begin in 2012. I employ these ownership linkages in a generally time-invariant manner primarily as a means of identifying taxpayers with an *a priori* strong individual response to the anti-tax haven reform[8], and I empirically validate that this time-invariant treatment of tax haven business indeed holds. I also use these data to identify the individual Ecuadorian shareholders of companies named in the Pandora and Panama Papers published by the International Consortium of Investigative Journalists as well as the businesses owned by tax havens. [9] Whenever I reference business ownership or shareholdership, I refer to indirect ownership (which weakly includes direct ownership).

I also use these data to study the activity of the firms owned by exposed individuals in exploring mechanisms and additional measures of connectedness to tax havens. For example, I identify all of the 10%-or-greater owned business of individuals (and additional ownership thresholds) and aggregate their flows with tax havens from the MID data, assigning their flows to their individual owners. Section 4.3 also explicitly studies the responses of firms owned by exposed individuals.

Firm-shareholder dividend payment data. The government also maintains annual firm-shareholder dividend and profit distribution payment data since 2015.[10] Because of the limited time frame of this dataset and its intersection with only the latter end of the time horizon I study, I use the annual data on firm dividend payout behavior to calibrate and validate an accounting

[8]Brounstein, ⓡ Bachas, and ⓡ Bajaña (2025) explores this data and offshore ownership linkages as an outcome variable. I limit the scope of this paper to the presentation of descriptive results pertaining to the distribution of offshore haven ownership linkages.

[9]By definition, these data will fail to report tax haven ownership linkages involving entities *not* in compliance with Ecuador's beneficial ownership reporting standards. Nonetheless, I substantiate my measures of haven affiliation with an array of independently-generated haven affiliation measures that allow me to confidently infer tax haven usage.

[10]These data originate from the Ecuadorian tax administrative dataset, the *Anexo de Dividendos*.

imputation for annual firm dividend payouts (detailed in Section B.1). I use these data and my resulting imputation to study how firms dividend payments react to changes in the outflows tax by country status.

ICIJ offshore leaks data. I use publicly available data from various offshore tax strategy service providers leaks to identify the beneficial owners of shell companies. These data, leaked to and published by the International Consortium of Investigative Journalists (ICIJ), report the names of companies and the affiliated individuals connected to the creation and maintenance of shell companies. The ICIJ leaks include data from several different leak incidents, namely the Panama Papers and the Pandora Papers. The use of these offshore shell companies does not generally constitute an illegal, tax fraudulent act in of itself, but rather generally indicates the practice of offshore tax strategy.

I identify Ecuadorian individuals and companies named in these leaks data and perform a fuzzy match against the publicly available online registry of taxpayer identification numbers to identify these individuals and firms in the tax data.[11] The data sometimes report dates of closing and opening of shell companies, which I use to elaborate on mechanisms and explore heterogeneous responses. Figure B.1 visually illustrates how all of the different datasets are connected.

Public data on the Ecuadorian economic and fiscal environment. In addition to publicly available data on the Ecuadorian domestic economic environment (e.g. domestic top tax rates, price levels, GDP, etc.) I employ the list of government-recognized tax havens. This list largely coincides with frequently used lists of tax havens (e.g. Hines and Rice (1994); T. Tørsløv, L. Wier, and Zucman (2022)). The biggest difference is that the Ecuadorian government also includes some microstates (e.g. Wallis and Futuna) and regions of countries (e.g. Trieste). However, these additional inclusions see no effectively no activity borne out in the data. The lists of countries and territories considered tax havens by the Ecuadorian government represent the definitive list of countries targeted by unilateral anti-tax haven policy. I generally treat tax haven status as time-invariant.[12]

[11] Spanish names typically feature two first names and two last names, which facilitates a more reliable fuzzy match.

[12] The list of tax havens *does* see some additions and removals of countries/regions over time—mainly involving microstates, small island nations not colloquially considered tax havens, and countries/regions that demonstrate minimal presence in the MID transaction data. However, because these removals and additions see such little activity, they do not lend themselves for use in an event study setting.

3 Individual tax haven use and individual responses

In this section, I demonstrate the individual-level responses to changes in the cost of using tax havens. The central tax avoidance and evasion mechanism I focus on elucidating here involves individuals' non-disclosed income flows to tax havens. Just as in the US and other high-income settings, high-earners and business owners engage in redirecting income flows abroad through controlled businesses for receipt by proxy entities or personal accounts domiciled in low-tax jurisdictions (Guyton et al. (2023)). If the individual does not report this abroad income, the individual is illegally evading the Ecuadorian personal income tax, which is levied on a worldwide basis (as is similar with most personal income tax systems). From here, the individual can either continue accruing funds abroad, or can make use of a foreign credit card sourced from their tax haven bank account as a means of financing untaxed consumption.

The outflows tax, given the breadth of its base, represents an increase in the cost of sending funds abroad. Regardless of the legality before or after the imposition of the outflows tax, sending money to tax havens becomes more costly. The response I elicit here therefore reflect a decrease in the incentive for individuals to engage in tax haven usage. For example, a taxpayer prior to the imposition of the outflows tax could transfer USD 50,000 funds abroad in an undisclosed manner not-in-compliance with the Ecuadorian personal income tax system; following the reform, a taxpayer wishing to send USD 50,000 abroad with similar tax-strategic motives could continue do so, but would have to pay USD 2,500 in outflows tax (following the imposition of the maximum rate in November 2011). Therefore, I anticipate that tax haven users will exhibit a substitution response toward domestic evasion vehicles or toward voluntary reporting.

Importantly, this period saw no changes in audit practices by the tax authorities; I therefore attribute changes in income reported by tax haven users to changes in the perceived cost of transacting with tax havens. While the installation of the outflows tax may have induced an increase in agents' internalized probability of detection (given the increase in the maintenance of the outflows tax and ownership datasets), the outflows tax rate increases allow me to isolate the role of the pecuniary cost of transacting with tax havens. I.e. as the outflows tax rate increases, one should observe a commensurate increase in reported income among tax haven users.

As an additional complication, 2008 also saw an increase of the top income tax rate from 25 to 35%. While this could undermine the design's identification of the impact of the outflows tax, I provide several pieces of substantiating evidence to assuage this threat. First, insofar as my exposure group constitutes tax haven users and my control group do not use tax havens, this tax change could induce a downward bias in my estimates through increased shifting in the control group, which would operate in the opposite direction of the response of interest.[13] Second, I implement a matching design that compares taxpayers of similar earners characteristics that face similar exposure to this tax rate change. Third, I provide estimates from a similar design that focuses on the 2011 outflows tax increase from 2% to 5%, which yields similar results.

3.1 Defining exposure to the outflows tax and describing tax haven use

I design exposure and control (non-exposure) groups based on a set of indicators of tax haven usage. I aim to design these groups to tag exposed individuals for whom I observe *any* financial connection with tax havens and compare them against a set of control individuals for whom I observe demonstrably *no* connection to tax havens across *all* measures of tax haven usage I develop. These measures of "financial connection to tax havens" consist of appearance in the ICIJ leaks, being observed as a substantial shareholder of an ICIJ or tax haven company (using the APS shareholdership data), or observation transacting with a tax haven company (using the MID and APS data).

In particular, I generate binary variables corresponding with 1) whether an individual was named in one of the ICIJ leaks, 2) whether an individual was a 10% or greater indirect or direct shareholder of a company named in the ICIJ leaks, 3) whether an individual was a 10% or greater indirect or direct shareholder of a company domiciled in a tax haven, 4) whether an individual was a 10% or greater indirect or direct shareholder of a company sending dividends or profit distributions to shareholders in tax havens before the change in the outflows tax to penalize tax haven usage in 2011, 5) whether an individual is observed sending money to a tax haven, 6) whether an individual is observed receiving money from a tax haven, and 7) whether an individual is a 50% or greater shareholder of a company sending money to a tax haven. "Control" or non-exposed individuals are individuals that are assigned "0" for all of these variables. While the reliance on the 10% threshold may introduce a degree of arbitrariness, this same ownership threshold is commonly used to define foreign direct investment (FDI) flows.[14]

[13] Alternatively, in the case the non-users are induced *into* tax haven usage, we would observe a decrease in reported income among the control group, which would operate in the same direction as the mechanism of interest. However, aggregated income reported among non-exposed individuals suggest this is not the case.

[14] Exposure variables based on observed shareholdership are based on shareholdership values observed in 2012, which is the earliest year available of the APS data. Exposure variables based on money flows with tax havens are based on values between 2008 and 2011, where 2008 is the beginning of the MID and 2011 marks the instance where

For simplicity, the main exposure variable I use consists of whether an individual is named in one of the ICIJ leaks.[15] I later show that my results are robust the precise exposure measure I use. Thus, my main research design compares these exposed individuals against other high-income individuals (deemed as high-income by appearing in the formalized non-automatically-filed income tax data) that simultaneously satisfy *none* of the measures of tax haven connectedness above. That is, I construe the control group as high income Ecuadorian taxpayers that demonstrate no observable connection with tax havens.

Table 1 compares the covariate balance of the two kinds of taxpayer groups. There are 614 Ecuadorian taxpayers named in the ICIJ leaks. The table shows that these taxpayers are substantially higher-earning than taxpayers not named in the leaks, in line with previous findings (e.g. Alstadsæter, Johannesen, and Zucman (2019)). These ICIJ individuals report more capital income, claim more capital and foreign income as well as independently generated labor income (e.g. self-employment, free practice/liberal occupation income). The table also shows that, as in most developing country settings that rely less on personal income taxation, most individuals face a *very* low personal income tax rate.

Figure 2 elaborates on the relationship between tax haven usage and income. Panels (a) and (b) plot the conditional distribution of different measures of tax haven usage by taxable income rank measured in 2012 (the first year of the availability of all data sources). Panel (a) plots probability of appearance in the ICIJ leaks (the main exposure variable of interest), and panel (b) plots several of the alternate measures of tax haven connectedness. Both figures show a much high concentration of tax haven association at the top of the income distribution, in line with previous findings (e.g. Londoño-Vélez and Ávila-Mahecha (2021); Alstadsæter, Johannesen, and Zucman (2019)). Within the top 1% of the top 1% of the population (about 100 individuals), individuals exhibit a 50% probability of haven been named in the Panama Papers, a substantially higher concentration than previously documented. Other measures corroborate this finding, with panel (b) showing concentrations of similar magnitude for being a 50% or greater shareholder of a firm named in the Panama Papers, a 50% or greater owner of a firm domiciled in a tax haven, and having sent or received funds to or from a tax haven entity either by oneself or an at-least 10%-owned business.

Panels (c) and (d) estimate an individual fixed effects regression-adjusted conditional distri-

the outflows tax explicitly penalized tax haven usage.

[15] Ideally, I would be able to positively identify individuals opening shell companies prior to 2008; however, the field reporting the opening date of shell companies is frequently missing in the ICIJ leaks data.

bution of flows with tax havens along income rank. These figures leverage the panel-structure of the cross-border payments and business-ownership datasets. Whereas previous work has only studied time-invariant measures of tax haven usage throughout the income and wealth distribution (Londoño-Vélez and Ávila-Mahecha (2021); Alstadsæter, Johannesen, and Zucman (2019)), these datasets permit repeated observation of tax haven connectedness each year. Thus, These figures estimate regressions of their respective measure of tax haven connectedness on an individual-level fixed effect and income rank. I estimate variations of the equation:

$$y_{it} = \alpha_i + \sum_{r=0}^{100} \gamma_r \cdot r_{it} + \varepsilon_{it}, \tag{1}$$

where y_{it} represents an individual-year varying measure of tax haven connectedness and r_{it} represents the within-year percentile income rank of individual i in year t. The estimators $\{\hat{\gamma}_r\}$ give the contribution of being assigned income percentile r, relative to a reference baseline (in all of the specifications, relative to the 50th percentile). The coefficients represent non-causal correlations between income rank movements *within* an individual and their connectedness with tax havens.

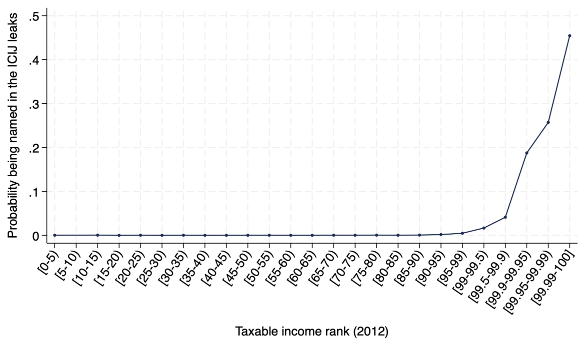
Panel (c) estimates this specification using whether an individual or one of their 10%-or-greater owned businesses is observed sending money to a tax haven in a given year. I document a convexly increasing relationship between income rank and sending money to tax havens, demonstrating that as a fixed individual gets richer, they become more likely to send money to tax havens. Figure A.1 Panel (b) demonstrates that this relationship also holds for percentiles income rank *within* the top 1% of the income distribution.[16] Where the F102 personal income tax records can be taken to represent the top 5% of earners of within the Ecuadorian population, this finding shows that, holding the individual constant, an income rank movement from p95 to p99.9 within the income distribution increases one's probability of transacting with a tax haven by about 8 percentage points. Interestingly, Panel (d) estimates this design using observation as the weak-majority owner of a tax haven firm, showing no relationship between within-individual income rank and owning a tax haven firm. Given the positive *cross-sectional* relationship between these objects shown in Panel (b), we can conclude that this margin (owning a tax haven firm) does not vary substantially within individuals based on income rank.

[16] Figure A.1 Panel (a) replicates Figure 2 Panel (c) while also including year fixed effects. Panel (c) of this figure replicates this same result while only including flows *directly* between the individual and a tax haven (excluding owned businesses). Panel (d) shows the analogous estimation for entrances from tax havens, depicting a flat relationship between haven entrances and within-individual income rank shape except at the very top of the income distribution. Figure A.2 shows that the amounts sent to tax havens also co-move positively with changes in income rank within and across individuals.

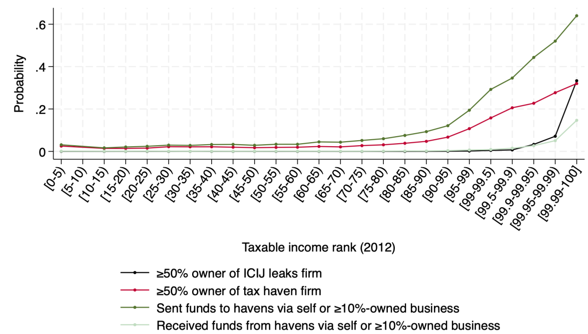
Table 2 displays the results of a series of prediction exercises in explaining variation in whether individuals serve at 100% direct owners of firms in tax havens. Panel (a) focuses on the explanatory power of individual economic characteristics. Column (1) shows that individual $\times$ time-varying earnings characteristics have nearly zero joint explanatory power over whether an individual is an owner of a tax haven firm. Rather, Column (2) shows that ID fixed effects explain around 40% of the variation, but Column (3) shows that a correlated random effects model that uses pre-reform average earnings characteristics perform moderately in predicting haven usage, explaining 25% of the variation. Columns (4)-(7) iterate combinations of ID and year fixed effects and individual $\times$ time-varying earnings characteristics, confirming indeed that the individual fixed effects pick up the plurality of variation. This result might be expected, as business ownership likely doesn't vary considerably over year, but this result is also confirmed in Table A.1 - Table C.7 that use alternate individual-time varying measures of tax haven use pertaining to current inflows and outflows and other measures of business ownership. The results imply that for the purposes of predicting individual usage of tax haven, annual cross-sectional characteristics matter little, as a great deal of tax haven usage does not vary within individuals; however, one can modestly predict tax haven usage based on longer-run averaged characteristics.

Panel (b) perform a similar horse-race that involves autoregression of haven usage on past haven usage (based on an identical variable) as well as regression on other entirely independent measures of haven affiliation. Column (1) shows substantial temporal persistence, estimating that an individual being observed as a full-owner of a tax haven firm has a 63% probability of being observed as a full-owner of a tax haven firm the following year, additionally explaining 35% of the variation. *Receiving* money from a tax haven either directly or through a $\geq$ 10%-owned business increases an individuals' propensity to be observed as a full owner of a tax haven firm by between 1.5 and 1.8 percentage points. On the other hand, *sending* money to a tax haven either directly or through a $\geq$ 10%-owned business only increases an individuals' propensity to be observed as a full owner of a tax haven firm by about 0.4 percentage points. Interestingly, these other measures such as receiving money from or sending money to a tax haven (or serving as a $\geq$ 10% of a firm that does so) have little overall explanatory power over whether an individual is an owner of a tax haven firm.

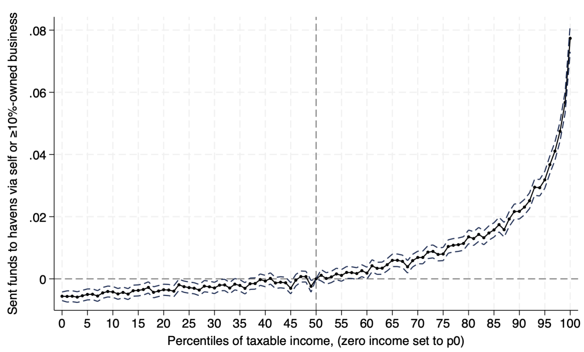
Figure 2: Tax haven association by income rank



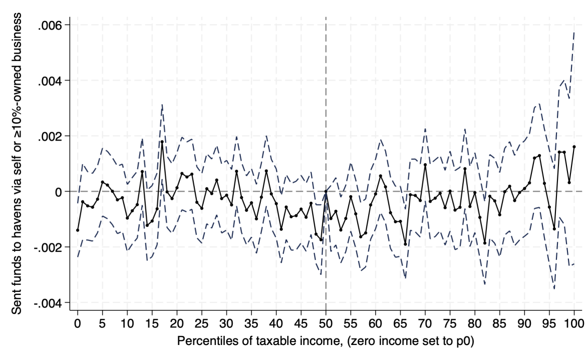
(a) Individual is named in ICIJ leaks



(b) Alternate measures of haven connection



(c) Sent *any* money to havens,
ID fixed effects



(d) $\geq 50\%$ owner of a haven firm,
ID fixed effects

Note: These figures plot conditional distributions of various measures of tax haven connectedness by taxable income rank. All values of taxable income rank are calculated within each year among the population of form F102 personal income tax filers; zero-income individuals are mapped onto a "p0" group. Panels (a) and (b) use 2012 cross-sectional data; Panels (c) and (d) estimate an individual fixed effect regression of outflows to tax havens and owning a haven firm as the dependent variable on income rank, as $y_{it} = \alpha_i + \sum_{r=0}^{100} \gamma_{r(it)} + \varepsilon_{it}$, with p50 specified as the reference group and standard errors clustered on the individual-level.

Table 1: Descriptive statistics on ICIJ individuals versus non-connected individuals

	Exposed	Non-connected	Difference
Gross income	91915	23307	68607.63
	(97205.31)	(32703.22)	(5256.493)
Taxable income	50121	10484	39636.74
	(49255.63)	(14597.98)	(2663.53)
Capital income	8629	1211	7417.848
	(33243.22)	(6932.061)	(1797.616)
Indep. labor income	619.0	329.1	289.9
	(4679.01)	(2198.474)	(253.034)
Other income	2327	299.0	2027.941
	(10722.18)	(2663.014)	(579.802)
Has business income	0.0860	0.0490	.036
	(.262)	(.194)	(.014)
Has foreign income	0.0230	0.00100	.022
	(.141)	(.028)	(.008)
Total deductions	1088	560.5	527.91
	(4863.904)	(3298.493)	(263.058)
Deductions share of base	0.110	0.0940	.016
	(.149)	(.15)	(.006)
PIT final taxbase	53489	11070	42419.12
	(47716.05)	(14953.92)	(2580.286)
PIT > 0	0.761	0.401	.36
	(.385)	(.446)	(.021)
Total PIT paid	9360	502.1	8858.113
	(14780.69)	(2550.145)	(799.256)
Average tax rate	0.109	0.0100	.098
	(.127)	(.028)	(.005)
$\geq$ 10% direct or indirect business interest	0.528	0.0370	.491
	(.5)	(.188)	(.02)
$\geq$ 50% business interest	0.287	0.00900	.278
	(.453)	(.093)	(.018)
100% business interest	0.0570	0.00100	.056
	(.232)	(.033)	(.009)
No. units	614	1,894,666	

Note: This table displays descriptive statistics of 2005-2007 averages of taxpayer characteristics. Exposed individuals are named in the ICIJ leaks; Non-connected individuals demonstrate no observable connection with tax havens in either the ICIJ leaks data, the business ownership data, nor the foreign transaction data. Parentheses in the "Exposed" and "Non-connected" column contain standard deviations; parentheses under the "Difference" column contain standard errors for the difference coefficient in cross sectional univariate regression of the row variable as the dependent variable on an exposure indicator. Dependent variables on business interest represent values in 2015.

Table 2: Predicting haven usage: Serving as a 100% owner of a tax haven firm

Panel (a): Horse race between observable characteristics and fixed effects

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Log gross income	.0004203	-.00004863	.0004689				-.0001224
	(.00004122)	(.00005066)	(.0001031)				(.00005085)
Log taxable income	.0003208	-.00005646	.0003689				-9.288e-06
	(.00003561)	(.00004332)	(.00008275)				(.00004331)
Any capital income	.001086	.0004895	.0009155				-.0002139
	(.0001115)	(.00009476)	(.0008298)				(.00009634)
Any independent labor income	.0009529	-.00005199	.0003293				-9.424e-06
	(.00007917)	(.00007774)	(.0003643)				(.00007772)
Any foreign income	.005838	.0007621	-.001652				.001059
	(.001884)	(.001406)	(.003312)				(.001406)
Any business income	.004725	-.0001332	.001348				.0000115
	(.000413)	(.0004496)	(.001164)				(.0004494)
Any other income	.0007763	-.0004619	-.0004876				-.0004845
	(.0001821)	(.0001844)	(.000413)				(.0001845)
Any 100%-owned haven businesses			.5066				
			(.009373)				
Constant	-.004423	.004385	-.00524	.0034	.003296	.0034	.004763
	(.0003354)	(.000383)	(.0008299)	(0)	(.0000419)	(0)	(.0003843)
Covariates	X_{it}	X_{it}	CRE	No	No	No	X_{it}
Fixed effects	No	ID	No	ID	Year	TWFE	TWFE
N	6,014,341	5,624,104	1,490,005	5,624,104	6,014,341	5,624,104	5,624,104
Number of clusters	1,585,099	1,194,862	276,007	1,194,862	1,585,099	1,194,862	1,194,862
F-statistic	112.2	5.919	380.6				3.459
Adjusted R-squared	.0005173	.4363	.2485	.4363	.0000802	.4363	.4365

Panel (b): Autoregression on past haven usage and contemporaneous other haven usage

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
y_{t-1}	.6261								.5872	.626
	(.004662)								(.004563)	(.004664)
$\geq$ 50% haven ownership		.09034					.0908		.05532	
		(.001032)					(.001037)		(.0006474)	
$\geq$ 10%-owner of a firm				.0152			-.0009365		-.003396	
receiving money from a haven				(.001582)			(.001513)		(.001063)	
$\geq$ 10%-owner of a firm			.004159				-.003393		-.002744	
sending money to a haven			(.0001842)				(.000178)		(.0001273)	
Received money directly						.01261		.01171		.005036
from a tax haven						(.001807)		(.001802)		(.001327)
Sent money directly to a tax haven					.00385			.003792		.001585
					(.0001843)			(.0001835)		(.0001251)
Constant	.00168	-8.565e-14	.003088	.003313	.003117	.003326	.0001905	.003107	-.0003462	.001571
	(.00002055)	(0)	(.00003869)	(.00003985)	(.0000388)	(.00003992)	(.00001028)	(.00003877)	(9.973e-06)	(.00002056)
N	5,006,719	7,079,513	7,079,513	7,079,513	7,079,513	7,079,513	7,079,513	7,079,513	5,006,719	5,006,719
R-squared	.349	.08729	.0002962	.0001252	.0002432	.00005454	.08749	.0002902	.3803	.3491

Note: This table shows predictors of tax haven usage between 2012 and 2019, as measured by whether an individual i in year t was observed as a 100% direct or indirect owner of a firm domiciled in a tax haven in year t. The columns of Panel (a) iterate over regressions of this variable on difference covariate and fixed effect specifications. Column (3) uses 2005-2007 averages of each listed variable as time-invariant individual covariates. Panel (b) regresses haven usage on combinations of past haven usage and other contemporary measures of haven usage. Standard errors in both panels are clustered on the individual-level.

3.2 Individual-level responses

To evaluate the impact of the outflows tax on individual behavior, I estimate a series of difference-in-differences designs to compare the evolution in reported income, personal income taxes paid, and other related outcomes of interest for exposed taxpayers to those of unexposed taxpayers around the implementation of the outflows tax in 2008 and increase to 5% by 2011. I estimate the following equation:

$$y_{it} = \alpha_i + \delta_t + \sum_{k=2005}^{2019} \beta_k \cdot Exposure_i \cdot \mathbb{1}\{Year_t = k\} + \varepsilon_{it}, \tag{2}$$

where 2007 is the reference period. Here, α_i and δ_t indicate individual and year fixed effects respectively. $Exposure_i$ indicates individual i's exposure to the outflows tax and does not vary over time. Lastly, y_{it} represents the outcome of interest of individual i in year t and ε_{it} is a mean-zero error. The research design aims to compare individuals exposed to the reform against those unexposed to the reform, so under a parallel trends assumption coefficients $\{\hat{\beta}_k\}$ identify the average effect of treatment on the treated (ATT) of the reform in year k.

Figure 3 Panel (a) shows the time series evolution in outcomes for the two groups. The figure illustrates parallel evolution in pre-event taxable income along with trend breaks that occur at changes in the outflows tax rate (namely the initial implementation and the change to 2% and to 5%). Proportionally, the exposure group nearly doubles their declared taxable income. The time series figure also illustrates no substantial trend break for the control group, indicating that they were indeed unaffected (and namely not adversely affected) by the reform.

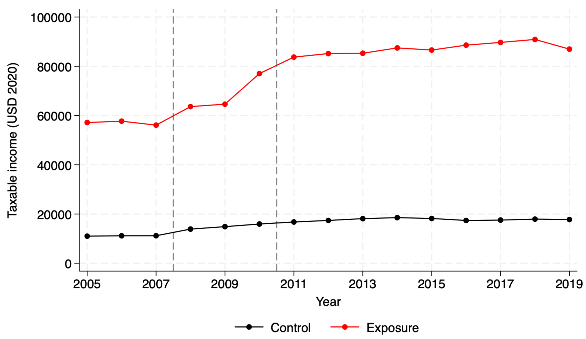
Panel (b) plots the difference-in-differences coefficients associated with this design. The figure again illustrates that the parallel trends assumption is satisfied. The graph shows two striking findings. First, the magnitude of the response increases during the outflows tax phase-in region, suggesting that individuals respond to the directly pecuniary component of the tax; if the tax only induced in perception of audit-risk, the effect would manifest instantly. Rather, the magnitude of the response increases as the outflows tax rate increases from 0% to 5%. Second, for the post-2011 period featuring the 5% outflows tax rate, tax haven users voluntarily declared around 20,000 USD (+40%) per year. Importantly, this response is also quite stable for the duration of the post-event period, which is unprecedented compared to other reforms (namely audit threat reforms, e.g. Bergolo et al. (2023)).

Panels (c) and (d) illustrate the impacts of the reform on log taxable income and taxes paid.

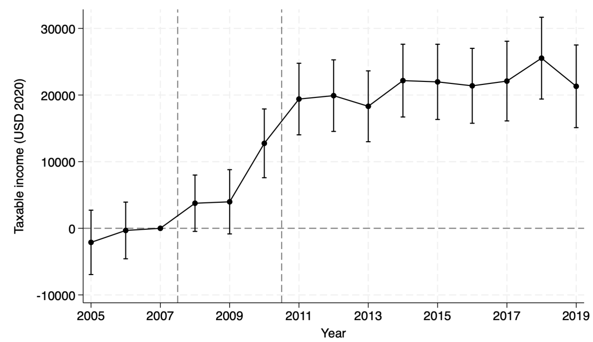
Panel (c) isolates the proportional change in income declared only the purely intensive margin, showing an increase (albeit somewhat noisy) in taxable income declared by around 20%, similarly as for the change in levels, suggesting little change in income declaration on the extensive margin (which is illustrated more explicitly in Figure A.4 Panel (b)). This increase in taxable income also results in an increase in personal income tax payments of around USD 8,000 by the end of the reform, corresponding the approximate top marginal income tax rate here. Proportionally, we should expect the change in personal income tax payments should exceed that of income tax declared due to the progressivity of the income tax schedule; however, the observed change in personal income tax payments (between 60% and 80%) is quite large. This may be attributable to changes in other compliance behavior. Additionally, Figure A.5 Panels (a)-(b) shows that this change in taxes paid occurred both on the extensive and pure intensive margins. Figure A.5 Panels (c)-(d) also show that this result is robust to mechanically controlling for the change in the top marginal personal income tax rate.

Table 3 displays the estimates for these difference-in-differences designs. This result indicates a large and sustained response among tax haven users to declare more income and pay more in income taxes. In a respect, a response of this magnitude may seem large compared to an an increase in the cost of sending funds abroad of 5%. However, there are several reasons why we might anticipate such a strong response. To start, an increase in the cost of sending funds abroad of 5% of the base undermines the tax-advantage of using a tax-haven by around 14% as a *lower bound* (assuming a top domestic marginal tax of 35% and a tax haven tax rate of 0%). However, there exist little evidence informing the pecuniary costs and fees structures associated with tax haven usage pre-existing the outflows tax. If the cost and risk structures associated with tax haven use induce a further decrease in the net return of haven usage, this 5% statutory reduction could represent a far greater proportion reduction in pecuniary benefit. For instance, high-earning and high-net-worth individuals may perceive greater potential risk for investments based out of tax havens; they cannot deduct losses against their tax bases. These factors combined with the potential role for risk aversion suggest that a five percentage point statutory decrease in the net return on tax haven usage could represent in fact a relatively large change in incentives for tax haven usage beyond the 14% relative decrease in net-of-tax return. To illustrate, if the cost structures associated with haven usage amounted to 20%, the 5% outflows tax would represent a 33% decrease in the net benefit of tax haven usage.

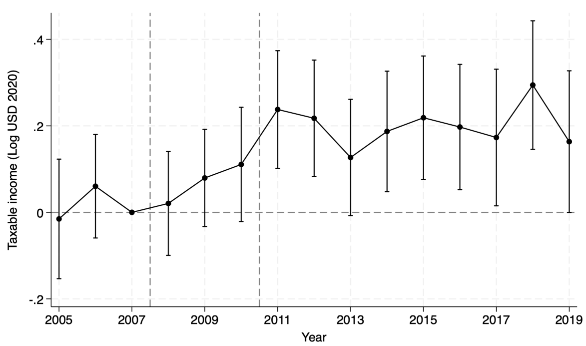
Figure 3: Impacts of the outflows tax on ICIJ individuals



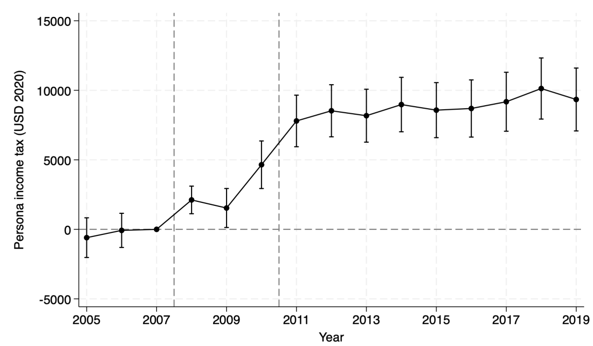
(a) Taxable income (time series)



(b) Taxable income (DD)



(c) Log taxable income (log)



(d) Taxes paid

Note: These figures estimate the difference-in-differences design $y_{it} = \alpha_i + \delta_t + \sum_{k=2005}^{2019} \beta_k \cdot Exposure_i \cdot \mathbb{1}\{Year_t = k\} + \varepsilon_{it}$ that compares the evolution in outcomes of individuals named in the ICIJ leaks against those of observed non-tax-haven users. Panel (a) plots the time series evolution in taxable income for both groups and Panels (b)-(d) plot the difference-in-differences coefficients for estimations of this equation, with 2007 as the reference year. The dashed gray vertical lines demarcate the implementation of the outflows tax at a rate of 0.5% and the subsequent increase to 5% respectively. All specifications include individual-level fixed effects. Error bars represent 95% confidence intervals computed using standard errors clustered on the individual-level.

Table 3: Individual responses

Panel (a): Taxable income declared

	Income (1)	Income (2)	Log inc. (3)	Log inc. (4)	Any inc. (5)	Any inc. (6)
Exposure × Year $\geq$ 2011	13767	21974	-0.0965	0.186	-0.0198	-0.0151
	(2598)	(2464)	(.06239)	(.05297)	(.01746)	(.01672)
Exposure × Year $\in [2008, 2010]$	4014	7647	-0.185	0.0564	-0.00158	0.00789
	(2198)	(2075)	(.05885)	(.04613)	(.01817)	(.01799)
Exposure	43828		1.663		0.0943	
	(2815)		(.06501)		(.01726)	
Year $\geq$ 2011	3127	5833	0.192	0.272	0.122	0.126
	(30.74)	(34.46)	(.00302)	(.002804)	(.0008032)	(.0008439)
Year $\in [2008, 2010]$	2944	2861	0.263	0.142	0.0821	0.0683
	(29.54)	(30.39)	(.00288)	(.002506)	(.0008412)	(.000846)
Constant	11173	10365	8.978	9.050	0.752	0.764
	(27.98)	(27.11)	(.002693)	(.002214)	(.0007352)	(.0007025)
Pre-period exposure mean	54674	54674	10.59	10.59	0.847	0.847
Individual FEs	N	Y	N	Y	N	Y
N	9,490,665	9,055,978	8,072,394	7,664,773	9,490,665	9,055,978
Adjusted R2	0.0112	0.654	0.00591	0.614	0.0110	0.438

Panel (b): Personal income taxes paid (PIT)

	PIT (1)	PIT (sim.) (2)	Log PIT (3)	Log PIT (sim.) (4)	Any PIT (5)
Exposure × Year $\geq$ 2011	8987	7050	0.609	0.792	0.0675
	(915.1)	(950)	(.09436)	(.09114)	(.01764)
Exposure × Year $\in [2008, 2010]$	2996	797.3	0.199	0.384	0.0427
	(661.3)	(698.3)	(.08404)	(.08184)	(.01653)
Year $\geq$ 2011	248.1	-106	0.221	-0.330	-0.0649
	(6.064)	(7.038)	(.006111)	(.006048)	(.001007)
Year $\in [2008, 2010]$	94.70	-260.7	0.0149	-0.540	-0.0331
	(4.905)	(5.892)	(.005397)	(.005372)	(.000942)
Constant	403.1	759.4	5.567	6.120	0.424
	(4.61)	(5.594)	(.004371)	(.004313)	(.0007818)
Pre-period exposure mean	10341	13133	8.280	8.646	0.796
Individual FEs	Y	Y	Y	Y	Y
N	9,055,978	9,055,978	3,334,383	3,346,436	9,055,978
Adjusted R2	0.614	0.610	0.659	0.657	0.489

Note: This table displays estimates of the difference-in-differences design: $y_{it} = \alpha_i + \delta_t + \beta_1 \cdot Exposure_i \cdot \mathbb{1}\{Year_t \in [2008, 2010]\} + \beta_2 \cdot Exposure_i \cdot \mathbb{1}\{Year_t \geq 2011\} + \varepsilon_{it}$. The Exposure × Post coefficients are estimated relative to the 2005-2007 average difference as the reference group. Columns (2) and (4) in Panel (b) use taxes mechanically simulated using the post-2008 tax schedule as the dependent variable. Standard errors are clustered on the individual-level.

3.2.1 Robustness

Here I provide additional evidence substantiating the robustness of my findings on four fronts. First, I demonstrate that my results are largely robust to the precise definition of "exposure" to the outflows tax via. My decision to use ICIJ individuals as the main exposure group is largely pedagogical in that there is substantial precedent of studying these individuals as tax haven users (e.g. Londoño-Vélez and Ávila-Mahecha (2021), Alstadsæter, Johannesen, and Zucman (2019)). Table 4 Panel (a) estimates the taxable income response using several entirely independently generated exposure variables that indicate financial connection with tax havens. The table shows that across all of these alternate definitions of exposure, tax haven users increased their taxable income by between 10,000 and 35,000 USD per year by the height of the outflows tax; my "preferred" estimates using ICIJ individuals as the main exposure group generates estimates that sit in the middle of this range. Figure C.3 - Figure C.9 display the event study coefficients here, and broadly show parallel pre-event trends, an increase in taxable income in 2008, and a continued, sustained increase in taxable income in 2011 throughout the rest of the time frame.[17][18]

The alternate exposure variables I use to illustrate robustness indicate whether an an individual was: 1) a weak-majority direct or indirect shareholder of a company named in the Panama Papers; 2) an individual named in the ICIJ leaks with a non-missing account opening date listed prior to 2008; 3) a $\geq 10\%$ direct or indirect shareholder of a company sending dividends to a tax haven; 4) a weak-majority direct or indirect shareholder of a company receiving money from a tax haven; 5) a weak-majority shareholder of a company domiciled in a tax haven; 6) observed having sent money directly to a tax haven; 7) observed having directly received money from an entity in a tax haven.

I view these measures as independently-generated, complementary, and mutually corroborating. Some differences with the main results of ICIJ individuals include response only appearing upon the 2010-2011 increase of the outflows tax to 5% as well as implied differences in intensive versus extensive margin responses. For instance, among the sample of individuals named in the ICIJ leaks

[17] However, Figure C.9 represents somewhat of an exception, displaying an ostensible violation to pre-reform trends, with the exposure group (here measured as individuals sending funds directly to tax havens between 2008 and June 2011) differentially increasing their reported taxable income leading into 2008. However, the figure does illustrate a trend break at 2008 and at 2010. I interpret these pre-trends to indicate that the exposure group under this measure is imperfectly defined, largely due to the limitation that the MID outflows data only exist starting in 2008 (coinciding with the outflows tax). Ideally, I would be able to tag individuals using these outflows data in the period *prior* to the implementation of the outflows tax.

[18] Additionally, Figure C.1- Figure C.2 show that my results are robust to panel rectangularization, treating all missing individual-year observations of levels of income or tax as dependent variables in regressions as zero.

with non-missing account opening dates listed explicitly prior to 2008, there is little compelling response of log taxable income (in part due to smaller exposure group sample size leading to substantially noisier estimation); the juxtaposition with the strong response of levels taxable income suggests individual response primarily on the *extensive* margin. Overall, this result demonstrates the robustness of my main finding to the specific definition of tax haven usage or association.

Second, I address the potential critique that exposed and control individuals are incomparable. In this critique, the control individuals, although of a significantly higher-earning demographic than *most* Ecuadorian individuals (as evidenced by their inclusion in the F102 data and their observable characteristics), do not serve as a suitable control group for the tax haven users. Per the critique it is possible the observed increase in taxable income among the treatment group does not reflect a change in tax haven usage *per se*, but rather an effect of the outflows tax on taxpayers with *international* (but not necessarily specifically tax haven) presence.

There are several points to address with this critique. The first aspect deals with a more careful interpretation of the econometric framework and relevant counterfactuals. Under a parallel trends assumption and a stable unit treatment value assumption (SUTVA), the econometric framework lends to estimating an ATT: the average effect of the outflows tax on exposed individuals. The relevant counterfactual here considers the evolution of outcomes for the exposure group had the outflows tax not been implemented. Therefore, I argue that the research design is valid for estimating the effect of the outflows tax on exposed individuals.

The second component of this critique essentially argues for a reframing of the exposure group: that the observed effect doesn't deal with tax haven usage *per se*, but rather the effect of the outflows tax on taxpayers with international tax presence. Under worldwide taxation of personal income (typical of most national personal income tax systems), the country-location for generating the personal income does not matter for personal income tax purposes. However, with bilateral tax treaties that allocate foreign-earned income tax liabilities across jurisdictions, a decrease in *legal* flows to non-havens should also result in an observed decrease of foreign declared income or a decrease in foreign tax credits applied.

I explore this possibility more explicitly in Section 4 by measuring the taxable income response disaggregated among income types and by studying individuals' flows in and out of Ecuador as measured in the MID data. However, see Table 5 for a display of difference-in-difference design estimates using different parameterizations of foreign income declared. The column shows that across parameterizations of foreign income—expressed in levels, log, binary, and as a share of gross income, there is no meaningful change in foreign income declarations (Table 6 columns (7) and (8) also show an *increase*, rather than a decrease, in credit application). The exceedingly small sample sizes exhibited in the pure intensive margin log specifications of Columns (5) and (6) also corroborate the argument legally declared foreign income (and resulting tax credits) is not a relevant mechanism here. Moreover, the magnitudes of the point estimates and standard errors rule out any statistically or economically significant change in foreign income declaration behavior: that is, I estimate a precise zero-change in legally-declared foreign income.[19] Lastly, note that the table shows that even among the exposure group, there is little declaration of foreign income: that is, even if the income is not associated with tax haven usage, such income if not properly declared, by definition constitutes evasion.

To further address this critique, I perform a simple matching exercise that matches exposure individuals with unexposed individuals based on pre-reform averages of earnings amounts, earnings composition (independent labor income, foreign income, wage income, etc.), and taxes. The aim of this matching exercise is to compare tax haven users against non-tax-haven users that resemble the exposure group on observable characteristics and demonstrate greater propensity to have some international tax haven presence. To this end, I perform two different matching procedures that matches each exposed individual with five control nearest-neighbor individuals (with replacement) based on propensity scores and Mahalanobis covariate score distance. The covariates used for the matching procedure include levels of gross and taxable income, independent labor income, capital income, the presence of business or foreign income, deductions claimed, and parameterizations of personal income tax payments. I average these values within individual between 2005 and 2007 and perform the matching procedure.

Table C.8 displays the covariate balance of these matching procedures, showing that both procedures—propensity score matching and Mahalanobis matching—result in strong covariate balance among exposure and control groups.[20] Table 4 Panel (b) shows the results of this estimation strategy, yielding nearly identical, if not slightly larger estimates, than of the main specification (Figure C.11 and Figure C.12 also graphically illustrate these designs). In this respect, one possible limitation of this approach this that because the control group now also resembles the exposure group in their international tax presence, they may also be affected by the outflows tax. However, the potential critique that the matched control group is negatively (and differentially) affected by

[19] Figure A.6 graphically illustrates result in the full event study plot.

[20] Figure C.10 shows the common support of the propensity scores of matched exposure and control individuals for the different matching procedures.

the outflows tax through their international tax presence admits that the effect exhibited by the exposure group is driven explicitly by tax haven usage.

Yet another critique could argue that the installation of the outflows tax both implicated both a change in evasion detection probability *and* an increase in the top marginal income tax rate. I believe the former point has some validity: in 2008, taxpayers presumably become aware that the government has some ability to observe (and tax) their cross-border transactions. It may be the case that the outflows tax also therefore increases taxpayers' perceived probability of evasion detection so that the initial component of the reform doesn't *only* affect the direct pecuniary incentive to evade the income tax.[21] However, this kind of exclusion violation does not invalidate the research design or estimation strategy, but rather prompts a reframing of the effect to correspond with both the pecuniary dimension of the tax as well as the impact of such a tax on detection perception. This reframing is likely important for contextualizing the external validity of these results and application of this kind of policy in other settings. However, I also consistently observe a compelling increase in taxable income and personal income tax payments concomitant with the rise in the outflows tax rate. Because these increases in the outflows tax rate were unaccompanied by changes in audit policies or other practices that would likely affect perception of evasion detection probability, I can confidently assign the subsequent response (occurring between the 2008-2011) to the strictly pecuniary dimension of the outflows tax.

A similar critique applies for the simultaneous change in the top marginal income tax rate in 2008. However, this critique is also addressed by the measured effect of the subsequent increase in the outflows tax rate as well as the matching design that compares individuals of similar earnings demographic so as to be identically affected by the top marginal income tax rate change. Moreover, Panel (b) of Table 3 columns (2) and (4) show nearly identical results qualitatively and quantitatively using a measure of personal income tax that mechanically projects the post-reform income tax brackets and rates onto pre-reform values of taxable income so as to mechanically control for the top marginal income tax rate change. While this mechanical approach does not account for behavioral responses, such behavioral responses would bias my estimates *downward* toward zero due to increased incentive to use tax havens. Therefore, this possibility supports the argument that I indeed measure an anti-tax haven and tax evasion effect of the outflows tax.

[21] One can see this simply from the first order condition of a parameterization of the model from Allingham and Sandmo (1972) that features utility linear in consumption and evasion costs as the sum of a linear cost (reflecting the outflows tax) and a convexly increasing cost: this setup yields a first order condition: $\tau = (\gamma + \xi(z)) + \rho\tau(1+\theta)$, for linear income tax rate τ, outflows tax γ, penalty rate upon detection θ, probability of detection ρ, and evasion amount z. For fixed τ and θ, evasion amount z decreases in both ρ and γ.

As further means of addressing this critique, I provide estimates of the outflows tax using a research design that aims to isolate the effect of the final 2011 reform that increased the outflows tax rate from 2% to 5%. However, because exposed individuals exhibit responses starting in 2008, I cannot use the same design as prescribed in Equation (2). Instead, I implement another matching design that matches exposed individuals to five nearest neighbors with replacement (with distance scores based on propensity scores and Mahalanobis covariate scores) based on pre-2011 average characteristics. This design is similar to the matching design implemented in Table 3 Panel (b), but specifically aims to isolate the effect of the final 2011 reform by comparing individuals with observably similar characteristics prior to the reform. This design estimates the equation

$$y_{it} = \alpha_i + \delta_t + \sum_{j \in \mathcal{J}} \theta_j \cdot \mathbb{1}\{g(i) = j\} + \sum_{k=2005}^{2019} \beta_k \cdot Exposure_i \cdot \mathbb{1}\{Year_t = k\} + \varepsilon_{it}, \tag{3}$$

using 2010 as the reference year. Here, the term $\sum_{g \in \mathcal{J}} \theta_j \cdot \mathbb{1}\{g(i) = j\}$ represents the matching component where a group $j \in \mathcal{J}$ fixed effect θ_j activates for an individual i included in group j.

Table C.9 displays the covariate balance of these matching procedures, showing again that both procedures—propensity score matching and Mahalanobis matching—result in strong covariate balance among exposure and control groups. Now, Panel (c) of Table 4 gives the results of this estimation strategy, yielding signficiantly, but slightly smaller estimates than in Panel (b), likely due to higher levels of pre-reform taxable income. Panels (c) and (d) in each Figure C.11 and Figure C.12 graphically illustrate these designs. These results again illustrate a persistent relative increase in declared income and taxes paid among the exposure group in the post reform period, demonstrating that my results are also robust to threats to the exclusion restriction of the initial 2008 reform.

Table 4: Robustness of individual responses:
Panel (a): Taxable income response across different definitions of haven affiliation

	50% or greater indirect shareholder of ICIJ leaks company	ICIJ individual with pre-2008 account	10% shareholder of company distributing profit to havens	50% or greater indirect shareholder of company receiving funds from havens	50% or greater indirect owner of a company owned in tax haven	Individual sent money directly to havens	Individual received money directly from havens
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Exposure × Year $\geq$ 2011	17410	17217	34491	19385	34683	8832	9183
	(3721)	(4566)	(7554)	(3757)	(9653)	(186.5)	(1360)
Exposure × Year $\in$ [2008, 2010]	8657	2475	19816	10516	28096	6775	8288
	(3149)	(3688)	(5162)	(3401)	(9316)	(159.5)	(1170)
Constant	10347	10354	10345	10345	10342	11161	10363
	(27.11)	(27.1)	(27.1)	(27.1)	(27.1)	(27.33)	(27.11)
Pre-period exposure mean	42953	74436	64842	42260	52274	24400	27776
TWFE FE	Y	Y	Y	Y	Y	Y	Y
N	9,052,116	9,051,907	9,050,734	9,051,609	9,050,418	9,622,104	9,061,597
Adjusted R2	0.652	0.653	0.652	0.652	0.652	0.677	0.652

Panel (b): 2007 matching results

	Taxable income	Taxable inc.	Log taxable inc.	Log taxable inc.	PIT	PIT	Log PIT	Log PIT
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Exposure × Year $\geq$ 2011	34076	36261	0.747	0.772	11786	12491	1.492	1.464
	(2845)	(2851)	(.06289)	(.06398)	(1091)	(1080)	(.1096)	(.1081)
Exposure × Year $\in$ [2008, 2010]	12729	15237	0.321	0.391	4192	4994	0.672	0.737
	(2321)	(2330)	(.05131)	(.0524)	(751.7)	(766.1)	(.09027)	(.09107)
Constant	52101	53011	10.54	10.55	12030	11894	8.694	8.654
	(888.7)	(949.2)	(.02326)	(.02557)	(309.7)	(312.6)	(.0364)	(.03617)
Pre-period exposure mean	54674	54674	10.59	10.59	13133	13133	8.646	8.646
TWFE	Y	Y	Y	Y	Y	Y	Y	Y
Mahalanobis matching	Y	N	Y	N	Y	N	Y	N
P-score matching	N	Y	N	Y	N	Y	N	Y
N	21,091	20,168	18,823	18,079	21,091	20,168	15,084	14,638
Adjusted R2	0.719	0.701	0.633	0.633	0.724	0.703	0.704	0.688

Panel (c): 2010 reform

	Taxable income	Taxable inc.	Log taxable inc.	Log taxable inc.	PIT	PIT	Log PIT	Log PIT
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Exposure × Year $\geq$ 2011	22235	26573	0.443	0.550	8085	8967	0.907	1.083
	(2034)	(1914)	(.04331)	(.04217)	(821.2)	(757.9)	(.07695)	(.07617)
Constant	61487	58036	10.70	10.61	11896	9742	8.489	8.224
	(743.2)	(589.7)	(.01672)	(.01714)	(280.2)	(178.1)	(.02884)	(.02754)
Pre-period exposure mean	58659	58659	10.66	10.66	12756	12756	8.570	8.570
TWFE	Y	Y	Y	Y	Y	Y	Y	Y
Mahalanobis matching	Y	N	Y	N	Y	N	Y	N
P-score matching	N	Y	N	Y	N	Y	N	Y
N	26,520	24,133	24,342	22,219	26,520	24,133	20,078	18,211
Adjusted R2	0.703	0.724	0.633	0.636	0.701	0.735	0.687	0.708

Note: This table displays results from a series of difference-in-differences designs that permute over independent variables, dependent variables, and matching specifications. Panel (a) estimates two-way fixed effect regressions of taxable income for different definitions of individual-level tax haven connectedness. Panel (b) estimates this design, using Mahalanobis and P-score matching procedures of each exposed taxpayer to five control taxpayers with replacement based on 2005-2007 average characteristics. Panel (c) estimates a design that focuses on only the post-2011 period, using Mahalanobis and P-score matching procedures of each exposed taxpayer to five control taxpayers with replacement based on 2005-2010 average characteristics. Time and exposure estimates are omitted for legibility. Standard errors are clustered on the individual-level.

Table 5: Declared foreign income

	Levels		Binary		Log		Share of gross income	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Exposure × Year ≥ 2011	-962.8	-803.4	0.000746	0.00599	-0.638	0.380	-0.00886	-0.00724
	(1170)	(1173)	(.007199)	(.008331)	(.5113)	(.3297)	(.005493)	(.005718)
Exposure × Year ∈ [2008, 2010]	-1096	-1151	0.00267	0.00497	-0.858	-0.0134	-0.00251	-0.00196
	(1105)	(1135)	(.006345)	(.006598)	(.5959)	(.3361)	(.004443)	(.004459)
Exposure	2120		0.0193		2.103		0.0132	
	(1148)		(.007007)		(.7837)		(.005382)	
Year ≥ 2011	-7.646	6.152	-4.22e-06	0.000341	-0.455	-0.0990	-0.000122	7.05e-05
	(4.097)	(2.927)	(.00005814)	(.0000627)	(.1607)	(.1716)	(.00004079)	(.00003398)
Year ∈ [2008, 2010]	-10.96	-3.184	2.13e-06	0.000216	-0.413	-0.000290	-0.000163	9.08e-06
	(4.018)	(2.458)	(.00006104)	(.00006086)	(.1523)	(.116)	(.00004086)	(.0000307)
Constant	28.11	21.25	0.000857	0.000628	8.813	9.281	0.000495	0.000340
	(3.786)	(2.482)	(.0000499)	(.00004892)	(.1233)	(.1167)	(.00003687)	(.00002664)
Pre-period exposure mean	2144	2144	0.0204	0.0204	10.42	10.42	0.0136	0.0136
Individual FE	N	Y	N	Y	N	Y	N	Y
N	9,490,665	9,055,978	9,490,665	9,055,978	8,178	4,373	8,685,069	8,275,891
Adjusted R2	0.000403	0.620	0.000322	0.402	0.0267	0.913	0.000127	0.582

Note: This table displays results from a series of difference-in-differences designs that permute over dependent variables and fixed effects specification. Panel (a) estimates two-way fixed effect regressions of taxable income for different definitions of individual-level tax haven connectedness. The dependent variable is indicated above the column number. The Exposure × Post coefficients are estimated relative to the 2005-2007 average difference as the reference group. Standard errors are clustered on the individual-level.

4 Individual-level responses: mechanisms

4.1 Individual response disaggregation by income types

To explore the mechanisms underlying exposed individual's observed income and tax responses, I turn to estimating my main design (Equation (2)) using disaggregations of income type and application of deductions and credits. For instance, Kleven et al. (2011) finds that independently generated income flows (e.g. self-employment income, certain kinds of capital income, etc.)[22] that see weaker or non-existent third party verification mechanisms are most susceptible to misreporting. I disaggregate individual responses by income type to study this possibility in my setting. Additionally, given the increase in income tax liability, I also anticipate that exposed taxpayers will exhibit positive tax avoidance responses in the form of increased deductions and credits (Chetty (2009); Saez, Slemrod, and Giertz (2012); Gruber and Saez (2002) Feldstein (1999)).

Figure 4 plots the differential response of select disaggregations of taxable income. Panel (a) plots the response of formal wage income, which is observed accurately due to third party verifi-

[22] The independently generated labor income concept in Ecuador includes self-employment, liberal profession, housing/asset rental, and agricultural income. This distinction of "independent" income is employed in other Spanish-speaking countries as income flows "with a dependency relation" and "without a dependency relation" and broadly differentiates between income sources that come from an employer versus those that do not.

cation and reporting for payroll tax (social security) purposes. Panel (b) plots the response for independently generated labor income, here generated as the different between taxable income and wage income.[23] I find that these two income sources respond in relatively equal proportion, with wage income perhaps exhibiting a slightly stronger response in magnitude. While this finding contrasts somewhat with prior results that ordinary wage income is more difficult to underreport in tax contexts (e.g Kleven et al. (2011)), it may be the case that exposed taxpayers may in fact generate wages through their owned companies as a form of income shifting (Gordon and Slemrod (1998)), as I demonstrate in Section 4.3.

Panels (c) and (d) plot the difference-in-difference designs using as dependent variables binary indicators for positive capital income and positive independent labor income respectively. I opt for using binary variables here, as independently generated sources of income likely feature levels measurement error in the Ecuadorian tax data.[24] These figures both illustrate a substantial increase in the probability that exposed individuals claim capital income or independent labor income on their tax returns. Moreover, all of these figures exhibit an identical pattern as in the main response with an initial increase following the implementation of the outflows tax that continues to increase as the outflows tax increases to 5% in 2011.

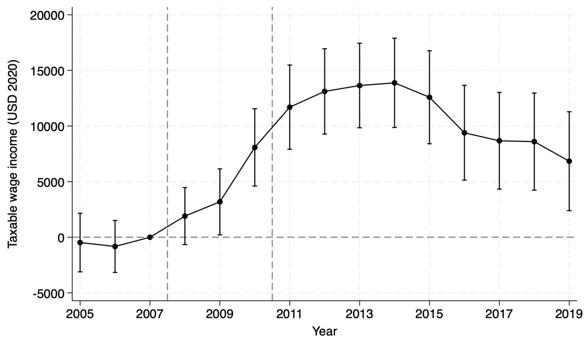
Table 6 provides estimates for these difference-in-difference specifications. The first four columns correspond with the four panels of Figure 4. The table confirms the findings in the event study plots. Columns (3) and (4) report substantial increases in the probability that taxpayers report positive capital income (+.187pp relative to a baseline of .206) or independent labor income (income

[23] The Ecuadorian administrative tax environment possibly features a mismeasured variable for independently generated income and its disaggregations. As an accounting identity, net wage income and net independent income should equal taxable income, but I observe irregularities with the populated independent income field. To address this issue, I produce imputations of capital income and its disaggregations that do not use or difference out independent labor. Figure A.7 Panel (b) plots the result using the original version of independent labor income, showing a large increase in 2008 as well as a continuted increase through 2011.

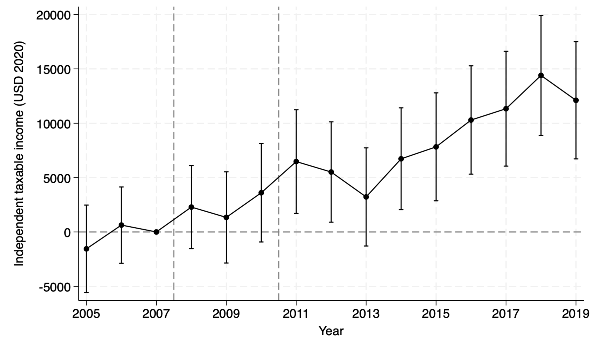
[24] These disaggregated independent income sources are not subject to third-party verification mechanisms and do not see accounting identity-based reporting enforcement (i.e. there are not mechanisms that *force* independently generated income sources to mechanically sum to taxable income along with other deductions and wage income) in the Ecuadorian tax data. Table C.11, Section C.4, Figure A.7, and Figure C.13 show the difference-in-difference results using the variables as observed directly on the F102 personal income tax form for capital income, independent labor income, and independent income. The results are qualitatively in line with the my preferred results that use imputed versions of these variables, but are significantly larger in magnitude so as to be potentially quantitatively implausible. For example, I estimate an increase in imputed independent income (measured as the difference between perfectly observed taxable income and formal wage income) of almost 10,000 USD per year on average among the exposure group in the post-2011 period, whereas the variable as observed on the form yields an estimate of 47,000 USD per year. Moreover, Figure A.7 Panel (b) shows a sharp increase observed independent income among the exposure group in 2008 that does not occur in any other fields outside the categories of "independent income". However, I ultimately do not view as a threat due to the qualitative and quantitative robustness of these results across specifications including matching designs, alternate imputations of the dependent variable, and designs that focus solely around the 2010 reform.

from self-employment and liberal professions) (+11pp from a baseline of about 73%) . Columns (5)-(8) correspond with graphical difference-in-difference designs in Figure A.7. As hypothesized, columns (7) and (8) also indicate an increased avoidance response through increased claiming of deductions and credits.

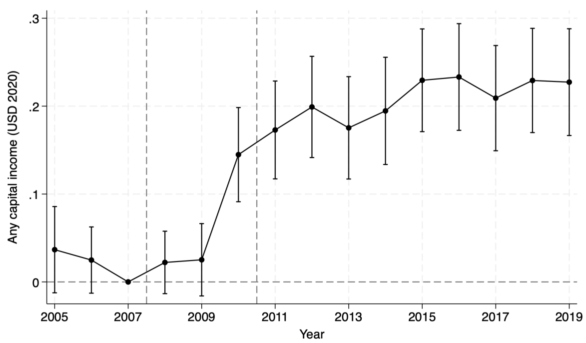
Figure 4: Impacts of the outflows tax on ICIJ individuals



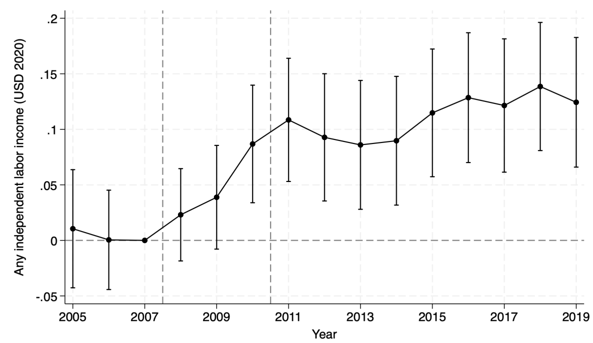
(a) Wage income



(b) Independent income



(c) Any capital income



(d) Any independent labor income

Note: These figures estimate the difference-in-differences design $y_{it} = \alpha_i + \delta_t + \sum_{k=2005}^{2019} \beta_k \cdot Exposure_i \cdot \mathbb{1}\{Year_t = k\} + \varepsilon_{it}$ that compares the evolution in outcomes of individuals named in the ICIJ leaks against those of observed non-tax-haven users. Each panel uses a different dependent variable, as indicated by the respective subtitle. The dashed gray vertical lines demarcate the implementation of the outflows tax at a rate of 0.5% and the subsequent increase to 5% respectively. All specifications include individual-level fixed effects. Error bars represent 95% confidence intervals computed using standard errors clustered on the individual-level.

Table 6: Individual responses by income types, deductions, and credits

	Wage income	Imputed independent income	Any capital income	Any independent labor income	Imputed capital income	Observed independent labor income	Total deductions	Total credits
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Exposure $\times$ Year $\geq$ 2011	11390	8791	0.187	0.107	21326	46757	6448	9629
	(1835)	(2320)	(.02413)	(.02284)	(1891)	(2763)	(422.2)	(1001)
Exposure $\times$ Year $\in [2008, 2010]$	4812	2720	0.0456	0.0465	7339	33766	5568	2282
	(1443)	(1960)	(.01786)	(.01838)	(1279)	(2485)	(408.9)	(449.9)
Year $\geq$ 2011	3476	2222	0.183	-0.0197	5556	9185	5371	369.3
	(22.43)	(29.46)	(.0007063)	(.0008593)	(21.96)	(28.71)	(10.82)	(4.034)
Year $\in [2008, 2010]$	1216	1587	-0.000444	-0.0343	4733	8548	2736	174.6
	(17.34)	(27.13)	(.0004924)	(.0007645)	(21.15)	(27.83)	(9.819)	(2.62)
Constant	4781	5683	0.0344	0.751	-685.7	-1259	-71.83	-131.7
	(16.85)	(23.55)	(.0004709)	(.0006582)	(16.57)	(23.03)	(8.429)	(2.799)
Pre-period exposure mean	18178	35713	0.206	0.727	666.8	1352	1105	41.53
Individual FE	Y	Y	Y	Y	Y	Y	Y	Y
N	9,055,978	9,055,978	9,055,978	9,055,978	9,055,978	9,055,978	9,055,978	9,055,978
Adjusted R2	0.779	0.574	0.469	0.616	0.457	0.559	0.626	0.447

4.2 Individual inflows and outflows

I next turn to studying how inflows and outflows as recorded in the MID cross-border flows data respond to the reform. One key challenge here is that these data do not begin until 2008, coinciding with the installation of the outflows tax. Therefore, these data do not lend themselves for rigorous study in the context of my main research design. Instead I opt to estimate my designs using only the 2010 reform using the matching strategy I employed in Section 3.2.1.

I estimate series of equations of the form

$$y_{it} = \alpha_i + \delta_t + \sum_{g \in \mathcal{G}} \theta_{g(i)} + \sum_{k=2008}^{2019} \beta_k \cdot Exposure_i \cdot \mathbb{1}\{Year_t = k\} + \varepsilon_{it}, \tag{4}$$

with 2010 as the reference year.

I construct dependent variables by summing all observations of each respective flow type (inflow or outflow) every year within each Ecuadorian individual and firm. In particular, in the main specification of this exercise, for each individual i, I identify the set of Ecuadorian firms, $\mathcal{F}_i$, for whom i serves as a 100% indirect owner according to the APS, and include these flows in person i's cross-border flows. Brounstein, ⓡ Bachas, and ⓡ Bajaña (2025) is the only other work that studies these outflows in conjunction with the ownership data; they validate that ownership linkages with entities in foreign countries also predict higher inflows and outflows with those respective countries. However, because only *outflows* generate tax revenues for the government (given the outflows tax), I suspect that outflows are more accurately recorded than are inflows.

Figure 5 shows the results of this estimation procedure, distinguishing between flows to/from haven/non-havens separately. The results exhibit substantial noise, but align with the results established up to this point. Namely, I observe an en exposure decrease in exits from both *and* non-haven combined on the order of around USD 20,000 per year relative to 2010. Moreover, I also observe some increase in inflows originating from tax havens. I observe no compelling change in inflows from non-tax havens.[25] Also observe that Figure A.8 shows a decrease in the probability that an individual or their owned-business makes *any* exit to either a haven or a non-haven.[26] Finally note that the change in haven flows alone amount to only several thousands USD per year so that changes in direct haven inflows or outflows cannot on their own entirely explain the change in reported taxable income.

Because the matching procedure matches exposure and control taxpayers with similar earnings and business characteristics, this response is somewhat surprising and particularly compelling in the context of the observed reported increase in taxable income among exposure taxpayers. Namely, the decrease in outflows and increase in inflows could ostensibly generate the increase in taxable income I observe in Table 3. Although the data limitations prevent me from more neatly aligning these cross-border flows results with my main results, I view these results as substantiating the mechanisms I discussed: prior to the reform, individual tax haven users pre-reform evade the income tax by sending money to tax havens directly and through their businesses in a manner that is not claimed as income: the outflows tax induces them to reduce their flows abroad and their usage of tax havens.

4.3 Firm responses

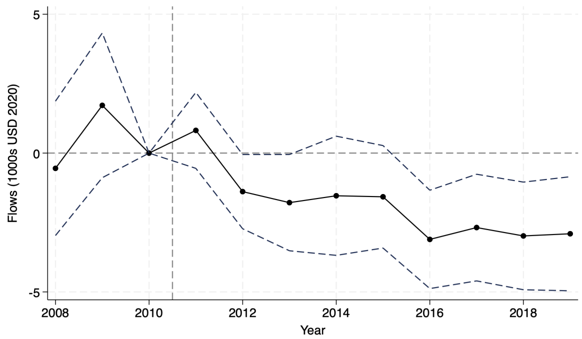
Here I evaluate changes in the payout of firms linked to individual tax haven users to produce further suggestive evidence of the mechanisms underlying my observed responses. I use firm business income tax declarations to gauge whether these firms saw changes in their labor and earnings payouts out of profits. If individuals are using their owned-firms to pay themselves more money, we should observe some increase in payouts exiting the firm.

My setting sees several important challenges to substantiating this mechanism. The first challenge deals with data limitations as pertaining to years available for the business tax declarations data and business ownership data. The business income tax data only begin in 2007; similarly as

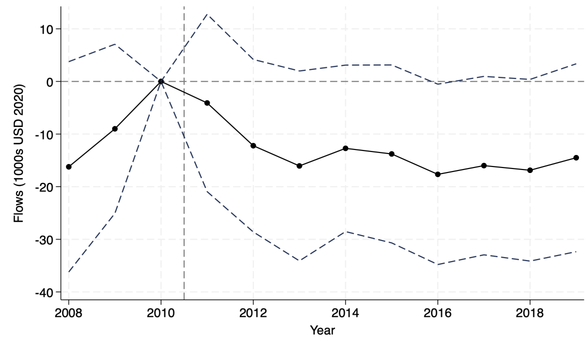
[25] Table A.3 reports the estimates for these designs, varying the firm-ownership threshold in assigning inflows and outflows to individuals.

[26] Figure A.9, and Figure A.10, further corroborate these results by plotting analogues of these graphs only using individuals' direct inflows and outflows.

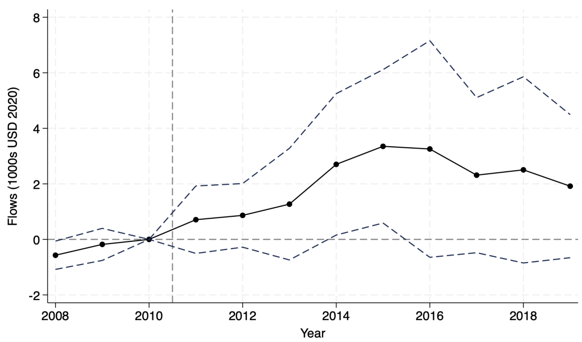
Figure 5: Impacts of the outflows tax on ICIJ individuals:
Inflows and outflows of individuals and their 100%-owned businesses (1000s USD)



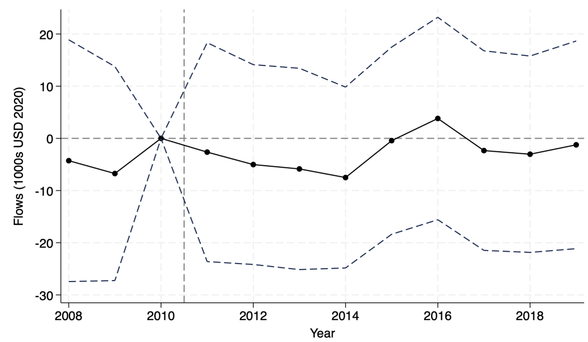
(a) Haven exits



(b) Non-haven exits



(c) Haven entrances



(d) Non-haven entrances

Note: These figures estimate the matched difference-in-differences design $y_{it} = \alpha_i + \delta_t + \sum_{g \in \mathcal{G}} \theta_{g(i)} + \sum_{k=2008}^{2019} \beta_k \cdot Exposure_i \cdot \mathbb{1}\{Year_t = k\} + \varepsilon_{it}$ that compares the evolution in outcomes of individuals named in the ICIJ leaks against those of observed non-tax-haven users. 2010 serves as the reference year. Each treatment unit is matched with five control individuals via a Mahalanobis nearest-neighbor matching processes with replacement based on pre-2011 characteristics. Each panel uses a different dependent variable, as indicated by the respective subtitle. The dependent variables in each specification here sums the respective flow-types of individuals and their 100%-owned businesses. The dashed gray vertical line demarcates the increase increase of the outflows tax rate to 5%. All specifications include individual-level fixed effects. Error bars represent 95% confidence intervals computed using standard errors clustered on the individual-level.

for the cross-border flows data, this limitation prevents me from neatly aligning firm-level results with the individual-level results in Section 3, as the data limitations do not allow me to demonstrate parallel pre-reform trends. Moreover, if I instead focus solely on the 2011 increase in the outflows tax from 2% to 5%, using the main specification from Section 3 with 2007 as a reference year in comparing the firms owned by exposed individuals against unexposed firms, my exposure group of firms may be continuously contaminated by the reform.

My main strategy to overcome this first challenge involves focusing on estimating the response of firms to the 2011 reform using a matched difference-in-difference design. I again employ a Mahalanobis matching procedure to compare exposure firms against groups of five matched control firms (with replacement) based on pre-2011 characteristics. The aim of this matching design is to eliminate potential pre-reform differential "contamination" of the exposure group.[27]

A matching design based on pre-2011 characteristics is well-suited to this end, because prior to 2011 the outflows tax featured no *explicit* targeting of tax havens. Rather, the outflows tax treated all foreign destinations equally. Beginning in 2011, the outflows tax began to feature an exemption on dividends and profit distributions sent by Ecuadorian business to non-controlling shareholders domiciled in non-tax havens.[28] Thus, I view a matching design as better suited to capture a comparison of firms that saw similar exposure to the outflows tax prior to 2011 through their international tax presence, but that saw different exposure to the outflows tax post-2011 due to their association with tax havens. I also produce results that do not rely on a matching procedure to demonstrate robustness.

As an additional challenge, the business ownership data only begin in 2012. In an ideal scenario, I would be able to identify the firms that ICIJ leaks individuals owned prior to the 2008 implementation of the outflows tax and evaluate the change in their activity. This limitation compromises how I aim to measure exposure on the business level. Instead, in my main specification for this section, I tag firms directly named in the ICIJ leaks. These firms are typically named as intermediaries that facilitate tax haven usage by individual beneficiaries—the exposed individuals in my main analysis—and are typically owned by these individuals. However, the firms named in the ICIJ leaks also potentially include firms listed as beneficiaries *themselves* as well as firms with missing owners/beneficiaries. As a robustness exercise, I also provide evidence using alternate definitions of firm-level exposure in Section A.1.

Thus, my main design for substantiating the role of firms in driving the increase in reported income of tax haven users involves a matched difference-in-difference design that compares each firm named in the ICIJ leaks against five matched unexposed firms using a Mahalanobis matching process (with replacement) based on pre-2011 covariates.[29] Table 7 displays the covariate balance

[27] Similar to as for the individuals design, I design the control group of firms to exclude firms for which I observe *any* connection to tax havens through either the ICIJ leaks data, the APS data, or the MID cross-border flows data.

[28] See Section G for a formal evaluation of the impact of this component of the reform on dividend flows to tax havens to non-havens; I develop a series of comparisons of dividend flows to havens and non havens compare with previously exempt transaction categories. I estimate a high degree sensitivity of dividends and profit distributions to the outflows tax rate.

[29] Specifically, the covariates include 1. the share of years from 2008-2010 in which the firm received payments from abroad, 2. the share of years from 2008-2010 the firm send payments abroad, 3. the pre-period average of $\log(assets_{it}+1)$, and a categorical variable for the observed industry. Further note that while many "log-like" transformation of the logarithm, namely $\log(x+1)$, do not preserve percentage effect interpretations (Chen and Roth (2023)), I employ this transformation not to study percentage effects, but rather to include firms with zero assets in the matching procedure while preserving a logarithmic relationship between firm size and exposure. This decision

for the unmatched and matched samples of exposed and unexposed firms. The table displays informative descriptive characteristics in understanding how firms with tax haven affiliation differ from firms with no visible affiliations with havens.

Within the unmatched sample, the table reveals that these firms with tax haven affiliation are substantially larger than unexposed firms in terms of revenue, assets, profits and taxes; they are also twice as likely to make profit distributions to their owners. The plurality of exposed firm (20%) identify as providing professional services. Interestingly, while I observe that on average exposure and control firm have negative profitability by assets (with substantial variation), exposed firms appear *more* profitable than control firms. However, there appears no significant difference in whether firms declare a gross loss or in their labor share of expenses, and although exposed firms have a significantly greater intangible asset share than non-haven firms, the size of difference is minor in relative terms (3.2pp relative to a 72.2% baseline), which contrast somewhat with prior evidence using non-administrative data (e.g. T. R. Tørsløv, L. S. Wier, and Zucman (2020)). The table also shows the effectiveness of the matching procedure in aligning firms on these pre-reform characteristics; this result may be somewhat surprising given the parsimonious and ostensibly unrelated covariates (pertaining to inflows and outflows, size, and industry) employed in the matching procedure.

To identify effects of the reform on exposed firms' activities, I estimate equations of the form of Equation (4). The purpose of this exercise is to determine whether the firms associated with tax haven usage experienced increased outlays in response to the outflows tax. For this reason, regressions feature equal weighting on observations (as opposed to weighting by pre-reform size or revenue).

Lastly, I identify three categories of outlays that could result in flows accruing from firms to individuals: worker expenses (wage and non-wage compensation), non-labor expenses, and profit/dividend distributions. However, I observe only labor expenses directly in the data. I construct non-labor expenses as the difference between total expenses and labor expenses. I impute profit/dividend distributions using a corporate post-profit accounting identity that expresses the year-to-year change in firm retained earnings as the difference between observable gross profits and taxes, reinvestment, and (unobserved) profit distributions. I calibrate my dividend imputation so

parametrically normalizes the effect of a one-log-order of magnitude increase in firm size (by assets) on the exposure selection propensity to the effect of changing from zero assets to one Dollar in assets. I view this normalization as somewhat discretionary, albeit not necessarily undesirable in allowing for a continuous marginal propensity effect of firm asset declaration on the extensive margin.

Table 7: Descriptive statistics:
ICIJ firms versus control firms

	Un-matched sample			Mahalanobis-matched sample		
	Exposure	Control	Difference	Exposure	Control	Difference
Revenue	2858	551.6	2307	2858	2650	201.3
	(10779.32)	(3805.703)	(479.797)	(10779.32)	(10545.02)	(308.871)
Expenses	2589	514.8	2074	2589	2441	138.5
	(9639.63)	(3438.284)	(428.646)	(9639.63)	(9492.688)	(276.395)
Net profit	195.1	25.68	169.4	195.1	145.5	51.20
	(950.304)	(329.393)	(41.805)	(950.304)	(846.755)	(27.794)
Positive profit (binary)	0.445	0.298	0.147	0.445	0.468	-0.00300
	(.42)	(.389)	(.019)	(.42)	(.425)	(.016)
Loss (binary)	0.19	0.179	0.0110	0.19	0.21	-0.00600
	(.298)	(.302)	(.013)	(.298)	(.315)	(.015)
Labor share of expenses	0.113	0.121	-0.00800	0.113	0.116	-0.00500
	(.155)	(.171)	(.008)	(.155)	(.15)	(.008)
CIT liability	41.84	6.435	35.41	41.84	34.29	7.526
	(188.835)	(62.377)	(8.422)	(188.835)	(170.615)	(5.501)
Paid dividend (binary)	0.16	0.0873	0.0723	0.16	0.164	0.00980
	(.3283)	(.2536)	(.0149)	(.3283)	(.3408)	(.0162)
Dividend share of profit	0.0859	0.0783	0.00760	0.0859	0.0889	-0.00160
	(.1662)	(.16)	(.0097)	(.1662)	(.1607)	(.0106)
Profitability by assets	-0.042	-0.246	0.204	-0.042	-0.091	0.0550
	(.699)	(2.751)	(.034)	(.699)	(1.23)	(.05)
Intangible assets share	0.753	0.722	0.0320	0.753	0.722	0.0240
	(.293)	(.334)	(.014)	(.293)	(.321)	(.014)
Assets	2879	529.6	2349	2879	2220	665.0
	(10097.34)	(3573.08)	(444.194)	(10097.34)	(8312.274)	(234.559)
Top industries						
1st most common	Prof. services	Physical goods		Prof. services	Physical goods	
	20.74%	18.1%		20.74%	22.75%	
2nd most common	Physical goods	Non-technical services		Physical goods	Prof. services	
	20.74%	15.96%		20.74%	19.29%	
3rd most common	Real estate services	Real estate services		Real estate services	Real estate services	
	15.12%	9.57%		15.12%	13.75%	
No. units	516	129,672		516	2,255	

Note: This table displays summary statistics and covariate balance for exposure and control firms under the main firm sample and the matched sample using average pre-reform characteristics. Monetary variables are expressed in units of 1000 USD 2019. Columns labeled "Exposure" and "Control" give group means as well as standard deviations in parentheses. Columns labeled "Difference" correspond with univariate cross-sectional regressions of each respective row variable on an indicator for exposure, here measured as being named in the ICIJ leaks, within the specified sample with soft parentheses containing hetreoskedasticity-robust standard errors. The first three columns show the covariate balance for all ICIJ firms versus all unexposed firms. The second set of three columns give the covariate balance using a sample of five Mahalanobis distance nearest neighbor control firms matched to each exposure firm with replacement.

that aggregate annual distributions match those observed directly starting 2015 with the availability of accurate dividend data in Ecuador.[30] Additionally, non-labor expenses do not clearly constitute payouts that could accrue to firm affiliates in the same way that would labor payments. For the reason, I view labor expenses as the most important outcome in inferring the payout responses of firms connected to tax haven users to the reform.

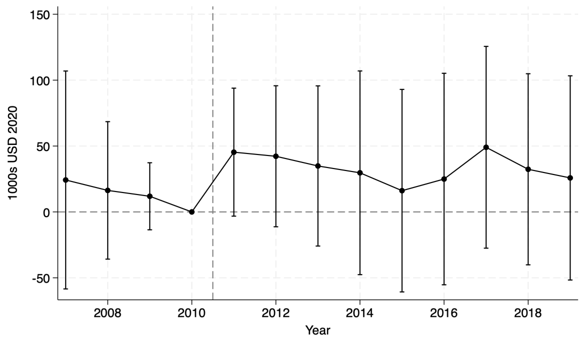
Figure 6 display the difference-in-differences results for this design. I observe no change in non-labor expenses or dividend/profit distribution payouts, implying that the observed increase in capital income is not attributable to increases in profit distributions from exposed individuals' owned firms. However, the figures show a consistent, albeit noisy increase in labor payments, on the order of around USD 40,000-50,000 per year or 10% on the pure-intensive margin. This response is consistent with the observation in declared taxable income observed in Figure 4. It is important to note that the expense accounting concept of "labor payments" in the Ecuadorian tax data does not distinguish between wage and non-wage compensation to workers, so that such flows may manifest as increases in either the dependent or independent earnings concepts as seen in Panels (a) and (b) of Figure 4. However, Table 8 shows that these coefficients are estimated with substantial noise, and do not attain joint significance.[31]

While the labor payouts response here fails to attain joint significance, Figure A.12 and Table A.6 show significant positive labor outlay responses of exposed firms relative to unexposed firms using an unmatched sample (using 2007 as a baseline) as well as different definitions of firm-level exposure. All of these specifications show relative increases in labor payouts of exposed firms on the order of USD 50,000 per year. Additionally, several of the unmatched difference-in-difference designs that use 2007 as the baseline indeed exhibit increases in labor payouts in the 2008-2010 intermediate period during which the outflows tax rate increased from 0% to 2%, substantiating the hypothesis that such firms were already "treated" or "contaminated" by their owners' exposure to the initial reform.

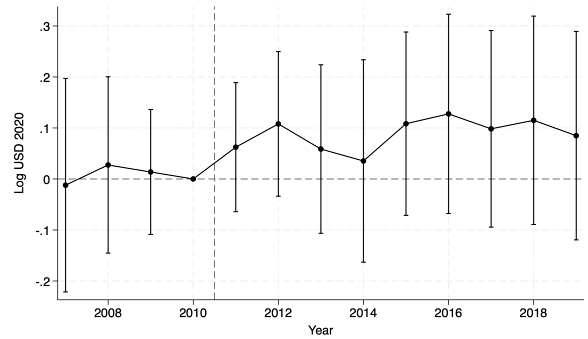
[30] I discuss this imputation in greater detail in Section B.1; because a component of the imputation involves taking the difference in retained earnings between years t and $t+1$, I cannot extend the imputation to 2019, my final year of data.

[31] Additionally, Figure A.11 and Table A.4 show no differential response in terms of 1) whether a firm makes a profit distribution payment, 2) retained cash earnings, 3) declared profits, or 4) corporate income tax payments.

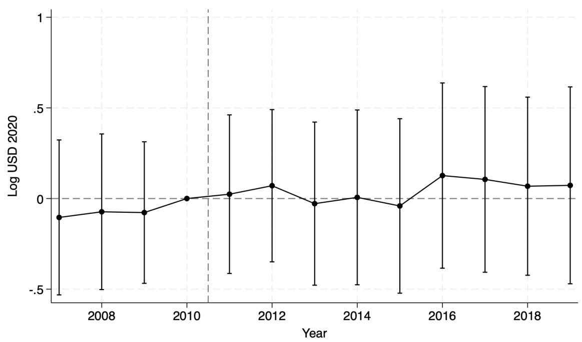
Figure 6: Firm responses to the outflows tax:
Labor, non-labor, and profit distribution payouts



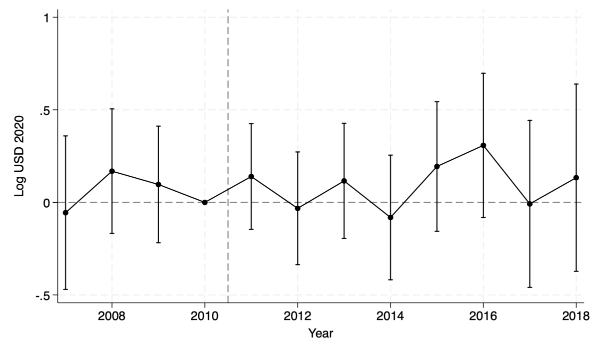
(a) Labor payments



(b) Log labor payments



(c) Log non-labor expenses



(d) Dividend and profit distributions

Note: These figures estimate the matched difference-in-differences design $y_{it} = \alpha_i + \delta_t + \sum_{g \in \mathcal{G}} \theta_{g(i)} + \sum_{k=2008}^{2019} \beta_k \cdot Exposure_i \cdot \mathbb{1}\{Year_t = k\} + \varepsilon_{it}$ that compares the evolution in outcomes of firms named in the ICIJ leaks against those of matched unexposed firms users. 2010 serves as the reference year. Each treatment unit is matched with five control individuals via a Mahalanobis nearest-neighbor matching processes with replacement based on pre-2011 characteristics. Each panel uses a different dependent variable, as indicated by the respective subtitle. The dependent variables in each specification here sums the respective flow-types of individuals and their 100%-owned businesses. The dashed gray vertical line demarcates the increase increase of the outflows tax rate to 5%. All specifications include individual-level fixed effects. Error bars represent 95% confidence intervals computed using standard errors clustered on the firm-level.

5 Discussion: tax haven policy design and optimality, conclusion

The outflows tax induced a substantial increase in reported taxable income and personal income tax payments among individuals that demonstrate connection with tax havens. Combining publicly available aggregate statistics[32] with estimates from Columns (1) and (2) of Table 3, I infer that the impact of the outflows tax on the reporting behavior of tax haven users increased annual aggregate personal income tax collections by 7.5% relative to 2007 and 3.7% relative to 2010 (this latter figure comes in the context of the pre-existing outflows tax at 2%). Figure 7 shows that the reform induced

[32]Government statistics on tax collections by the Ecuadorian government are available at https://www.sri.gob.ec/estadisticas-generales-de-recaudacion-sri.

Table 8: Difference-in-differences: Firm outlays responses

	Labor payments		Non-labor expenses		Dividend and profit distributions		
	Levels	Log	Levels	Log	Levels	Log	Binary
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Exposure × Year ≥ 2011	22.25	0.0785	-63.84	0.0996	3.505	0.0363	-0.0299
	(31.67)	(.07531)	(233.7)	(.1282)	(23.96)	(.1185)	(.0208)
Year ≥ 2011	75.93	0.245	-237.8	-0.326	38.99	-0.463	0.0102
	(17.39)	(.04298)	(140.2)	(.2078)	(18.31)	(.1179)	(.0169)
Constant	258.8	4.212	2923	5.209	142.4	2.335	0.527
	(6.151)	(.02133)	(51.83)	(.1504)	(7.458)	(.05054)	(.008547)
Pre-period exposure mean	244	4.258	2881	5.261	165.3	2.608	0.513
Firm FEs	Y	Y	Y	Y	Y	Y	Y
Mahalanobis matching	Y	Y	Y	Y	Y	Y	Y
N	29,277	16,207	28,709	21,383	24,928	13,374	24,928
Adjusted R2	0.908	0.881	0.931	0.797	0.732	0.789	0.482

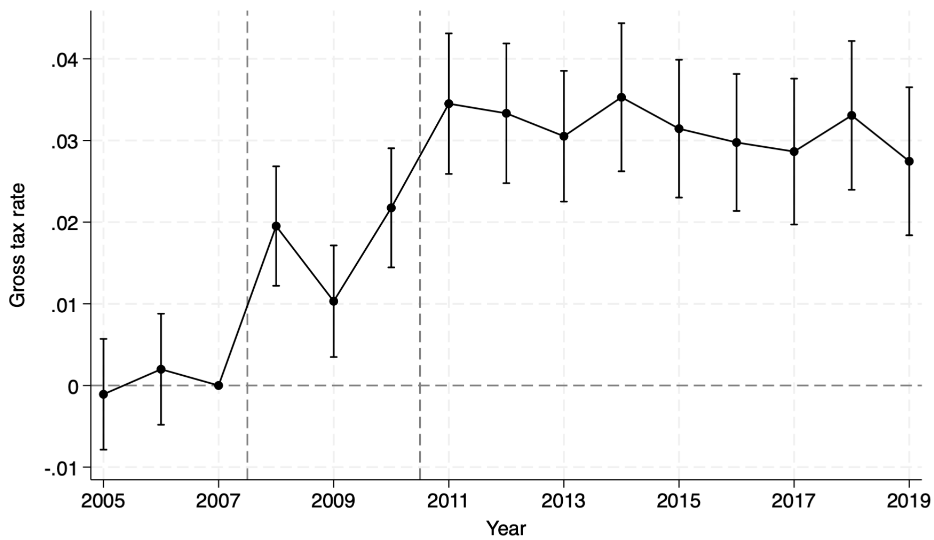
Note: This table displays results from a series matched difference-in-differences designs $y_{it} = \alpha_i + \delta_t + \sum_{g \in \mathcal{G}} \theta_{g(i)} + \sum_{k=2008}^{2019} \beta_k \cdot Exposure_i \cdot \mathbb{1}\{Year_t = k\} + \varepsilon_{it}$ that permute over dependent variables and fixed effects specification. Panel (a) estimates two-way fixed effect regressions of taxable income for different definitions of firm-level tax haven connectedness. The dependent variable is indicated above the column number. The Exposure × Post coefficients are estimated relative to the 2007-2010 average difference as the reference group. Standard errors are clustered on the firm-level.

a 3pp increase in effective tax rates for exposed individuals. This response, which is attributable to the highest earning taxpayers in the economy is large and persistent in the context of existing evidence on other policies aimed at mitigating tax haven usage (Alstadsæter, Casi, et al. (2023); Alstadsæter, Johannesen, Le Guern Herry, et al. (2022)) that 1) either do not document large tax collections responses, 2) document responses that are only temporary (e.g. following a repatriation amnesty), or 3) do not elicit responses from top earners (e.g. Fejerskov Boas et al. (2024)).

Nonetheless, this effect size requires additional context and discussion in order to understand the optimality of this kind of policy and other, possibly more desirable policy alternatives. For one, this effect size comes in the context of a lower-middle income country where the personal income tax operates with a much higher degree of progressivity but also represents a substantially smaller share of overall tax collections than in developed countries; perhaps in higher income settings where a larger share of taxpayers pay the personal income tax, the increase in personal income tax collections due to less evasion relative to overall collections would be mechanically smaller. Nonetheless, I conclude that this aspect of the reform increased revenue collections and augmented the progressivity of the *de facto* tax system.

These results offer several strong policy takeaways that are applicable for other counties. The first is an intuition that my results corroborate that in determining tax noncompliance, “directly pe-

Figure 7: Gross income tax rate



Note: This figure displays estimates of the difference-in-differences design $y_{it} = \alpha_i + \delta_t + \sum_{k=2005}^{2019} \beta_k \cdot Exposure_i \cdot \mathbb{1}\{Year_t = k\} + \varepsilon_{it}$ that compares the evolution in the gross income tax rate of individuals named in the ICIJ leaks against that of observed non-tax-haven users, with 2007 as the reference year. The dependent variable is computed as personal income tax payments divided by gross income declared. The dashed gray vertical lines demarcate the implementation of the outflows tax at a rate of 0.5% and the subsequent increase to 5% respectively. All specifications include individual-level fixed effects. Error bars represent 95% confidence intervals computed using standard errors clustered on the individual-level.

cuniary" incentives may induce greater behavioral responses than actuarially equivalent "indirectly pecuniary" incentives that affect perception of detection probability. From a simple perspective of a taxpayer's income underreporting decision (e.g. Yitzhaki (1974); Allingham and Sandmo (1972); Becker (1968)), we can think about a composite penalty rate as the product of a detection probability ρ and a statutory penalty rate conditional upon detection θ. I broadly refer instruments that directly change θ (e.g. the statutory penalty rate or the cost of sending funds abroad, in my setting incurred with probability one) as "directly pecuniary". Policies such as audits, TIES, the implementation of the CRS, and AEoI, all focus on adjusting agents' perception of ρ. As I discuss, most of these policies tend to only generate temporary tax responses as individuals either internalize the one-off nature of audits or find ways to adapt and decrease perceived detection probabilities (Hebous et al. (2023)). Moreover, literature in public and behavioral economics tend to show that agents exhibit substantial misperception in audit probabilities and tend to reject linear expected utility frameworks for decisions involving probabilities near zero and one (Bergolo et al. (2023); Chander and Wilde (2021); Tversky and Kahneman (1992)). For these reasons, behavioral frictions may imply that policies that affect detection probability may demonstrate less salience and yield more mild or temporary behavioral responses than more "directly pecuniary" policies. My results imply that policy makers may find greater success in focusing on policies that target the "directly pecuniary" component of agent decision-making.

The second takeaway deals with considerations for a policy like the Ecuadorian outflows tax that I study here. This policy is quite novel in its breadth, where most capital controls policies tend to only apply to a narrow range of activity. One obvious tension that comes with an outflows tax is the tradeoff between tax base expansion, which reduces avoidance/evasion opportunities, and taxing entirely non-illicit outflows as a kind of "false-positive". This latter aspect will operate like a tariff or a standard capital control. In absence of information constraints and enforcement frictions, the outflows tax would only affect tax strategic uses of tax havens. As a standard optimal tax result, when the government has access to a linear income tax as well as the ability to perfectly observe and linearly tax avoidance and underreporting activities, a revenue-maximizing tax administration will set the tax rate on underreporting activity equal to the income tax rate (Piketty and Saez (2013); Chetty (2009); Feldstein (1999)). However, in the presence of information constraints, the tax on avoidance/underreporting activities (here, the outflows tax) affects perfectly non-tax-strategic consumption—namely imported goods and goods produced using intermediate inputs that are affected by the tax ("false positives"), driving down the social welfare maximizing outflows tax rate below the linear income tax rate. Section E develops and calibrates a model for the optimal outflows tax that considers this tradeoff along with taxpayer evasion responses to the outflows tax, rationalizing an outflows tax rate on the same order of magnitude as empirically observed.

The outflows tax offers considerable promise as an anti-tax haven policy. While its tariff- and capital controls-like properties are possibly less desirable, the outflow tax is substantially smaller in magnitude than empirically implemented tariffs (Broda, Limao, and Weinstein (2008)). If illicit use of tax havens is more price-responsive than are imports or exports to tariffs, one could rationalize a similarly small outflows tax as an anti-tax haven measure. Moreover, while removing "false-positive" transactions from the outflows tax base by enacting more explicit targets toward tax havens reduces its tariff- and capital controls-like properties, such action also opens up the possibility of avoidance, for example via round-tripping (Feldstein (1999)). In Ecuador's case where in 2011 the country introduced an exemption on dividends sent to shareholders in non-tax havens, the government addressed this concern by excluding from this exemption payments to shareholders—domiciled in non-havens—with controlling interest in Ecuadorian businesses, facilitated by the beneficial ownership registry data that the tax administration maintains. While the administrative data requirements for enforcing the outflows tax are likely considerable, Ecuador's experience with state capacity limitations and as a lower-middle income country speaks quite directly to the policy-realm of possibility for countries of similar or higher income and state-capacity background.

Ecuador's outflows tax also speaks to another, possibly overlooked direction for multilateral policy: if countries do not seek to *unilaterally* adopt a similar outflows tax to a wide array of countries (or possibility to *all* countries as was the case at the beginning of Ecuador's outflows tax), *multilateral* policy could instead aim to incorporate small, coordinated outflows taxes to tax havens. For instance, instead of Ecuador taxing *all* outflows with the aims that individuals reduce flows to tax havens, many countries could coordinate on taxing flows *only* to a fixed set of countries jointly recognized as tax havens as well as to non-cooperating countries, operating in effect as a form of sanctions. Set at a sufficiently low rate, the outflows tax would not overly discourage non-tax-strategic activity (the "false positives"), while the coordinated tax would prevent agents from engaging in round-tripping behavior as a means of avoiding the tax. Given the level of multinational coordination involved in implementing CRS or AEoI, such a policy may also be within the realm of possibility.

5.1 Conclusion

Policy design in reducing tax haven usage has seen substantial challenges in recent years; in light of the of inherently multinational nature of tax haven usage and the increasing sophistication of taxpayers, policy discussions tend to focus around multilateral coordination. However, multilateral policies, such as AEoI and TIEAs tend to be slow, as they by definition require consensus of multiple countries, and feature significant exemptions that undermine policy effectiveness. This conflict naturally gives way to the question of what countries can do on their own to mitigate tax haven usage.

To this end, I study the introduction of a near-universal outflows tax in Ecuador. While this tax was not initially installed with the explicit purpose of reducing tax haven usage, its breadth of enforcement induced a decrease in incentives for high earners to use tax havens. I use combine the cross-border transaction data underlying the enforcement of the outflows tax in with beneficial ownership data and leaks from the Panama Papers to identify individuals that demonstrate connection to tax havens. Compared to other high earners that demonstrate no connection to tax havens, I find that the installation of the outflows tax led to an increase in taxable income among tax haven users by 40%, and through the progressivity of the income tax schedule, and personal income tax payments increase by around 60%. I demonstrate the robustness of this result to changing the definition of tax haven exposure, leveraging different sub-reforms to the outflows tax rate, and using a matching design that mitigates some of the differences between exposed and control individuals.

This response is large in magnitude, persistent over time, and is concentrated among the highest-earning tax payers in the Ecuadorian economy, leading to an increase in annual aggregate personal income tax collections of about between 3.7% and 7.5% every year. While the tax also has potentially less desirable tariff-like properties, its low rate of 5% is substantially lower than most tariffs, likely affecting high-sensitivity tax haven users more than non-tax strategic trade.

I elaborate on my results by exploring mechanisms. The data environment allow me to granularly observe individual activity, as beyond characterizing responses disaggregated by income type, I can observe the cross-border flows of individuals, identify the businesses in which they serve as direct or indirect shareholders, and observe the corresponding activity of *those* businesses. I find that the income response is driven *both* by wage income and independently-generated income (capital and non-wage labor income), with exposed taxpayers exhibiting a substantial increase in the probability they declare capital and independent labor income. While the response of *both* wage- and non-wage income may contrast somewhat with prior work that argues that wage income sees relatively little underreporting (Kleven et al. (2011)), the Ecuadorian environment does not see as prevalent third party income reporting on wage income. Moreover, I show that the payouts to individuals also likely come in part from the companies owned by tax haven-exposed individuals. This result is further corroborated by evidence on changes in cross-border flows; I find that exposed individuals and their wholly-owned businesses exhibit a decrease in outflows *to* tax havens and non-havens and an increase in inflowing payments originating *from* tax havens.

The results show that it is indeed possible for countries to act unilaterally in mitigating tax haven usage. I leverage variation both from the initial implementation of the outflows tax rate at a rate of 0.5% and its subsequent increase to 5% to speak to the distinction between responses to the 1) strictly pecuniary dimension of the tax's impact on incentives (the cost of sending funds abroad) and 2) the potential conflation of the initial outflows tax with an increase in the probability of detection of wrongdoing (Allingham and Sandmo (1972)). While the initial installation of the outflows tax may have shifted both the cost of sending funds abroad and agents' subjective probabilities of detection of wrongdoing (perhaps by merit of the fact that the Ecuadorian government can observe and monitor outflows), the subsequent outflows tax increases were unaccompanied by changes to enforcement and audit policy; moreover, there is little reason that agent's subjective detection probabilities also increase with the outflows tax rate. For this reason, the elicited decrease in evasion likely reflects a response to the "directly" pecuniary dimension of tax evasion incentives. In light of more mixed evidence on the effectiveness of past policies that focus on the "information-dimension" of incentives and enforcement (e.g. Alstadsæter, Casi, et al. (2023); Menkhoff and Miethe (2019)) it is possible that a promising avenue for policy design in the realm of tax evasion and tax administration could place similar focus on the "directly pecuniary" dimension of taxpayers' incentives.

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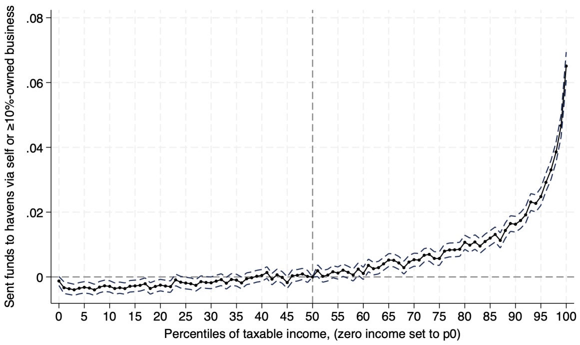
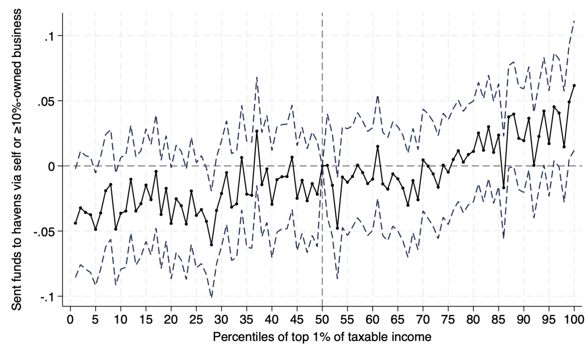
Appendix A Additional graphs and tables

A.1 Exhibits to accompany the main text

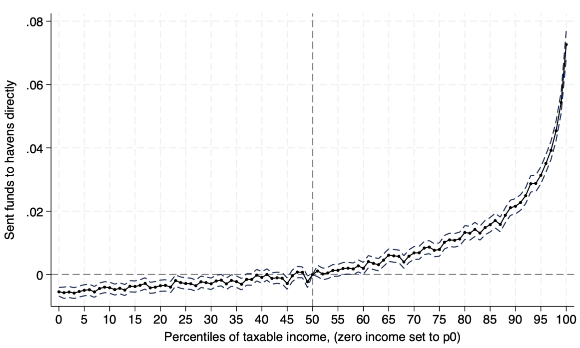
Figure A.1: Tax haven association by income rank:
Additional fixed effect specifications



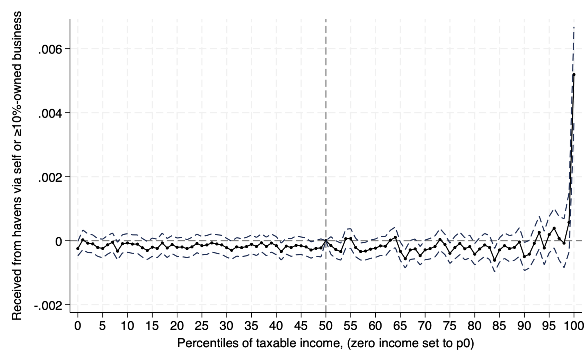
(a) Any flows to havens,
Two way fixed effects



(b) Sent *any* money to havens,
ID fixed effects (top 1%)



(c) Sent *any* money *directly* to havens,
ID fixed effects



(d) Received *any* money from havens,
ID fixed effects

Note: These figures plot regression-adjusted conditional distributions of various measures of tax haven connectedness by taxable income rank. All values of taxable income rank are calculated within each year among the population of form F102 personal income tax filers; zero-income individuals are mapped onto a "p0" group. All panels estimate a fixed effect regression of respective haven activity dependent variable on income rank, as $y_{it} = \alpha_i + \sum_{r=0}^{100} \gamma_{r(it)} + \varepsilon_{it}$, with p50 specified as the reference group and standard errors clustered on the individual-level. Panel (a) also includes year fixed effects.

Table A.1: Predicting haven usage:
Sent money to tax havens directly or via $\geq$ 100%-owned business

Panel (a): Horse race between observable characteristics and fixed effects

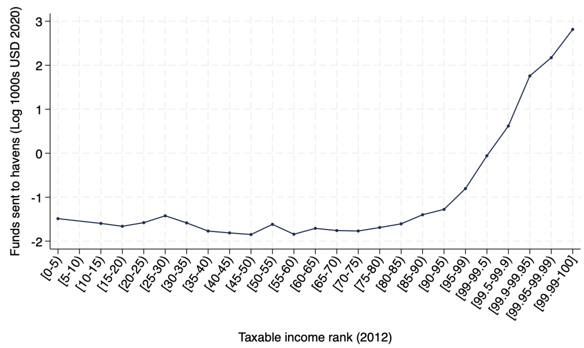
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Log gross income	.008382	.004348	.007456				.00398
	(.0001269)	(.0001833)	(.0004818)				(.0001826)
Log taxable income	.01482	.001196	.01981				.001022
	(.0001172)	(.0001568)	(.0003834)				(.0001564)
Any capital income	.03148	.004528	.0319				.002065
	(.0004523)	(.0004364)	(.003878)				(.00044)
Any independent labor income	.008476	-.001702	-.00054				-.001374
	(.0002558)	(.0003293)	(.00168)				(.0003283)
Any foreign income	.03612	.004773	.04242				.004303
	(.004829)	(.005353)	(.01787)				(.005351)
Any business income	.04503	.01961	.06271				.018
	(.001458)	(.001698)	(.005545)				(.001694)
Any other income	.005522	-.001308	-.01646				.0003529
	(.0006011)	(.0007589)	(.002068)				(.0007579)
Any 100%-owned haven businesses			.05166				
			(.007078)				
Constant	-.1733	.00861	-.1734	.06353	.06145	.06353	.0141
	(.001172)	(.001383)	(.003975)	(0)	(.0001605)	(0)	(.001378)
Covariates	X_{it}	X_{it}	CRE	No	No	No	X_{it}
Fixed effects	No	ID	No	ID	Year	TWFE	TWFE
N	7,830,975	5,624,104	1,490,005	5,624,104	6,014,341	5,624,104	5,624,104
Number of clusters	1,752,082	1,194,862	276,007	1194862	1,585,099	1,194,862	1,194,862
F-statistic	5776	252.5	775.6				195.2
Adjusted R-squared	.01878	.3129	.01525	.3126	.003056	.3126	.3164

Panel (b): Autoregression on past haven usage and contemporaneous other haven usage

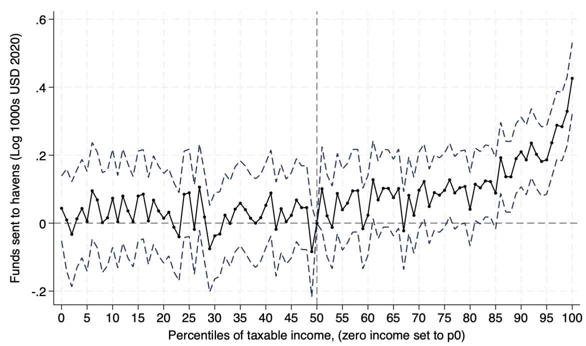
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
y_{t-1}	.459									.02001	.0003149
	(.001081)									(.0003774)	(.00006564)
$\geq$ 50% haven ownership		.1109						-.01592		-.01721	
		(.001128)						(.0004126)		(.0004464)	
$\geq$ 10%-owner of a firm receiving money from a haven				.2406				-.0933		-.09904	
				(.004976)				(.003844)		(.00407)	
$\geq$ 10%-owner of a firm sending money to a haven			.952					.9583		.9476	
			(.0006194)					(.0005539)		(.0007307)	
Received money directly from a tax haven							.2446		.0002168		.000199
							(.005875)		(.0001737)		(.0001942)
Sent money directly to a tax haven						1			1		.9998
						(3.050e-06)			(4.256e-06)		(.00003164)
100% haven owner					.0646				.001424		.001382
					(.00296)				(.0003479)		(.0003454)
Constant	.03623	.05392	1.929e-12	.0511	.0578	.00002194	.05123	.0006152	.00001532	.0001312	9.334e-06
	(.00008908)	(.0001404)	(0)	(.0001291)	(.0001462)	(3.050e-06)	(.0001295)	(.00001397)	(2.719e-06)	(.0000157)	(1.778e-06)
N	6,866,948	7,079,513	9,369,735	9,369,735	7,079,513	9,369,735	9,369,735	7,079,513	7,079,513	5,562,200	5,562,200
R-squared	.1855	.008019	.9493	.001869	.0002542	.9996	.001245	.9538	.9997	.9506	.9996

Note: This table shows predictors of tax haven usage between 2008 and 2019, as measured by whether an individual i in year t or their 100%-owned business sent any money *directly* to a tax haven. The columns of Panel (a) iterate over regressions of this variable on difference covariate and fixed effect specifications. Column (3) uses 2005-2007 averages of each listed variable as time-invariant individual covariates. Panel (b) regresses haven usage on combinations of past haven usage and other contemporary measures of haven usage. Standard errors in both panels are clustered on the individual-level.

Figure A.2: Log haven outflows conditional on income rank



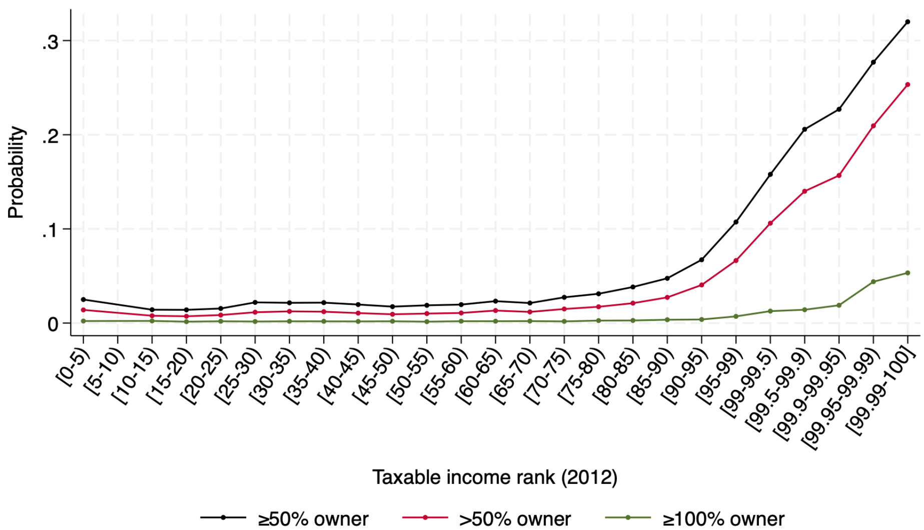
(a) Average log flows to havens (2012)



(b) Average log direct flows to havens, ID fixed effects

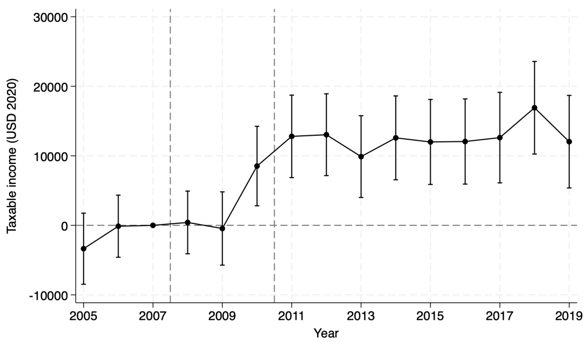
Note: These figures plot the conditional distribution of log outflows to havens by taxable income rank. All values of taxable income rank are calculated within each year among the population of form F102 personal income tax filers; zero-income individuals are mapped onto a "p0" group. Outflows are calculated as the sum of funds outflowing directly to tax havens from Ecuadorian individual i in year t along with those of i's 10% or greater indirectly-owned businesses in year t. Panel (a) plots a 2012 cross-section of this relationship; Panel (b) adjusts the conditional distribution by controlling for individual fixed effects (and clustering standard errors on the individual-level).

Figure A.3: Conditional probability of owning a haven firm by income rank (2012)

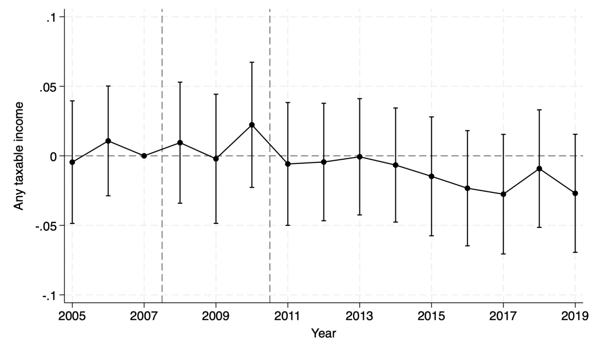


Note: This figure plots the conditional probability of directly or indirectly owning a business domiciled in a tax haven at a given indirect ownership threshold by income rank.

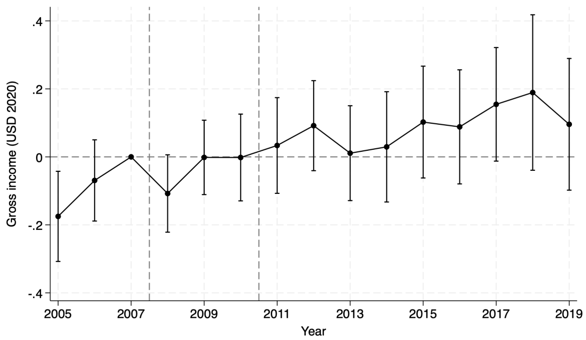
Figure A.4: Additional difference-in-difference results: Income



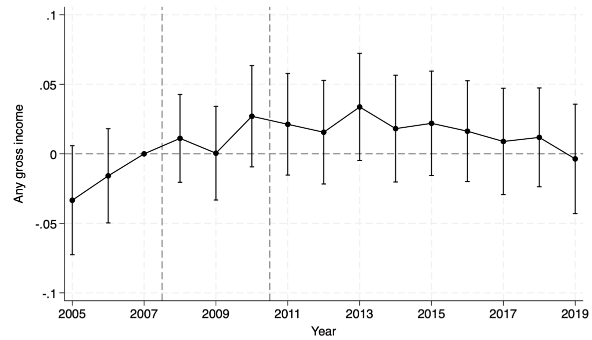
(a) Taxable income (no fixed effects)



(b) Any taxable income



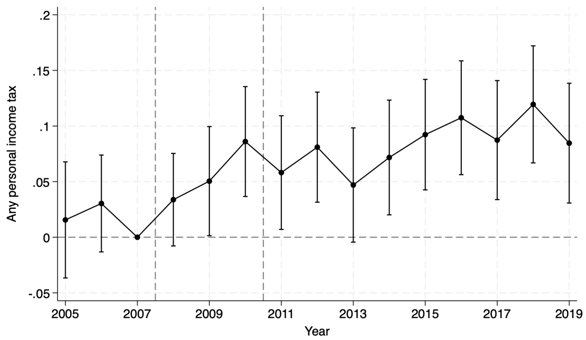
(c) Log gross income



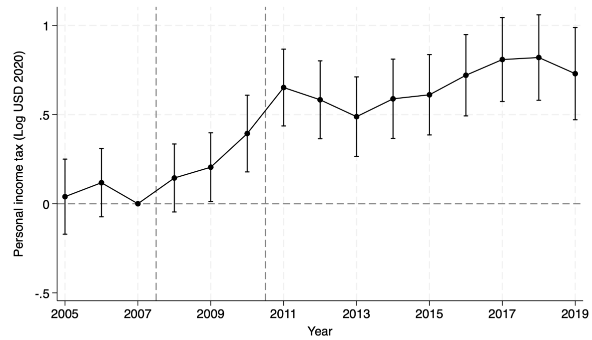
(d) Any gross income

Note: These figures estimate the difference-in-differences design $y_{it} = \alpha_i + \delta_t + \sum_{k=2005}^{2019} \beta_k \cdot Exposure_i \cdot \mathbb{1}\{Year_t = k\} + \varepsilon_{it}$ that compares the evolution in outcomes of individuals named in the ICIJ leaks against those of observed non-tax-haven users. The dashed gray vertical lines demarcate the implementation of the outflows tax at a rate of 0.5% and the subsequent increase to 5% respectively. All specifications include individual-level fixed effects. Error bars represent 95% confidence intervals computed using standard errors clustered on the individual-level.

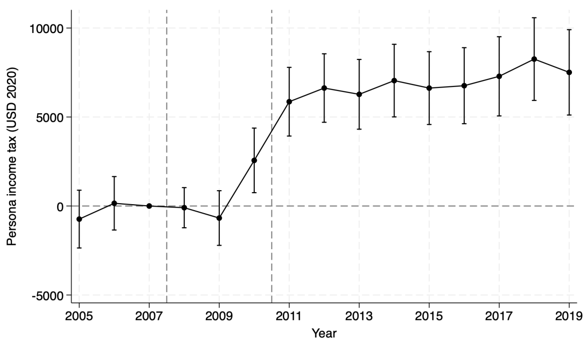
Figure A.5: Additional difference-in-difference results: Personal income taxes



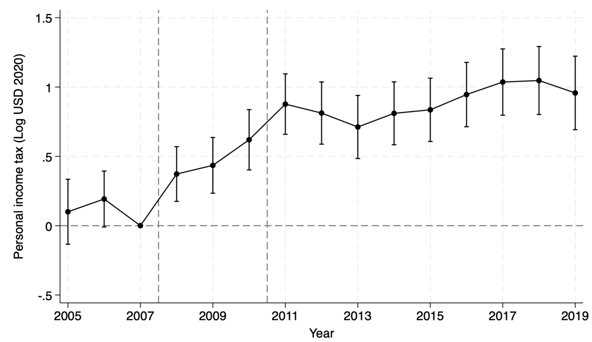
(a) Any personal income taxes



(b) Log personal income taxes



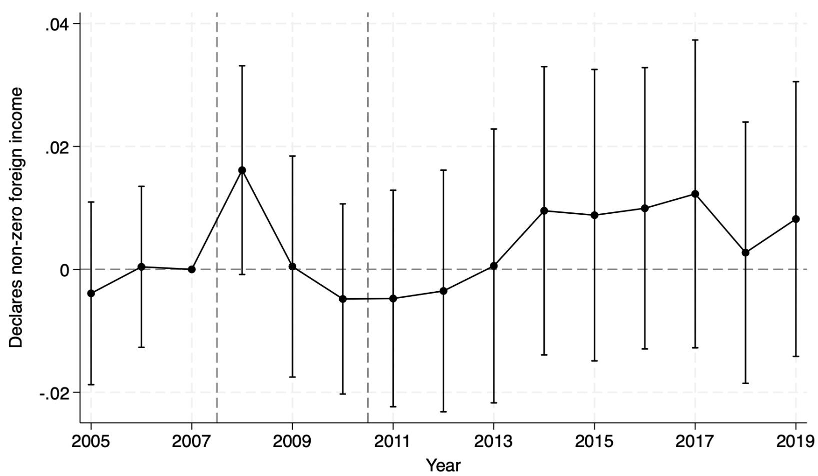
(c) Simulated personal income taxes



(d) Simulated personal income taxes (log)

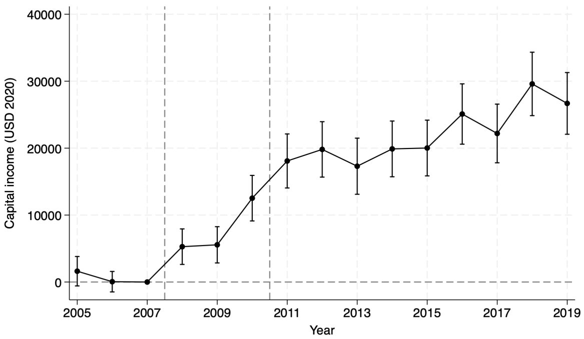
Note: This figure estimates the difference-in-differences design $y_{it} = \alpha_i + \delta_t + \sum_{k=2005}^{2019} \beta_k \cdot Exposure_i \cdot \mathbb{1}\{Year_t = k\} + \varepsilon_{it}$ that compares the evolution in outcomes of individuals named in the ICIJ leaks against those of observed non-tax-haven users. The dashed gray vertical lines demarcate the implementation of the outflows tax at a rate of 0.5% and the subsequent increase to 5% respectively. All specifications include individual-level fixed effects. Error bars represent 95% confidence intervals computed using standard errors clustered on the individual-level.

Figure A.6: Any foreign income declared

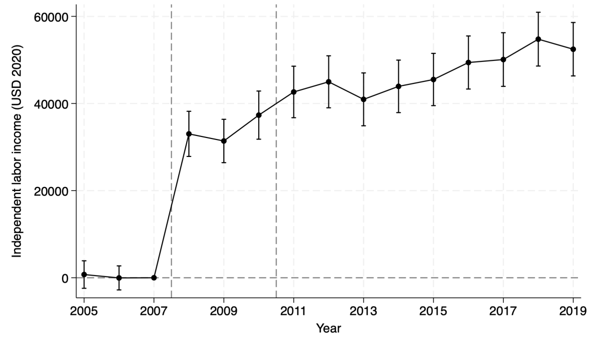


Note: This figure displays estimates of the difference-in-differences design $y_{it} = \alpha_i + \delta_t + \sum_{k=2005}^{2019} \beta_k \cdot Exposure_i \cdot \mathbb{1}\{Year_t = k\} + \varepsilon_{it}$ that compares the evolution in outcomes of individuals named in the ICIJ leaks against those of observed non-tax-haven users, with 2007 as the reference year. The dependent variable is an indicator for whether an individual i in year t declared any foreign income. The dashed gray vertical lines demarcate the implementation of the outflows tax at a rate of 0.5% and the subsequent increase to 5% respectively. All specifications include individual-level fixed effects. Error bars represent 95% confidence intervals computed using standard errors clustered on the individual-level.

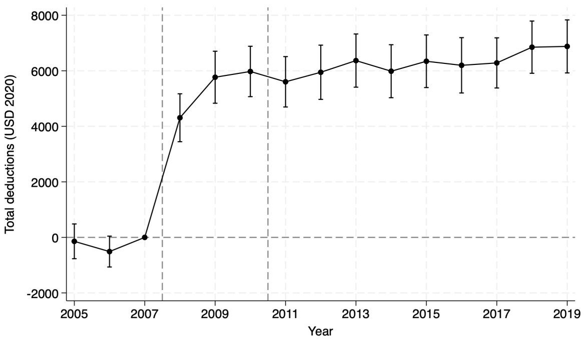
Figure A.7: Impacts of the outflows tax on ICIJ individuals
Additional line items



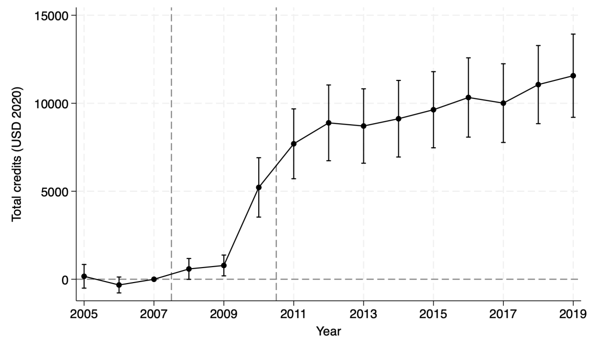
(a) Imputed capital income



(b) “Observed” independent income



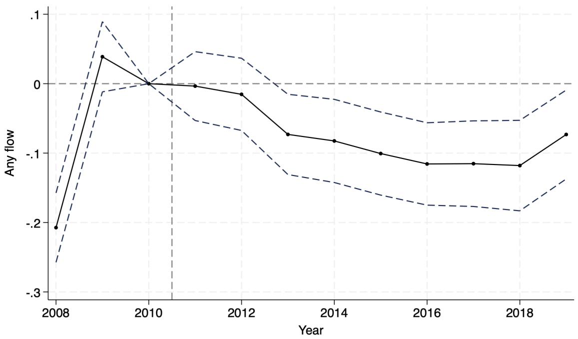
(c) Total deductions



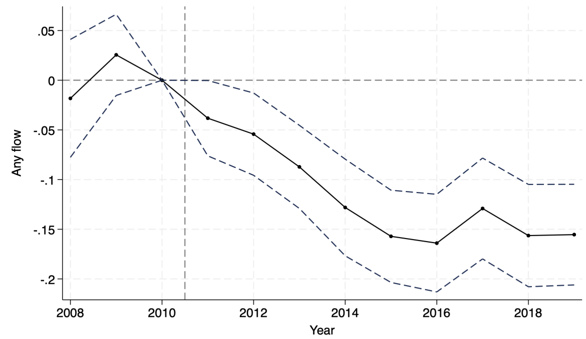
(d) Total credits

Note: These figures estimate the difference-in-differences design $y_{it} = \alpha_i + \delta_t + \sum_{k=2005}^{2019} \beta_k \cdot Exposure_i \cdot \mathbb{1}\{Year_t = k\} + \varepsilon_{it}$ that compares the evolution in outcomes of individuals named in the ICIJ leaks against those of observed non-tax-haven users. Each panel uses a different dependent variable, as indicated by the respective subtitle. Panel (a) uses imputed capital income as the dependent variable, where the imputation is performed by subtracting the reported disaggregations of independent labor income from the total independent income concept (which are suspected to feature mismeasurement); Panel (b) plots the suspected-mismeasured independent income concept. The dashed gray vertical lines demarcate the implementation of the outflows tax at a rate of 0.5% and the subsequent increase to 5% respectively. All specifications include individual-level fixed effects. Error bars represent 95% confidence intervals computed using standard errors clustered on the individual-level.

Figure A.8: Impacts of the outflows tax on ICIJ individuals:
Any inflows or outflows of individuals and their 100%-owned businesses

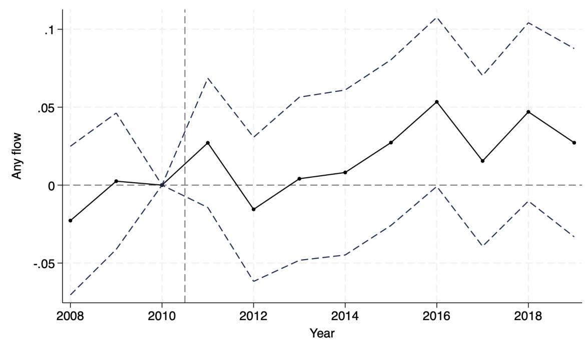


(a) Haven exits



(b) Non-haven exits

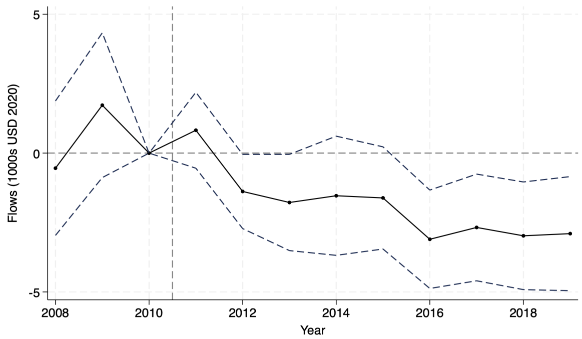
(c) Haven entrances



(d) Non-haven entrances

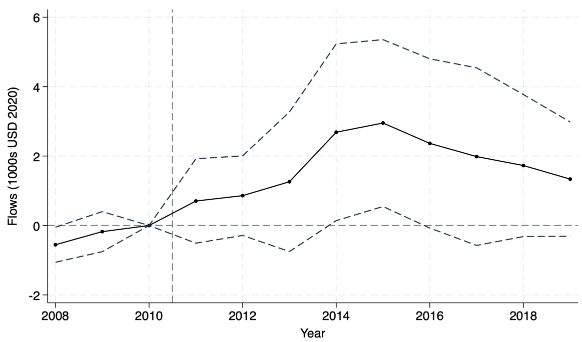
Note: These figures estimate the matched difference-in-differences design $\mathbb{1}\{y_{it} > 0\} = \alpha_i + \delta_t + \sum_{g \in \mathcal{G}} \theta_{g(i)} + \sum_{k=2008}^{2019} \beta_k \cdot Exposure_i \cdot \mathbb{1}\{Year_t = k\} + \varepsilon_{it}$ that compares the evolution in outcomes of individuals named in the ICIJ leaks against those of observed non-tax-haven users. 2010 serves as the reference year. Each treatment unit is matched with five control individuals via a Mahalanobis nearest-neighbor matching processes with replacement based on pre-2011 characteristics. Each panel uses a different dependent variable, as indicated by the respective subtitle. The dependent variables in each specification here corresponds with the respective flow-type of individuals and their 100%-owned businesses. The dashed gray vertical line demarcates the increase increase of the outflows tax rate to 5%. All specifications include individual-level fixed effects. Error bars represent 95% confidence intervals computed using standard errors clustered on the individual-level.

Figure A.9: Impacts of the outflows tax on ICIJ individuals:
Direct inflows and outflows of individuals

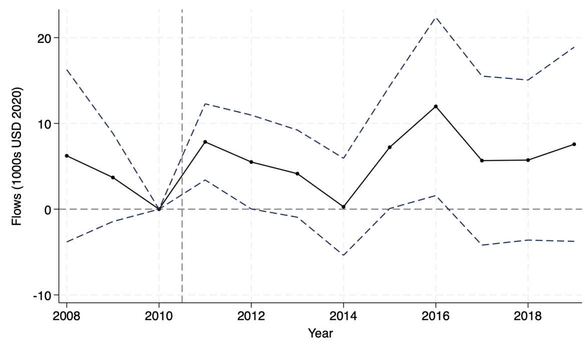


(a) Haven exits

(b) Non-haven exits



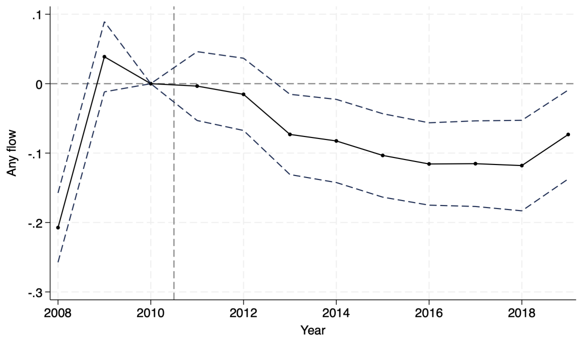
(c) Haven entrances



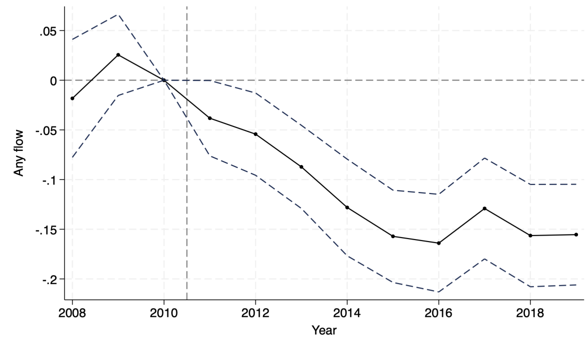
(d) Non-haven entrances

Note: These figures estimate the matched difference-in-differences design $y_{it} = \alpha_i + \delta_t + \sum_{g \in \mathcal{G}} \theta_{g(i)} + \sum_{k=2008}^{2019} \beta_k \cdot Exposure_i \cdot \mathbb{1}\{Year_t = k\} + \varepsilon_{it}$ that compares the evolution in outcomes of individuals named in the ICIJ leaks against those of observed non-tax-haven users. 2010 serves as the reference year. Each treatment unit is matched with five control individuals via a Mahalanobis nearest-neighbor matching processes with replacement based on pre-2011 characteristics. Each panel uses a different dependent variable, as indicated by the respective subtitle. The dashed gray vertical line demarcates the increase increase of the outflows tax rate to 5%. All specifications include individual-level fixed effects. Error bars represent 95% confidence intervals computed using standard errors clustered on the individual-level.

Figure A.10: Impacts of the outflows tax on ICIJ individuals:
Any direct inflows or outflows of individuals

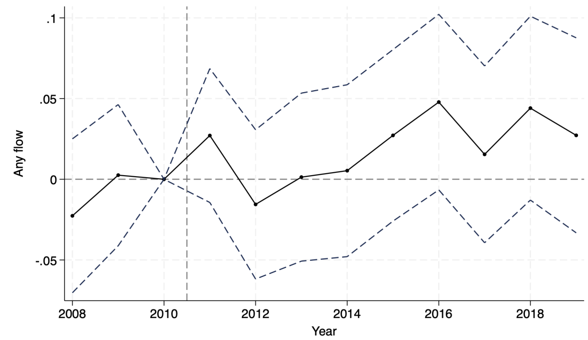


(a) Haven exits



(b) Non-haven exits

(c) Haven entrances



(d) Non-haven entrances

Note: These figures estimate the matched difference-in-differences design $\mathbb{1}\{y_{it} > 0\} = \alpha_i + \delta_t + \sum_{g \in \mathcal{G}} \theta_{g(i)} + \sum_{k=2008}^{2019} \beta_k \cdot Exposure_i \cdot \mathbb{1}\{Year_t = k\} + \varepsilon_{it}$ that compares the evolution in outcomes of individuals named in the ICIJ leaks against those of observed non-tax-haven users. 2010 serves as the reference year. Each treatment unit is matched with five control individuals via a Mahalanobis nearest-neighbor matching processes with replacement based on pre-2011 characteristics. Each panel uses a different dependent variable, as indicated by the respective subtitle. The dashed gray vertical line demarcates the increase increase of the outflows tax rate to 5%. All specifications include individual-level fixed effects. Error bars represent 95% confidence intervals computed using standard errors clustered on the individual-level.

Table A.3: Individual responses: cross-border inflows and outflows

Panel (a): Individuals and their 100%-owned businesses

	Flows with havens				Flows with non-havens			
	Outflows		Inflows		Outflows		Inflows	
	Levels	Binary	Levels	Binary	Levels	Binary	Levels	Binary
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Exposure × Year ≥ 2011	-2.232	-0.0206	2.311	0.0181	-5.442	-0.112	1.005	0.0289
	(.8113)	(.01787)	(.8298)	(.005441)	(4.522)	(.01611)	(3.68)	(.01619)
Constant	0.797	0.0437	0.0103	0.00102	10.55	0.484	3.569	0.0824
	(.1218)	(.003989)	(.1244)	(.001068)	(.7043)	(.005538)	(.928)	(.004105)
Pre-period exposure mean	4.024	0.214	0.192	0.00733	32.71	0.773	14.65	0.152
Individual FEs	Y	Y	Y	Y	Y	Y	Y	Y
Mahalanobis matching	Y	Y	Y	Y	Y	Y	Y	Y
N	22,221	22,221	22,221	22,221	22,221	22,221	22,221	22,221
Adjusted R2	0.283	0.355	0.287	0.278	0.525	0.627	0.413	0.380

Panel (b): Individuals' direct transactions

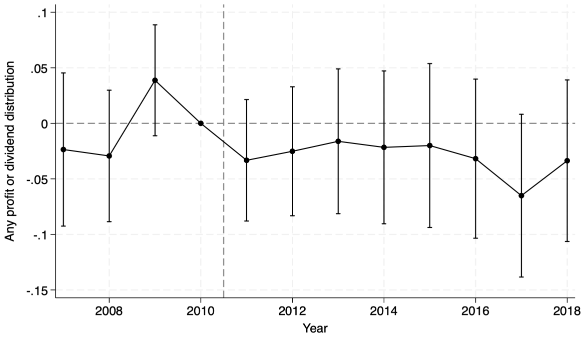
	Flows with havens				Flows with non-havens			
	Outflows		Inflows		Outflows		Inflows	
	Levels	Binary	Levels	Binary	Levels	Binary	Levels	Binary
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Exposure × Year ≥ 2011	-2.237	-0.0209	1.986	0.0181	-3.396	-0.112	3.117	0.0272
	(.8111)	(.01788)	(.6091)	(.005441)	(4.065)	(.01611)	(3.049)	(.01619)
Constant	0.797	0.0437	0.0125	0.00102	10.07	0.484	3.008	0.0824
	(.1218)	(.00399)	(.09271)	(.001068)	(.6413)	(.005538)	(.8772)	(.004106)
Pre-period exposure mean	4.022	0.214	0.192	0.00733	29.64	0.773	10.99	0.152
Individual FEs	Y	Y	Y	Y	Y	Y	Y	Y
Mahalanobis matching	Y	Y	Y	Y	Y	Y	Y	Y
N	22,221	22,221	22,221	22,221	22,221	22,221	22,221	22,221
Adjusted R2	0.284	0.354	0.245	0.278	0.580	0.627	0.456	0.379

Panel (c): Individuals and their ≥10%-owned businesses

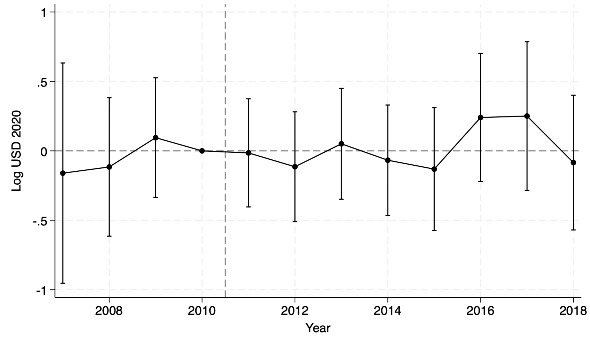
	Flows with havens				Flows with non-havens			
	Outflows		Inflows		Outflows		Inflows	
	Levels	Binary	Levels	Binary	Levels	Binary	Levels	Binary
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Exposure × Year ≥ 2011	1.956	-0.00195	-11.22	0.0442	160.8	-0.129	1231	0.0877
	(4.195)	(.01919)	(25.76)	(.00975)	(74.12)	(.01413)	(692.8)	(.01896)
Constant	4.727	0.0733	21.16	0.00526	86.49	0.507	477.8	0.138
	(.6425)	(.004225)	(4.17)	(.001684)	(11.1)	(.005382)	(113.9)	(.004632)
Pre-period exposure mean	22.86	0.298	80.37	0.0266	310.7	0.827	2016	0.321
Individual FEs	Y	Y	Y	Y	Y	Y	Y	Y
Mahalanobis matching	Y	Y	Y	Y	Y	Y	Y	Y
N	22,221	22,221	22,221	22,221	22,221	22,221	22,221	22,221
Adjusted R2	0.709	0.454	0.590	0.387	0.899	0.644	0.942	0.525

Note: This table displays results from a series of difference-in-differences designs that permute over dependent variables pertaining to individual inflows and outflows. All of the specifications employ Mahalanobis matching of each exposure individual to five unexposed units with replacements, based on pre-2008 average covariates. Panels (a), (b), and (c) permute over the threshold of business-ownership in assigning cross-border transactions to individuals. Panel (a), the specification used in the main text, assigns to individuals the inflows and outflows directly attributable to them or their 100%-owned businesses. Dependent variables in panel (b) only include flows directly with the individual; Panel (c) assigns to individuals the inflows and outflows directly attributable to them or their 10%-or-greater-owned businesses. Difference-in-difference coefficients are computed relative to a 2008-2010 average difference as the reference group. Levels variables are denominated in 1000s USD 2020. Standard errors are clustered on the individual-level.

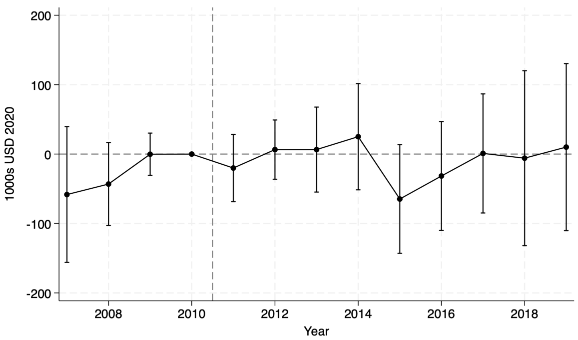
Figure A.11: Firm responses to the outflows tax:
Distributions and retained earnings, profit and tax outcomes



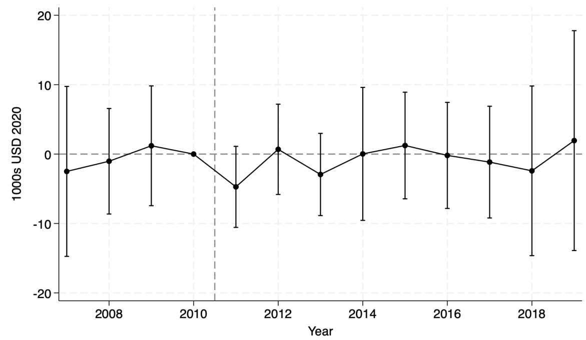
(a) Any dividend payment



(b) Log change in retained earnings



(c) Taxable income



(d) CIT payments

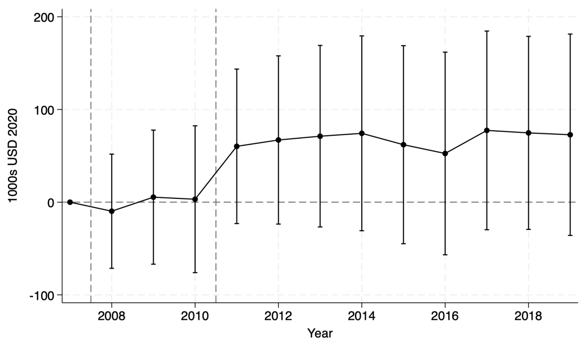
Note: These figures estimate the matched difference-in-differences design $y_{it} = \alpha_i + \delta_t + \sum_{g \in \mathcal{G}} \theta_{g(i)} + \sum_{k=2008}^{2019} \beta_k \cdot Exposure_i \cdot \mathbb{1}\{Year_t = k\} + \varepsilon_{it}$ that compares the evolution in outcomes of firms named in the ICIJ leaks against those of matched unexposed firms users. 2010 serves as the reference year. Each treatment unit is matched with five control individuals via a Mahalanobis nearest-neighbor matching processes with replacement based on pre-2011 characteristics. Each panel uses a different dependent variable, as indicated by the respective subtitle. The dependent variables in each specification here sums the respective flow-types of individuals and their 100%-owned businesses. The dashed gray vertical line demarcates the increase increase of the outflows tax rate to 5%. All specifications include firm-level fixed effects. Error bars represent 95% confidence intervals computed using standard errors clustered on the firm-level.

Table A.4: Firm responses to the outflows tax:
Profit and tax outcomes

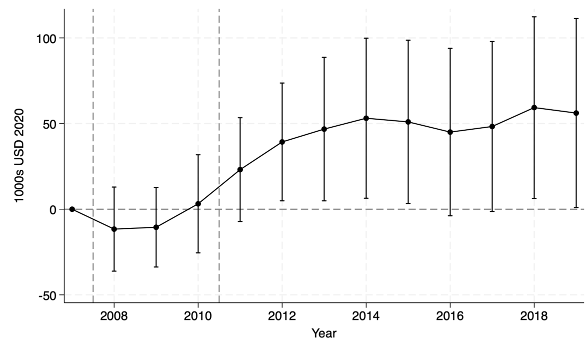
	Taxable profits			Business income tax payments		
	Levels	Log	Binary	Levels	Log	Binary
	(1)	(2)	(3)	(4)	(5)	(6)
Exposure $\times$ Year $\geq$ 2011	12.61	0.0739	0.0164	-0.699	-0.229	0.0339
	(32.16)	(.1004)	(.02028)	(2.506)	(.2087)	(.01886)
Year $\geq$ 2011	-18.29	-0.275	-0.104	6.246	-0.307	-0.111
	(19.92)	(.08452)	(.01721)	(2.891)	(.2334)	(.01363)
Constant	219.9	3.307	0.532	9.892	0.398	0.250
	(6.96)	(.03627)	(.008031)	(.9207)	(.09019)	(.007625)
Pre-period exposure mean	225.7	3.349	0.512	9.842	0.248	0.251
Firm FE	Y	Y	Y	Y	Y	Y
Mahalanobis matching	Y	Y	Y	Y	Y	Y
N	28,370	14,711	28,370	28,083	6,196	28,083
Adjusted R2	0.839	0.817	0.578	0.446	0.755	0.362

Note: This table displays results from a series of two-way fixed effect difference-in-differences designs that permute over dependent variables. Each treatment unit is a firm named in the ICIJ leaks and is matched with five control individuals via a Mahalanobis nearest-neighbor matching processes with replacement based on pre-2011 characteristics. The sample size changes in columns (2) and (5) are due to the use of the pure-intensive margin logarithm where zero- and negatively-valued observations are omitted. Standard errors are clustered on the firm-level.

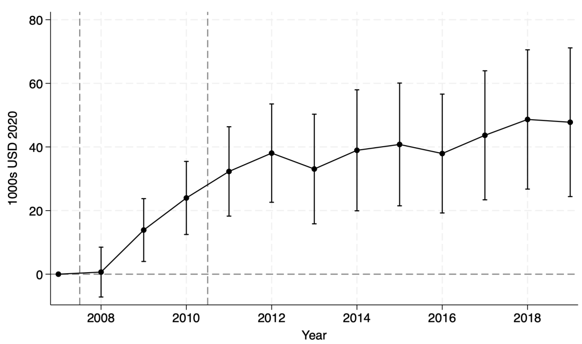
Figure A.12: Firm labor payment response to the outflows tax:
Un-matched sample, by definition of firm-level exposure



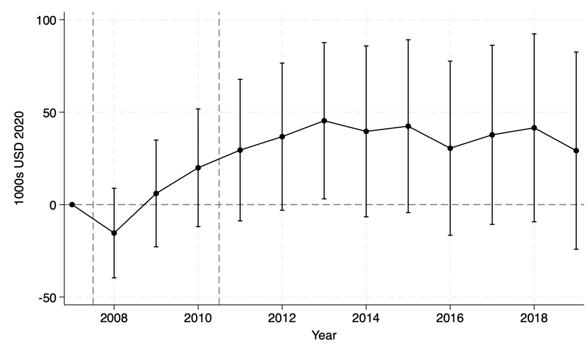
(a) Firms named in the ICIJ leaks



(b) Firms weak-majority owned by ICIJ individuals



(c) Firms weak-majority owned by individuals sending money to tax havens



(d) Firms with weak-majority shareholdership in tax havens

Note: These figures estimate the difference-in-differences design $y_{it} = \alpha_i + \delta_t + \sum_{k=2007}^{2019} \beta_k \cdot Exposure_i \cdot \mathbb{1}\{Year_t = k\} + \varepsilon_{it}$ that compares the evolution in outcomes of firms named in the ICIJ leaks against those of unexposed firms users. 2007 serves as the reference year. Each panel uses a different definition of exposure, as indicated by the respective subtitle. The dashed gray vertical lines demarcate the implementation of the outflows tax at a rate of 0.5% and the subsequent increase to 5% respectively. All specifications include individual-level fixed effects. Error bars represent 95% confidence intervals computed using standard errors clustered on the firm-level.

Table A.6: Firm labor outlay responses to the outflows tax:
Non-matched comparison by definition of firm-exposure
Panel (a): 2010 as reference year

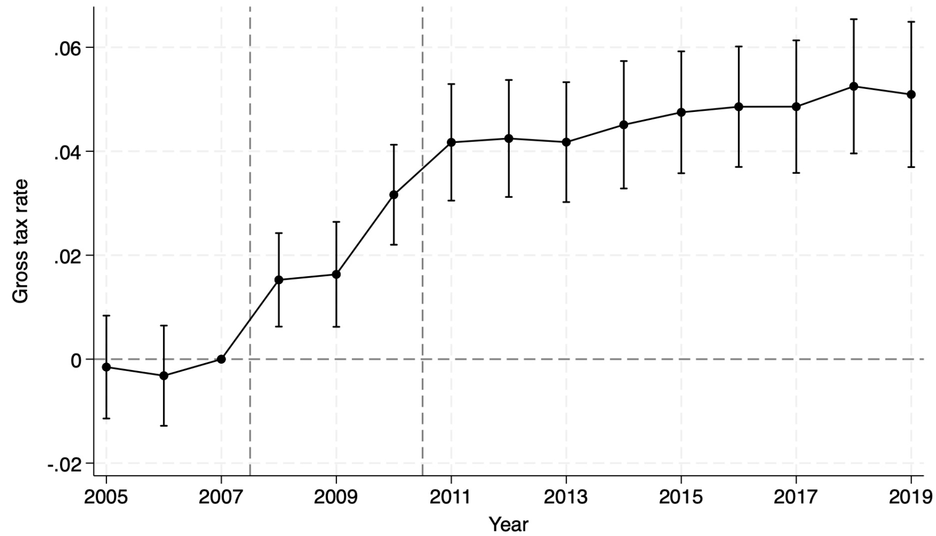
	ICIJ companies	Weak-majority-owned companies by ICIJ individuals	Weak-majority-owned companies by individuals sending money to havens	Companies weak-majority by tax haven shareholders
	(1)	(2)	(3)	(4)
Exposure $\times$ Year $\geq$ 2011	67.48	50.34	28.34	34.56
	(28.89)	(15.4)	(6.652)	(15.23)
Constant	66.03	65.65	68.30	70.28
	(.4381)	(.4323)	(.4365)	(.4392)
Pre-period exposure mean	244	156.2	147.9	315.1
Firm FEs	Y	Y	Y	Y
Year FEs	Y	Y	Y	Y
Mahalanobis matching	N	N	N	N
N	1,119,544	1,121,170	11,527,48	1,134,268
Adjusted R2	0.885	0.886	0.886	0.885

Panel (b): 2007 as reference year

	ICIJ companies	Weak-majority-owned companies by ICIJ individuals	Weak-majority-owned companies by individuals sending money to havens	Companies weak-majority by tax haven shareholders
	(1)	(2)	(3)	(4)
Exposure $\times$ Year $\geq$ 2011	66.95	45.68	39.05	36.87
	(47.14)	(21.34)	(8.74)	(21.75)
Exposure $\times$ Year $\in [2008, 2010]$	-0.672	-5.922	13.49	3.932
	(34.35)	(12.34)	(4.578)	(13.56)
Constant	57.60	57.22	59.10	61.16
	(.7934)	(.7806)	(.7875)	(.8243)
Pre-period exposure mean	257.6	178.5	160	337.6
Firm FEs	Y	Y	Y	Y
Year FEs	Y	Y	Y	Y
Mahalanobis matching	N	N	N	N
N	1,119,544	1,121,170	1,152,748	1,134,268
Adjusted R2	0.885	0.886	0.886	0.885

Note: This table displays results from a series of difference-in-differences designs that permute over exposure definitions and matching specification. Panel (a) displays difference-in-differences estimates to a pre-2011 mean; Panel (b) displays difference-in-differences estimates to 2007 differences. Standard errors are clustered on the firm-level.

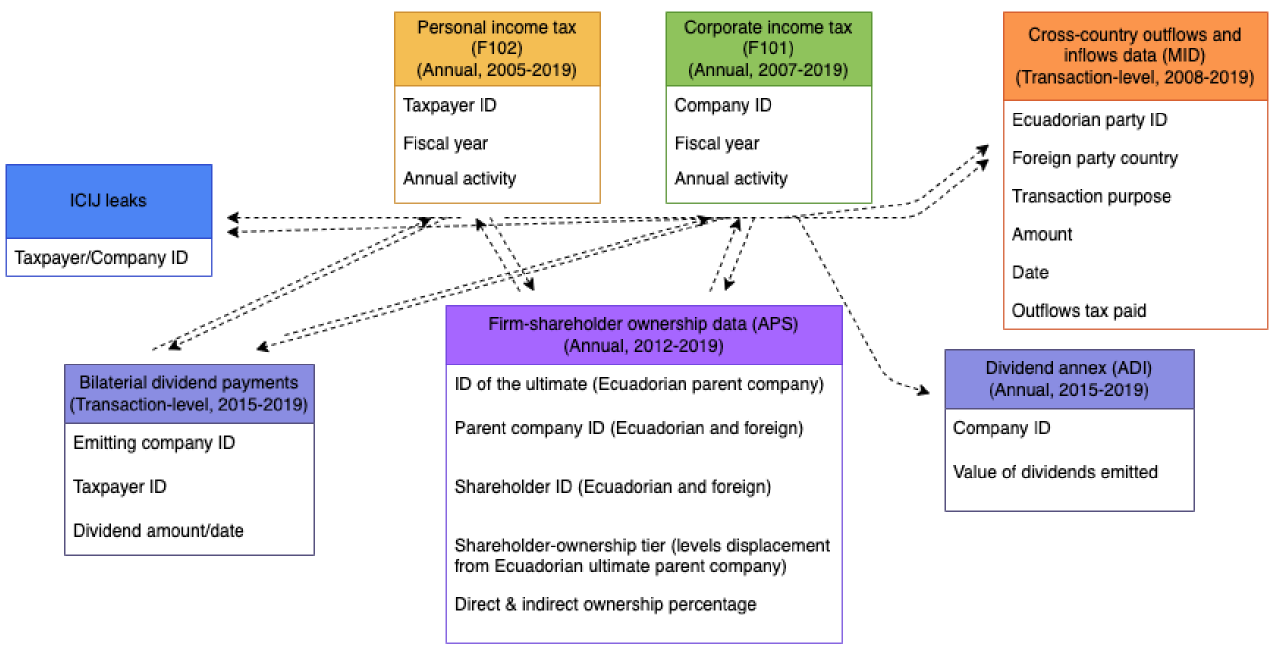
Figure A.13: Gross income tax rate
Mahalanobis matching and simulated income tax rate



Note: This figure estimates the matched difference-in-differences design $y_{it} = \alpha_i + \delta_t + \sum_{g \in \mathcal{G}} \theta_{g(i)} + \sum_{k=2005}^{2019} \beta_k \cdot Exposure_i \cdot \mathbb{1}\{Year_t = k\} + \varepsilon_{it}$ that compares the evolution in the gross income tax rate of individuals named in the ICIJ leaks against sets of matched non-tax-haven users, with 2007 as the reference year. The specification uses a matching strategy that matches five control individuals to each exposure individual with replacement based on a nearest neighbor Mahalanobis distance for pre-2008 average characteristics. The dependent variable is computed as simulated personal income tax payments using a constant top marginal income tax rate divided by gross income declared. The dashed gray vertical lines demarcate the implementation of the outflows tax at a rate of 0.5% and the subsequent increase to 5% respectively. All specifications include individual-level fixed effects. Error bars represent 95% confidence intervals computed using standard errors clustered on the individual-level.

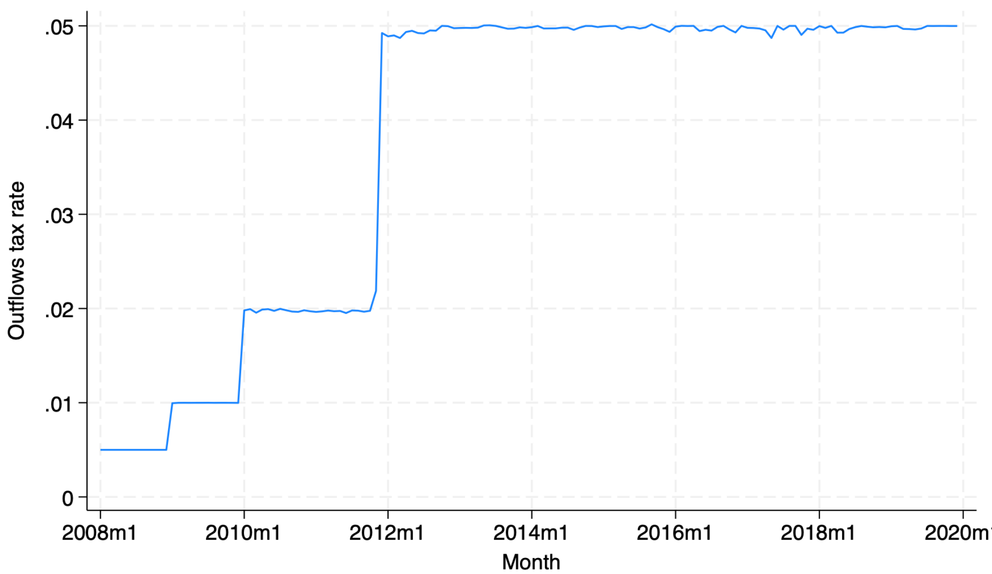
Appendix B Data appendix

Figure B.1: Datasets of the Ecuadorian tax administrative environment



Note: This figure illustrates the linkages between select Ecuadorian administrative datasets.

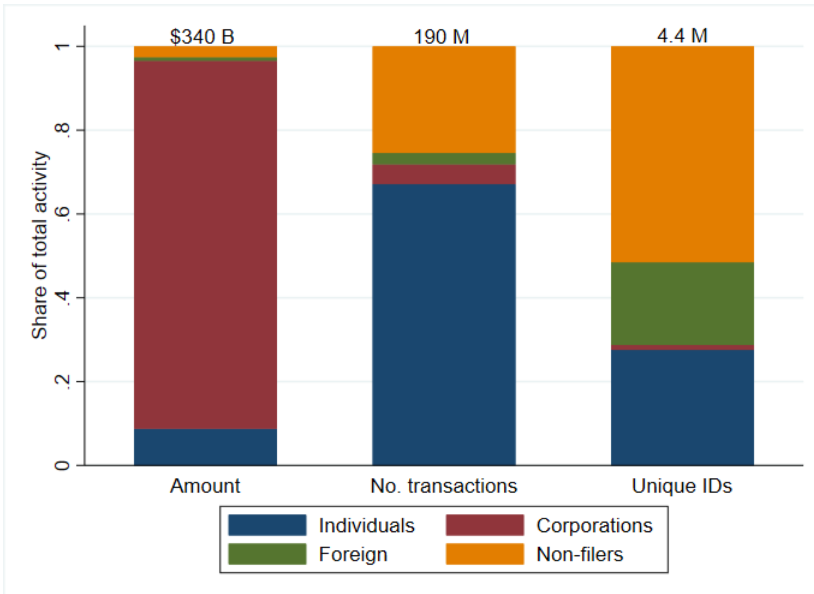
Figure B.2: Empirical outflows tax rate



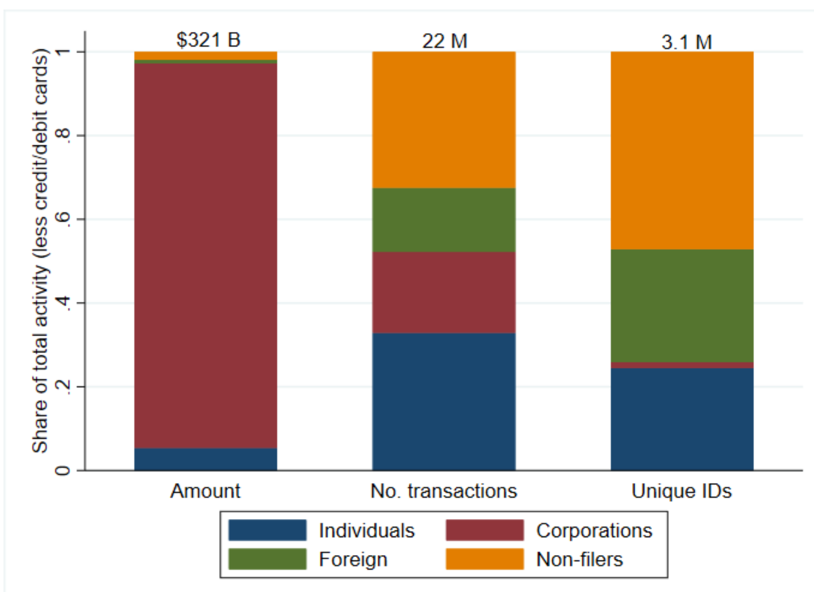
Note: This figure displays the evolution of the statutory outflows tax (ISD) rate as borne out in the MID outflows data. Each observation is a within-month mean of the modal effective outflows tax rate over transaction category $\times$ destination country $\times$ month-year cells for cells with at least 30 transactions. Outflows tax rate is constructed as outflows tax amount divided by transaction amount.

Figure B.3: MID cross-border transaction data: aggregate characteristics

(a) All currency exits



(b) All currency exits less card transactions



Note: This figure illustrates various metadata surrounding currency exits registered in the MID disaggregated by taxpayer type. The top of each stacked bar graph displays its cumulative total from fiscal years 2008 to 2019. All nominal values are expressed in USD 2020. Panel (b) excludes credit card transactions.

Table B.1: Personal income tax declarations summary statistics

	Mean	SD	p5	p25	p50	p75	p95	p99
Gross income	29863	41542	0	8524	18333	34559	97689	227444
Capital income	1854	12836	0	0	0	0	4407	49058
Net business profit	977.3	13126	0	0	0	0	0	41895
Personal deductions	2811	4246	0	0	0	4876	13056	14633
Taxable income	15625	19389	0	2927	11553	20078	48300	101324
PIT tax base	12497	17048	0	2088	9777	14600	39786	91464
PIT obligations	821.8	3823	0	0	0	198.1	3546	15011
Gross tax rate (PIT / gross income)	0.0100	0.0390	0	0	0	0.00500	0.0550	0.141
Effective tax rate (PIT / taxable income)	0.0140	0.0350	0	0	0	0.0100	0.0760	0.153
Final tax rate (PIT / tax base)	0.0170	0.0390	0	0	0	0.0130	0.0910	0.168
Max age in panel (out of 15)	5.958	4.601	1	2	5	9	15	15
Years per individual	5.201	4.162	1	2	4	8	14	15
Reporting ratio	0.916	0.169	0.500	0.917	1	1	1	1
Exposed	0.05							
Unique individuals	1.994e+06							
Total ID-years	1.040e+07							

Note: This table displays summary statistics for select variables in the form F102 personal income tax data pooled between 2005 and 2019. All monetary values are expressed in USD 2020. Reporting ratio is defined as number of years present in the data divided by the in-panel taxpayer age (last reporting year less first reporting year).

Table B.2: Corporate income tax declarations summary statistics

	Mean	SD	p5	p25	p50	p75	p95
Income	939.4	5384	0	0	3.234	183.3	3009
Expenses	874.0	4870	0	0	6.141	178.1	2856
Labor share of expenses	0.116	0.179	0	0	0.00400	0.174	0.521
Gross profit (pretax)	52.74	510.4	-20.39	0	0	3.918	135.9
CIT tax base	54.96	429.3	0	0	0	3.038	122.9
CIT liability	12.55	98.07	0	0	0	0.666	28.27
Effective CIT rate (CIT / gross profits)	0.105	0.143	0	0	0	0.212	0.310
CIT rate (CIT / taxable profit)	0.107	0.117	0	0	0	0.230	0.250
Dividends distributed (imputed)	39.26	343.4	0	0	0	0.937	68.79
Log assets	3.192	2.833	0	0.337	3.017	5.437	8.061
Labor expense per unit capital	0.345	1.460	0	0	0.00700	0.199	1.318
Max age in panel (out of 13)	6.407	4.397	1	2	6	11	13
Years per firm	6.314	4.348	1	2	5	11	13
Reporting ratio	0.989	0.0540	0.923	1	1	1	1
Most common industry (2019, by frequency)	Wholesale goods	18.71%					
2nd	Special interest groups	13.53%					
3rd	Real estate	9.84%					
Unique firms	263898						
Total firm-years	1.666e+06						

Note: This table displays summary statistics for select variables in the form F101 corporate income tax data pooled between 2007 and 2019. All monetary values are expressed in 1000s USD 2020. Reporting ratio is defined as number of years present in the data divided by the in-panel firm age (last reporting year less first reporting year).

Table B.3: List of transaction purpose categories in the MID foreign transaction data

No.	Purpose	No.	Purpose
1	N/A	35	Workers' remittances
2	Imports	36	Donations
3	Anticip. imports	37	Compliance with laws and regulations
4	Int'l. Transport	38	Credit amortization abroad
5	Cargo Fleet Transport	39	Credit disbursements abroad
6	Ports and airports	40	Credit prepayment abroad
7	Business, health, education travel	41	Long term fin. inv. abroad
8	Reinsurance premia	42	Short term fin. inv. abroad
9	Insurance indemnization	43	Long term capital inv. abroad
10	Fin. services	44	Short term capital inv. abroad
11	Foreign currency guarantees	45	Overnight inv. abroad
12	Merchant leasing	46	Deposits in foreign bank accounts
13	Telecom service	47	Credit amort. (domestic)
14	IT services	48	Credit disbursement (domestic)
15	Brands and patents	49	Prepaid credit (domestic)
16	Archit., eng., and tech. services	50	Short term fin. inv. (domestic)
17	Agriculture and mining services	51	Long term fin. inv. (domestic)
18	Health services	52	Long term capital inv. (domestic)
19	Audiovisual services	53	Short term capital inv (domestic)
20	Rent	54	Overnight investments (domestic)
21	Construction	55	Bank account deposits (domestic)
22	R&D	56	Other
23	Legal, acc. services	57	Debit and credit cards
24	Publicity And market research	58	Collections from abroad
25	Repairs	59	Anticip. imports
26	Cultural services	60	Anticip. exports
27	Services To foreign gov't	61	Brands and patents
28	Subscriptions And membership Fees	62	Royalties and authorship rights
29	Education expenses	63	Trash and pollutant processing
30	Anticip. Foreign Trade	64	Trade and other business services
31	Wages	65	Intragroup trade
32	Dividends/profit distributions	66	Temporary operations
33	Credit interest	67	Consular collections
34	Return On fin. investment		

Note: This table lists all of the discrete transaction purpose bins in the MID cross-border transaction data.

B.1 Firm-year dividend imputation methodology

The Ecuadorian administrative data on firm-year dividend payments only begins in 2015. For this reason, in order to make inference pertaining to the effect of the tax haven reform of 2011 on exposed firms' dividend payout policies, I develop two imputations to accommodate the limitations of the Ecuadorian administrative data environment.

I rely on three data sources for these imputations:

1. **Firm-shareholder dividend payment data** *(Anexo de Dividendos)* accurately reports annual firm-dividend payout policies starting in 2015. The dataset also reports individual dividend payments between firms and shareholders. All Ecuadorian firms making profit distributions to shareholders are required to register with the Ecuadorian tax authorities and are observable in this dataset.

2. **Foreign transaction data** *(Anexo - Movimiento Internacional de Divisas ("MID"))*: This dataset accurately reports profit distributions by Ecuadorian firms to shareholders abroad.

3. **Corporate income tax returns** *(F101).* The corporate income tax returns report withholdings taxes on dividend payments. While the publicly available withholdings formula creates a bijection between funds withheld and dividend payments,[33] in practice the implied value of dividends to be paid poorly predicts realized dividend payments (as reported in the dividend payment registry between 2015 and 2019).

The steps to this imputation, in order, are as follows:

1. I use the accounting measures reported in the corporate income tax declarations to assign each firm-year a dividend imputation:

   $$Div_{it} = Profit_{it} - Tax_{it} - Reinvestment_{it} - (Retained\ Earnings_{it} - Retained\ Earnings_{it-t}).$$

   All of the right-hand-side variables are perfectly observed in the corporate income tax data.[34] However, data on retained earnings are actually observed with a one-year lag (i.e. year t's retained earnings for firm i are actually observed in firm i's corporate income tax declaration

[33] The capital income tax dividend payment withholdings formula creates a bijection for values above USD 1,000 in withheld funds or USD 20,000 in dividends anticipated to be paid out. Values below USD 20,000 in dividend payments generate zero withholdings obligation.

[34] I perform this imputation on a version of the data winsorized above the 99.5% level.

for year $t+1$). For this reason, I cannot perform this imputation for the last year in my data, 2019. Also note that interest on retained earnings is subsumed in the profit term.

- This step constitutes the first imputation; from an accounting perspective, this procedure would normally measure profit distributions.

2. I construct an alternative imputation that is also informed by the data and legal environment underlying profit distribution rules in Ecuador, as described below:

3. Ecuador has a law where firms cannot make profit distribution payments if they report non-positive pre-tax and pre-deduction profits (similar to an EBITDA concept) for two consecutive years. For all firms reporting two consecutive years of non-positive profits (i.e. $\pi_{it} \leq 0 \cap \pi_{it-1} \leq 0$), I map their dividends in year t to zero.

4. I check if a firm's corporate income tax declaration years coincide with the years of the dividend payment registry (2015-2019). If *both* a firm's corporate income tax filings intersects with the years of the dividend payment registry *and* the firm is not present in dividend payment registry, I map all years of the firm's dividend imputation to zero.

5. If a firm is *both* present in the dividend payment registry *and* observed to never pay out dividends in the dividend firm registry, I map all years of the firm's dividend imputation to zero

6. If a firm i reports non-zero dividend withholdings in their annual corporate income tax declaration in year t, I map their dividend imputation in year t to the accounting identity in step 1.

7. If a firm i reports a profit distribution abroad in the foreign transaction data (MID) t, I map their dividend imputation in year t to the accounting identity in step 1.

8. If a firm ever makes positive dividend payments between years 2015 and 2019 (as observed in the dividend payment registry), I map their pre-2015 annual dividend payments to the accounting identity in step 1.

9. I inflate the dividend imputation by the factor difference between the mean of aggregate annual dividend payments between 2015 and 2018 from the ADI data and statistical aggregates and the mean of aggregate annual imputed dividend payments between 2015 and 2018. This factor is 1.03.

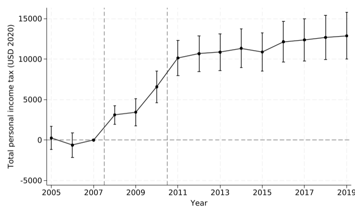
The imputation performs well. In addition to needing relatively little adjustment on the intensive margin, the above steps provide a satisfactory extensive-margin imputation. Between 2015 and 2018, around 4,000 firms (out of the universe of approximately 100,000 corporate income tax filing firms) report profit distribution payments in the dividend payment registry data.[35] The imputation method produces around 6000 firms making dividend payments in a given year.

[35] Around 40% of the 500 companies publicly listed on the Guayaquileño and Quiteño stock exchanges pay dividends, and around 2.5% of the remaining non-publicly-traded companies report dividend payments in the dividend payment registry in a given year,

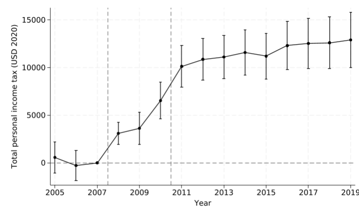
Appendix C Additional robustness specifications

Figure C.1: Impacts of the outflows tax on personal income tax payments
Rectangularized

Mahalanobis matching to five nearest neighbors with replacement

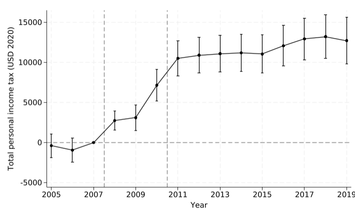


(a) No fixed effects

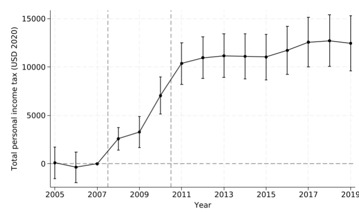


(b) Two way fixed effects

Propensity-score matching to five nearest neighbors with replacement



(c) No fixed effects

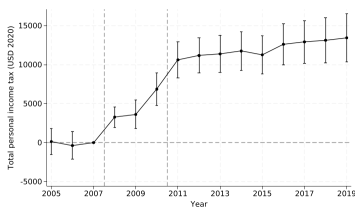


(d) Two way fixed effects

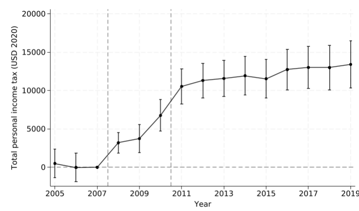
Note: These figures estimate the difference-in-differences design $y_{it} = \beta_0 + \delta_t + \sum_{k=2005}^{2019} \beta_k \cdot Exposure_i \cdot \mathbb{1}\{Year_t = k\} + \varepsilon_{it}$ that compares the evolution of realized personal income tax payments of individuals named in the ICIJ leaks against those of observed non-tax-haven users with 2007 as the reference year. All specifications feature data rectangularized across individual-years, where new observations generated through rectangularization are assigned a value of zero for personal income tax payments. For computational feasibility, all of the results rely on matching methods that group each exposed individual with five control individuals using Mahalanobis and propensity score matching procedures with replacement. The dashed gray vertical lines demarcate the implementation of the outflows tax at a rate of 0.5% and the subsequent increase to 5% respectively. Error bars represent 95% confidence intervals computed using standard errors clustered on the individual-level.

Figure C.2: Impacts of the outflows tax on simulated personal income tax payments
Rectangularized

Mahalanobis matching to five nearest neighbors with replacement

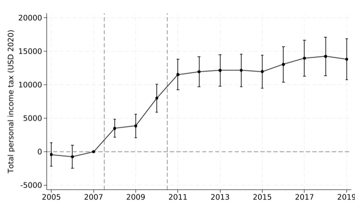


(a) No fixed effects

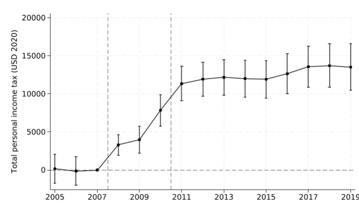


(b) Two way fixed effects

Propensity-score matching to five nearest neighbors with replacement



(c) No fixed effects



(d) Two way fixed effects

Note: These figures estimate the difference-in-differences design $y_{it} = \beta_0 + \delta_t + \sum_{k=2005}^{2019} \beta_k \cdot Exposure_i \cdot \mathbb{1}\{Year_t = k\} + \varepsilon_{it}$ that compares the evolution of simulated personal income tax payments of individuals named in the ICIJ leaks against those of observed non-tax-haven users with 2007 as the reference year. All specifications feature data rectangularized across individual-years, where new observations generated through rectangularization are assigned a value of zero for personal income tax payments. For computational feasiblity, all of the results rely on matching methods that group each exposed individual with five control individuals using Mahalanobis and propensity score matching procedures with replacement. The dashed gray vertical lines demarcate the implementation of the outflows tax at a rate of 0.5% and the subsequent increase to 5% respectively. Error bars represent 95% confidence intervals computed using standard errors clustered on the individual-level.

C.1 Alternate definitions of individual exposure: predicting haven usage

The following tables display regressions aiming to predict individual-time-varying tax haven usage, where each table set changes the precise definition of tax haven usage. In the tables, Panels (a) test to what extent different observable income demographic characteristics or fixed effects predict haven usage; Panels (b) test serial correlation in tax haven usage and to what extent *other* independently generated tax haven usage measures predict haven usage. Dependent variables either come from the MID cross-border transaction data or from the APS business ownership data.

Table C.1: Predicting haven usage: Sending money directly to tax havens

Panel (a): Horse race between observable characteristics and fixed effects

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Log gross income	.008371	.004348	.007434				.003979
	(.0001269)	(.0001832)	(.0004816)				(.0001826)
Log taxable income	.01481	.001194	.01979				.00102
	(.0001171)	(.0001568)	(.0003832)				(.0001564)
Any capital income	.03143	.004513	.03192				.002049
	(.0004521)	(.0004363)	(.003877)				(.0004399)
Any independent labor income	.008451	-.00171	-.000513				-.001382
	(.0002557)	(.0003293)	(.00168)				(.0003282)
Any foreign income	.0358	.004709	.04108				.004239
	(.004822)	(.005352)	(.01784)				(.005351)
Any business income	.04507	.01967	.06261				.01806
	(.001458)	(.001697)	(.00554)				(.001693)
Any other income	.005512	-.001303	-.01649				.0003575
	(.0006009)	(.000759)	(.002065)				(.000758)
Any 100%-owned haven businesses			.04997				
			(.007062)				
Constant	-.173	.008612	-.173	.06351	.06143	.06351	.0141
	(.00117)	(.001383)	(.003973)	(0)	(.0001605)	(0)	(.001378)
Covariates	X_{it}	X_{it}	CRE	No	No	No	X_{it}
Fixed effects	No	ID	No	ID	Year	TWFE	TWFE
N	7830975	5624104	1490005	5624104	6014341	5624104	5624104
Number of clusters	1752082	1194862	276007	1194862	1585099	1194862	1194862
F-statistic	5775	252.4	773.9				195.1
Adjusted R-squared	.01874	.3128	.0152	.3125	.003057	.3125	.3163

Panel (b): Autoregression on past haven usage and contemporaneous other haven usage

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
$\mathbb{1}\{\text{Sent money to havens}_{i,t-1}\}$	.4589								.02016	.4555
	(.001081)								(.0003785)	(.001108)
≥ 50% haven ownership		.1107					-.01612		-.01742	
		(.001127)					(.000414)		(.0004478)	
≥ 10%-owner of a firm				.24			-.09393		-.09973	
receiving money from a haven				(.004969)			(.003852)		(.004078)	
≥ 10%-owner of a firm			.9516				.9581		.9472	
sending money to a haven			(.0006216)				(.0005555)		(.0007328)	
Received money directly						.2444		.2355		.1292
from a tax haven						(.005878)		(.006225)		(.004811)
100% haven owner					.06318			.06216		.03606
					(.002938)			(.002923)		(.002193)
Constant	.03622	.05391	3.978e-14	.05108	.05779	.05121	.0006223	.05752	.0001351	.03742
	(.00008907)	(.0001404)	(0)	(.000129)	(.0001462)	(.0001294)	(.00001402)	(.0001455)	(.00001574)	(.00009595)
N	6866948	7079513	9369735	9369735	7079513	9369735	7079513	7079513	5562200	5562200
R-squared	.1854	.007987	.9489	.001859	.0002432	.001244	.9534	.001402	.9503	.1904

Note: This table shows predictors of tax haven usage between 2008 and 2019, as measured by whether an individual i in year t sent any money *directly* to a tax haven. The columns of Panel (a) iterate over regressions of this variable on difference covariate and fixed effect specifications. Column (3) uses 2005-2007 averages of each listed variable as time-invariant individual covariates. Panel (b) regresses haven usage on combinations of past haven usage and other contemporary measures of haven usage. Standard errors in both panels are clustered on the individual-level.

Table C.2: Predicting haven usage: Receiving money directly from tax havens

Panel (a): Horse race between observable characteristics and fixed effects

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Log gross income	.0003495	.00008274	.0007297				.00006306
	(.00001973)	(.00003831)	(.00006779)				(.00003839)
Log taxable income	.0002297	-.0001368	.0007509				-.0001326
	(.0000176)	(.00003236)	(.0000513)				(.00003231)
Any capital income	.001765	-.00002103	.007582				-.0001392
	(.00008439)	(.00007719)	(.001058)				(.0000778)
Any independent labor income	.0005418	.0001106	-.0008107				.0001226
	(.00003695)	(.00005133)	(.0001645)				(.00005133)
Any foreign income	.02049	.009246	-.001169				.009277
	(.002289)	(.002451)	(.003515)				(.002451)
Any business income	.001284	.0008053	-.004115				.0007856
	(.0002204)	(.0003297)	(.001227)				(.0003296)
Any other income	.001602	-.00009316	.002422				-.00006558
	(.0001227)	(.0001592)	(.000478)				(.0001593)
Any 100%-owned haven businesses			.00426				
			(.001511)				
Constant	-.005065	.001602	-.01215	.0012	.001155	.0012	.001771
	(.000184)	(.0002789)	(.0006957)	(0)	(.00002026)	(0)	(.0002798)
Covariates	X_{it}	X_{it}	CRE	No	No	No	X_{it}
Fixed effects	No	ID	No	ID	Year	TWFE	TWFE
N	7830975	5624104	1490005	5624104	6014341	5624104	5624104
Number of clusters	1752082	1194862	276007	1194862	1585099	1194862	1194862
F-statistic	187.1	5.944	67.67				6.332
Adjusted R-squared	.001651	.1753	.002068	.1752	.00005749	.1752	.1754

Panel (b): Autoregression on past haven usage and contemporaneous other haven usage

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
$\mathbb{1}\{\text{Received money from havens}_{i,t-1}\}$	.4163								.1578	.3992
	(.00703)								(.004121)	(.007329)
$\geq$ 50% haven ownership		.004255					-.00166		-.001863	
		(.0001873)					(.0001311)		(.000131)	
$\geq$ 10%-owner of a firm receiving money from a haven				.6447			.6331		.5848	
				(.006927)			(.006978)		(.007352)	
$\geq$ 10%-owner of a firm sending money to a haven			.005343				-.00151		-.001834	
			(.0001494)				(.0000931)		(.00009659)	
Sent money directly to a tax haven						.00509		.004924		.0036
						(.0001482)		(.0001544)		(.0001246)
100% haven owner					.004325			.004014		.002611
					(.0006245)			(.0006218)		(.0005261)
Constant	.0007871	.0009861	.0007289	-3.014e-14	.001129	.0007559	.0001515	.0008444	.00009301	.0005977
	(.00001168)	(.00001744)	(.00001319)	(0)	(.00001864)	(.00001347)	(6.987e-06)	(.00001576)	(7.493e-06)	(.00001194)
N	6866948	7079513	9369735	9369735	7079513	9369735	7079513	7079513	5562200	5562200
R-squared	.1488	.0005644	.001436	.6444	.00005454	.001244	.6321	.001214	.6398	.143

Note: This table shows predictors of tax haven usage between 2008 and 2019, as measured by whether an individual i in year t received any money *directly* from a tax haven. The columns of Panel (a) iterate over regressions of this variable on difference covariate and fixed effect specifications. Column (3) uses 2005-2007 averages of each listed variable as time-invariant individual covariates. Panel (b) regresses haven usage on combinations of past haven usage and other contemporary measures of haven usage. Standard errors in both panels are clustered on the individual-level.

Table C.3: Predicting haven usage:
Sent money to tax havens directly or via $\geq$ 10%-owned business

Panel (a): Horse race between observable characteristics and fixed effects

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Log gross income	.009669	.004318	.009978				.003942
	(.0001339)	(.0001854)	(.0005137)				(.0001848)
Log taxable income	.01643	.001276	.02258				.001097
	(.0001231)	(.0001586)	(.0004056)				(.0001582)
Any capital income	.03894	.004612	.0519				.002116
	(.000499)	(.0004403)	(.004425)				(.0004443)
Any independent labor income	.009822	-.00162	-.002606				-.001278
	(.0002679)	(.0003317)	(.001723)				(.0003307)
Any foreign income	.04289	.005653	.04645				.005185
	(.005135)	(.005349)	(.01985)				(.005346)
Any business income	.04728	.01924	.07077				.01757
	(.001555)	(.001729)	(.006265)				(.001725)
Any other income	.01112	-.001155	-.005444				.0005049
	(.000663)	(.0007735)	(.002386)				(.0007726)
Any 100%-owned haven businesses			.06129				
			(.007647)				
Constant	-.1996	.01127	-.2187	.06668	.06442	.06668	.01689
	(.00131)	(.0014)	(.004334)	(0)	(.0001681)	(0)	(.001395)
Covariates	$X_{\{it\}}$	$X_{\{it\}}$	CRE	No	No	No	$X_{\{it\}}$
Fixed effects	No	ID	No	ID	Year	TWFE	TWFE
N	7830975	5624104	1490005	5624104	6014341	5624104	5624104
Number of clusters	1752082	1194862	276007	1194862	1585099	1194862	1194862
F-statistic	5806	250.2	920.4				192.5
Adjusted R-squared	.02321	.3335	.0209	.3332	.002919	.3332	.337

Panel (b): Autoregression on past haven usage and contemporaneous other haven usage

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	
y_{t-1}	.4786							.466	.04411	
	(.001084)							(.001096)	(.0007451)	
$\geq$ 50% haven ownership		.1333					.1302	.07054		
		(.001221)					(.001208)	(.0007952)		
$\geq$ 10%-owner of a firm receiving money from a haven			.3451				.3203	.1751		
			(.005629)				(.00585)	(.004098)		
Received money directly from a tax haven						.2688			.02155	
						(.006087)			(.002582)	
Sent money directly to a tax haven					.9972			.997		.9779
					(.00003716)			(.00004367)		(.0003656)
100% haven owner				.07121				.008108		.00635
				(.003056)				(.0008678)		(.0009093)
Constant	.03689	.05576	.05354	.06045	.002761	.05381	.05529	.002806	.03553	.001855
	(.00009019)	(.0001446)	(.0001355)	(.0001527)	(.00003716)	(.0001366)	(.0001434)	(.00003888)	(.00009578)	(.00002448)
N	6866948	7079513	9369735	7079513	9369735	9369735	7079513	7079513	5562200	5562200
R-squared	.2026	.0111	.003669	.0002962	.9489	.001436	.01434	.953	.2106	.9509

Note: This table shows predictors of tax haven usage between 2008 and 2019, as measured by whether an individual i in year t or their 10%-or-greater owned business sent any money *directly* to a tax haven. The columns of Panel (a) iterate over regressions of this variable on difference covariate and fixed effect specifications. Column (3) uses 2005-2007 averages of each listed variable as time-invariant individual covariates. Panel (b) regresses haven usage on combinations of past haven usage and other contemporary measures of haven usage. Standard errors in both panels are clustered on the individual-level.

Table C.4: Predicting haven usage:
Received money from tax havens directly or via $\geq$ 10%-owned business

Panel (a): Horse race between observable characteristics and fixed effects

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Log gross income	.0006695	.00007726	.001673				.0000357
	(.00002715)	(.00004574)	(.0001103)				(.00004582)
Log taxable income	.0006279	-.000104	.001525				-.00008449
	(.00002434)	(.000037)	(.00007871)				(.00003697)
Any capital income	.003568	.0001755	.01386				-.0001702
	(.0001236)	(.00009745)	(.001576)				(.00009893)
Any independent labor income	.000841	.0001762	-.001266				.0002005
	(.00004929)	(.00006415)	(.0002372)				(.00006416)
Any foreign income	.02644	.01082	.01223				.01095
	(.002934)	(.002757)	(.009184)				(.002757)
Any business income	.001391	.0007336	-.004762				.0007654
	(.0003172)	(.0004254)	(.001921)				(.0004253)
Any other income	.002476	-.0002605	.004971				-.0002388
	(.0001622)	(.0002041)	(.0007332)				(.0002042)
Any 100%-owned haven businesses			.007472				
			(.002371)				
Constant	-.01165	.002095	-.02718	.001984	.001893	.001984	.002366
	(.0003257)	(.0003322)	(.001124)	(0)	(.00002887)	(0)	(.000333)
Covariates	X_{it}	X_{it}	CRE	No	No	No	X_{it}
Fixed effects	No	ID	No	ID	Year	TWFE	TWFE
N	7830975	5624104	1490005	5624104	6014341	5624104	5624104
Number of clusters	1752082	1194862	276007	1194862	1585099	1194862	1194862
F-statistic	262.8	5.851	116.4				5.325
Adjusted R-squared	.003323	.248	.005112	.2479	.00006615	.2479	.2482

Panel (b): Autoregression on past haven usage and contemporaneous other haven usage

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
y_{t-1}	.4813								.4682	.2318
	(.006236)								(.006359)	(.007354)
$\geq$ 50% haven ownership		.009661					.008296		.00483	
		(.0002939)					(.0002833)		(.0002012)	
$\geq$ 10%-owner of a firm sending money to a haven			.01063				.01024		.006942	
			(.0002357)				(.0002448)		(.0001713)	
Received money directly from a tax haven						.9994		.9986		.913
						(.00001481)		(.00004905)		(.003111)
Sent money directly to a tax haven					.007748			.002771		.001965
					(.0001955)			(.0001308)		(.0001133)
100% haven owner				.00824				.003745		.002504
				(.0008674)				(.0005958)		(.0005566)
Constant	.001133	.001451	.001004	.001781	.00118	.0005614	.0008804	.0004933	.0005668	.0003487
	(.00001431)	(.00002273)	(.00001645)	(.00002578)	(.00001853)	(.00001481)	(.00001821)	(.00001441)	(.00001392)	(.00001046)
N	6866948	7079513	9369735	7079513	9369735	9369735	7079513	7079513	5562200	5562200
R-squared	.1984	.001841	.003669	.0001252	.001859	.6444	.005113	.6321	.1967	.6623

Note: This table shows predictors of tax haven usage between 2008 and 2019, as measured by whether an individual i in year t or their 10%-or-greater owned business received any money *directly* from a tax haven. The columns of Panel (a) iterate over regressions of this variable on difference covariate and fixed effect specifications. Column (3) uses 2005-2007 averages of each listed variable as time-invariant individual covariates. Panel (b) regresses haven usage on combinations of past haven usage and other contemporary measures of haven usage. Standard errors in both panels are clustered on the individual-level.

Table C.5: Predicting haven usage: Received money from tax havens directly or via ≥ 100%-owned business

Panel (a): Horse race between observable characteristics and fixed effects

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Log gross income	.0003687	.00008358	.0007545				.00006385
	(.00002097)	(.00003837)	(.00006922)				(.00003845)
Log taxable income	.0002475	-.0001373	.0007807				-.0001331
	(.00001839)	(.00003239)	(.00005251)				(.00003234)
Any capital income	.001796	-.00001461	.007872				-.0001328
	(.00008628)	(.00007746)	(.001116)				(.00007803)
Any independent labor income	.0005629	.0001123	-.0008396				.0001243
	(.00003864)	(.00005142)	(.0001651)				(.00005142)
Any foreign income	.02184	.009502	.00421				.009534
	(.002593)	(.002464)	(.006734)				(.002464)
Any business income	.00134	.0008186	-.004453				.0007988
	(.0002321)	(.0003289)	(.001276)				(.0003288)
Any other income	.001687	-.00009583	.002594				-.00006839
	(.0001298)	(.0001595)	(.0005078)				(.0001596)
Any 100%-owned haven businesses			.0053				
			(.001808)				
Constant	-.005412	.001621	-.01264	.001225	.001178	.001225	.00179
	(.0002093)	(.0002793)	(.0007222)	(0)	(.00002087)	(0)	(.0002802)
Covariates	X_{it}	X_{it}	CRE	No	No	No	X_{it}
Fixed effects	No	ID	No	ID	Year	TWFE	TWFE
N	7830975	5624104	1490005	5624104	6014341	5624104	5624104
Number of clusters	1752082	1194862	276007	1194862	1585099	1194862	1194862
F-statistic	168.6	6.084	66.89				6.426
Adjusted R-squared	.001782	.1893	.002252	.1892	.00005572	.1892	.1893

Panel (b): Autoregression on past haven usage and contemporaneous other haven usage

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
y_{t-1}	.4285									.1583	.02225
	(.007395)									(.004169)	(.005098)
≥ 50% haven ownership		.004498						-.001536		-.001757	
		(.0001983)						(.0001295)		(.0001286)	
≥ 10%-owner of a firm receiving money from a haven				.6589				.6448		.5952	
				(.00677)				(.006892)		(.00728)	
≥ 10%-owner of a firm sending money to a haven			.005541					-.001458		-.001785	
			(.0001582)					(.00009204)		(.00009521)	
Received money directly from a tax haven							1		.9999		.992
							(4.704e-06)		(.00001703)		(.001832)
Sent money directly to a tax haven						.005253			.0001558		.0001267
						(.0001558)			(.00004619)		(.00004341)
100% haven owner					.00511				.0007752		.0007634
					(.0007099)				(.0003384)		(.0003692)
Constant	.0007897	.0009983	.0007405	-4.817e-14	.001148	.0007698	.00002233	.0001438	9.637e-06	.00008452	-1.344e-06
	(.0000117)	(.00001765)	(.00001355)	(0)	(.00001907)	(.00001391)	(4.704e-06)	(6.892e-06)	(2.873e-06)	(7.423e-06)	(2.748e-06)
N	6866948	7079513	9369735	9369735	7079513	9369735	9369735	7079513	7079513	5562200	5562200
R-squared	.158	.0006195	.001512	.6585	.00007474	.001296	.9785	.6438	.9818	.6519	.9811

Note: This table shows predictors of tax haven usage between 2008 and 2019, as measured by whether an individual i in year t or their 100%-owned business received any money *directly* from a tax haven. The columns of Panel (a) iterate over regressions of this variable on difference covariate and fixed effect specifications. Column (3) uses 2005-2007 averages of each listed variable as time-invariant individual covariates. Panel (b) regresses haven usage on combinations of past haven usage and other contemporary measures of haven usage. Standard errors in both panels are clustered on the individual-level.

Table C.6: Predicting haven usage:
Serving as a weak-majority indirect owner of a tax haven firm

Panel (a): Horse race between observable characteristics and fixed effects

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Log gross income	.008957	.0003154	.01547				-.0002911
	(.0001494)	(.0001423)	(.0005522)				(.0001421)
Log taxable income	.005657	-.0006077	.008906				-.000211
	(.0001239)	(.000113)	(.0004048)				(.0001126)
Any capital income	.01922	.006367	.01248				.0004868
	(.0004264)	(.0002635)	(.003897)				(.0002657)
Any independent labor income	.01163	.0005379	-.01162				.0008765
	(.0002806)	(.0002066)	(.001534)				(.000206)
Any foreign income	.0252	-.008344	.05723				-.00583
	(.005502)	(.003785)	(.02046)				(.003782)
Any business income	.1108	.01058	.166				.01183
	(.001863)	(.001466)	(.006522)				(.001457)
Any other income	.023	.001063	.01197				.0007993
	(.0007603)	(.0005172)	(.002493)				(.0005164)
Any 100%-owned haven businesses			.5793				
			(.009142)				
Constant	-.1136	.04006	-.1792	.03886	.03732	.03886	.0431
	(.001231)	(.001028)	(.004274)	(0)	(.0001612)	(0)	(.001027)
Covariates	X_{it}	X_{it}	CRE	No	No	No	X_{it}
Fixed effects	No	ID	No	ID	Year	TWFE	TWFE
N	6014341	5624104	1490005	5624104	6014341	5624104	5624104
Number of clusters	1585099	1194862	276007	1194862	1585099	1194862	1194862
F-statistic	2451	109.2	1109				20.77
Adjusted R-squared	.01886	.645	.05224	.6448	.0004791	.6448	.6462

Panel (b): Autoregression on past haven usage and contemporaneous other haven usage

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
y_{t-1}	.7861								.7829	.753
	(.001145)								(.001158)	(.001279)
$\geq$ 10%-owner of a firm receiving money from a haven			.1906				.1625		.03531	
			(.005064)				(.00501)		(.002896)	
$\geq$ 10%-owner of a firm sending money to a haven		.08328					.08151		.02148	
		(.0007958)					(.0007887)		(.0003665)	
Received money directly from a tax haven						.1327		.1045		.02514
						(.005426)		(.005085)		(.003256)
Sent money directly to a tax haven					.07215			.06793		.01981
					(.0007616)			(.0007341)		(.0003651)
100% haven owner				.9662				.9615		.4754
				(.0001461)				(.000279)		(.003167)
Constant	.01186	.03192	.03663	.03375	.03279	.03683	.03174	.02971	.01045	.01003
	(.00005818)	(.0001395)	(.0001517)	(.0001461)	(.0001419)	(.0001523)	(.0001392)	(.0001352)	(.0000557)	(.00005407)
N	5006719	7079513	7079513	7079513	7079513	7079513	7079513	7079513	5006719	5006719
R-squared	.5689	.0111	.001841	.08729	.007987	.0005644	.01244	.09483	.5697	.5896

Note: This table shows predictors of tax haven usage between 2012 and 2019, as measured by whether an individual i in year t was observed as a weak-majority indirect owner of a firm domiciled in a tax haven in year t. The columns of Panel (a) iterate over regressions of this variable on difference covariate and fixed effect specifications. Column (3) uses 2005-2007 averages of each listed variable as time-invariant individual covariates. Panel (b) regresses haven usage on combinations of past haven usage and other contemporary measures of haven usage. Standard errors in both panels are clustered on the individual-level.

Table C.7: Predicting haven usage:
Serving as a strict-majority indirect owner of a tax haven firm

Panel (a): Horse race between observable characteristics and fixed effects

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Log gross income	.005435	-.0001672	.009842				-.0004953
	(.0001139)	(.0001138)	(.0004257)				(.0001139)
Log taxable income	.003418	-.0001626	.005655				.00005375
	(.00009369)	(.00008991)	(.0003123)				(.00008974)
Any capital income	.01205	.003348	.01542				.0001361
	(.0003263)	(.0002085)	(.003305)				(.000211)
Any independent labor income	.006619	.0002224	-.007585				.0004047
	(.0002091)	(.0001606)	(.001121)				(.0001604)
Any foreign income	.02407	-.005811	.02754				-.004437
	(.004693)	(.003249)	(.01698)				(.00325)
Any business income	.07013	.004997	.1047				.005691
	(.001508)	(.001218)	(.005466)				(.001214)
Any other income	.01676	-.00008255	.01313				-.0002264
	(.0006053)	(.0004195)	(.002046)				(.0004193)
Any 100%-owned haven businesses			.554				
			(.009339)				
Constant	-.07089	.02409	-.1177	.02155	.02067	.02155	.02573
	(.0009584)	(.0008284)	(.003317)	(0)	(.0001193)	(0)	(.0008301)
Covariates	X_{it}	X_{it}	CRE	No	No	No	X_{it}
Fixed effects	No	ID	No	ID	Year	TWFE	TWFE
N	6014341	5624104	1490005	5624104	6014341	5624104	5624104
Number of clusters	1585099	1194862	276007	1194862	1585099	1194862	1194862
F-statistic	1461	49.05	848.7				12.15
Adjusted R-squared	.0131	.6074	.061	.6074	.0001795	.6074	.6081

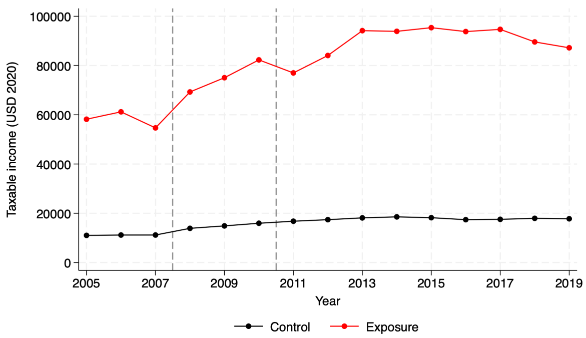
Panel (b): Autoregression on past haven usage and contemporaneous other haven usage

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
y_{t-1}	.7484									.4624	.6862
	(.001645)									(.00212)	(.001954)
≥ 50% haven ownership		.5551						.5544		.371	
		(.001963)						(.001964)		(.001998)	
≥ 10%-owner of a firm receiving money from a haven				.1306				.02372		.003401	
				(.004334)				(.002663)		(.002085)	
≥ 10%-owner of a firm sending money to a haven			.05002					.003586		-.002721	
			(.0006244)					(.0003676)		(.0002755)	
Received money directly from a tax haven							.09335		.07186		.02288
							(.004598)		(.004197)		(.002786)
Sent money directly to a tax haven						.04279			.03866		.01328
						(.0005926)			(.0005581)		(.0003023)
100% haven owner					.9828				.98		.5614
					(.0001045)				(.0001802)		(.003204)
Constant	.007389	-1.043e-13	.01749	.02029	.01724	.01805	.02042	-.0002344	.01493	-.001967	.005723
	(.00004586)	(2.477e-11)	(.0001023)	(.0001121)	(.0001045)	(.0001043)	(.0001126)	(.00002092)	(.00009568)	(.00002109)	(.00004093)
N	5006719	7079513	7079513	7079513	7079513	7079513	7079513	7079513	7079513	5006719	5006719
R-squared	.5161	.5458	.007093	.001532	.1599	.004975	.0004951	.5459	.1644	.6824	.5647

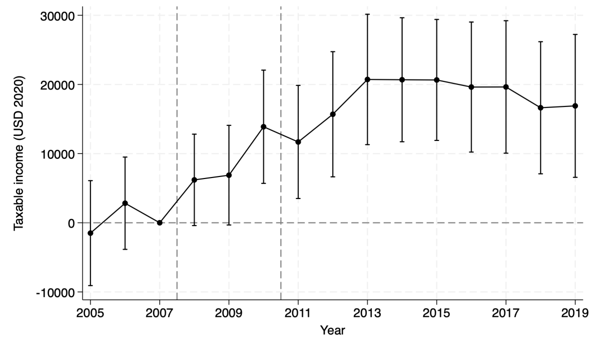
Note: This table shows predictors of tax haven usage between 2012 and 2019, as measured by whether an individual i in year t was observed as a strict-majority indirect owner of a firm domiciled in a tax haven in year t. The columns of Panel (a) iterate over regressions of this variable on difference covariate and fixed effect specifications. Column (3) uses 2005-2007 averages of each listed variable as time-invariant individual covariates. Panel (b) regresses haven usage on combinations of past haven usage and other contemporary measures of haven usage. Standard errors in both panels are clustered on the individual-level.

C.2 Alternate definitions of individual exposure: difference-in-differences results

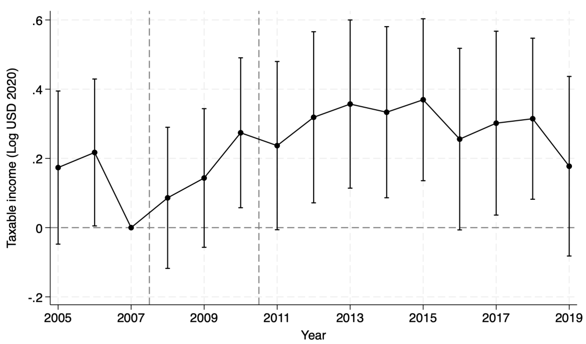
Figure C.3: Impacts of the outflows tax on exposed individuals
Robustness: exposure defined as being a $\geq 50\%$ shareholder of an ICIJ firm



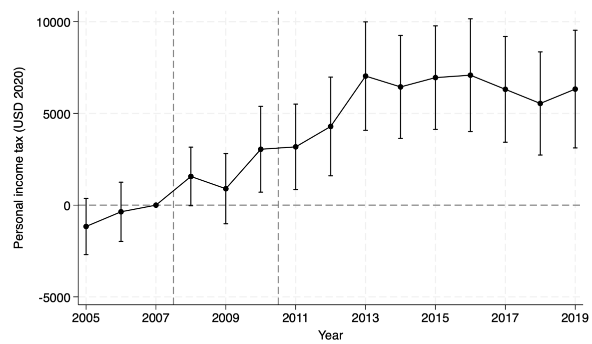
(a) Taxable income (time series)



(b) Taxable income (DD)



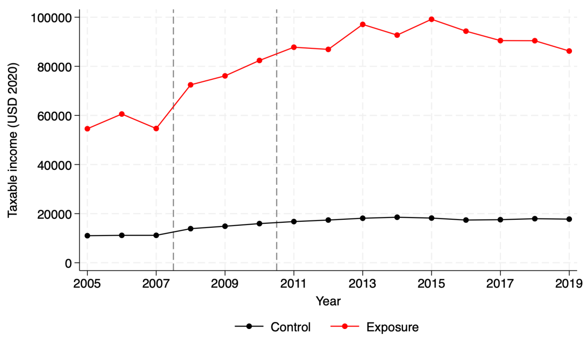
(c) Log taxable income (log)



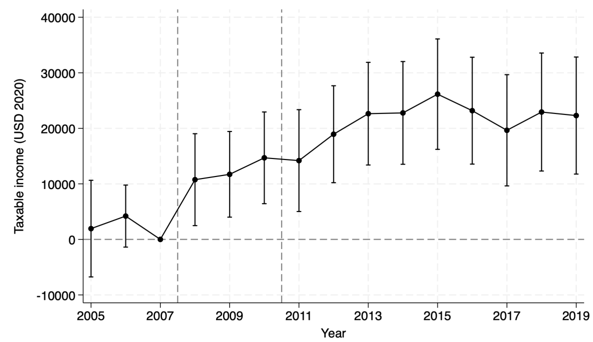
(d) Taxes paid

Note: These figures estimate the difference-in-differences design $y_{it} = \alpha_i + \delta_t + \sum_{k=2005}^{2019} \beta_k \cdot Exposure_i \cdot \mathbb{1}\{Year_t = k\} + \varepsilon_{it}$ that compares the evolution in outcomes of individuals named in the ICIJ leaks against those of observed non-tax-haven users. Panel (a) plots the time series evolution in taxable income for both groups and Panels (b)-(d) plot the difference-in-differences coefficients for estimations of this equation, with 2007 as the reference year. The dashed gray vertical lines demarcate the implementation of the outflows tax at a rate of 0.5% and the subsequent increase to 5% respectively. All specifications include individual-level fixed effects. Error bars represent 95% confidence intervals computed using standard errors clustered on the individual-level.

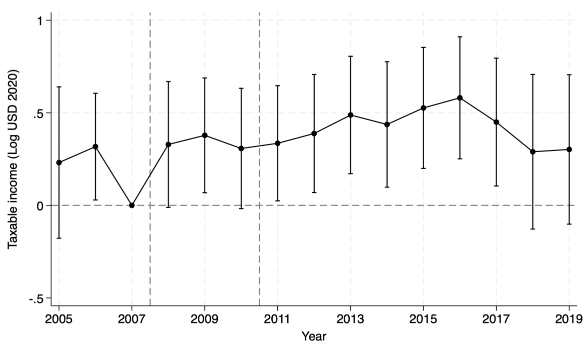
Figure C.4: Impacts of the outflows tax on exposed individuals
Robustness: exposure defined as being a $\geq 50\%$ shareholder of a firm receiving funds from a tax haven



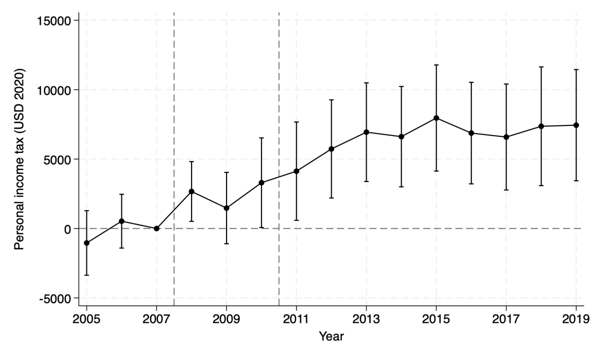
(a) Taxable income (time series)



(b) Taxable income (DD)



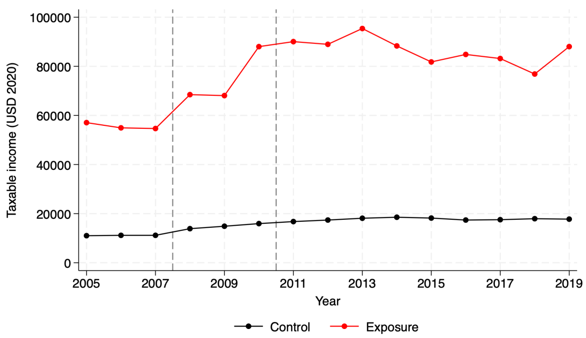
(c) Log taxable income (log)



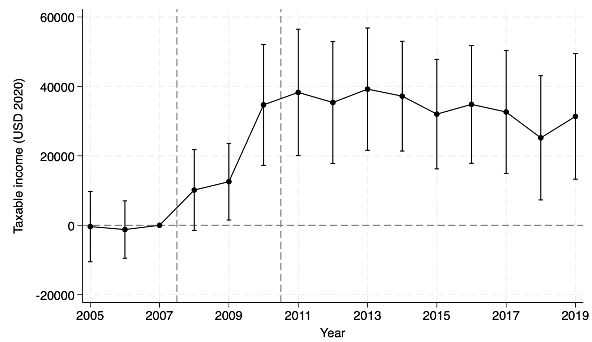
(d) Taxes paid

Note: These figures estimate the difference-in-differences design $y_{it} = \alpha_i + \delta_t + \sum_{k=2005}^{2019} \beta_k \cdot Exposure_i \cdot \mathbb{1}\{Year_t = k\} + \varepsilon_{it}$ that compares the evolution in outcomes of individuals named in the ICIJ leaks against those of observed non-tax-haven users. Panel (a) plots the time series evolution in taxable income for both groups and Panels (b)-(d) plot the difference-in-differences coefficients for estimations of this equation, with 2007 as the reference year. The dashed gray vertical lines demarcate the implementation of the outflows tax at a rate of 0.5% and the subsequent increase to 5% respectively. All specifications include individual-level fixed effects. Error bars represent 95% confidence intervals computed using standard errors clustered on the individual-level.

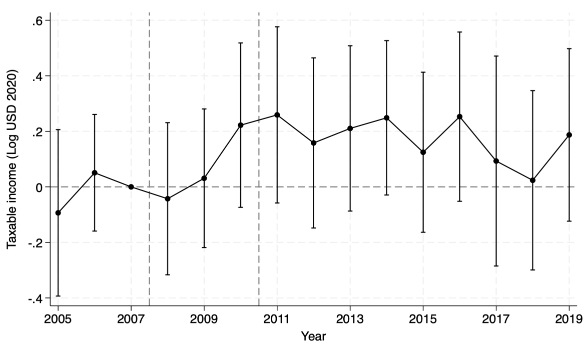
Figure C.5: Impacts of the outflows tax on exposed individuals
Robustness: exposure defined as being a $\geq 10\%$ shareholder of a firm sending dividends to tax havens



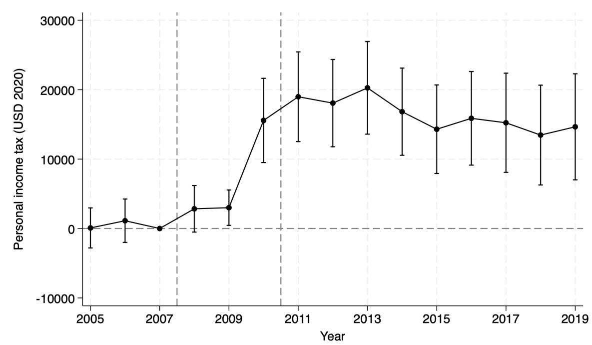
(a) Taxable income (time series)



(b) Taxable income (DD)



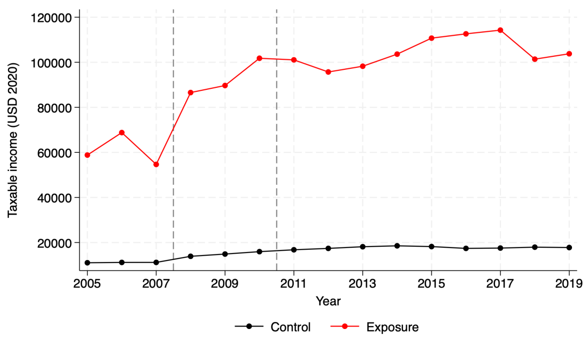
(c) Log taxable income (log)



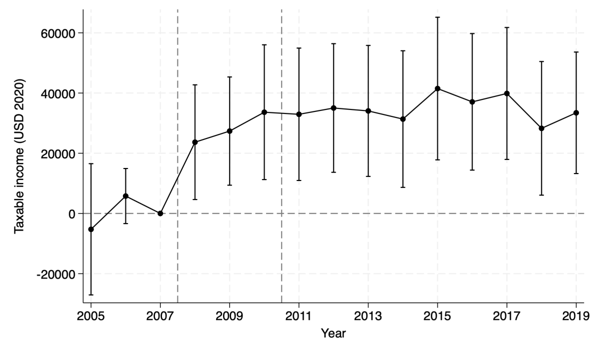
(d) Taxes paid

Note: These figures estimate the difference-in-differences design $y_{it} = \alpha_i + \delta_t + \sum_{k=2005}^{2019} \beta_k \cdot Exposure_i \cdot \mathbb{1}\{Year_t = k\} + \varepsilon_{it}$ that compares the evolution in outcomes of individuals named in the ICIJ leaks against those of observed non-tax-haven users. Panel (a) plots the time series evolution in taxable income for both groups and Panels (b)-(d) plot the difference-in-differences coefficients for estimations of this equation, with 2007 as the reference year. The dashed gray vertical lines demarcate the implementation of the outflows tax at a rate of 0.5% and the subsequent increase to 5% respectively. All specifications include individual-level fixed effects. Error bars represent 95% confidence intervals computed using standard errors clustered on the individual-level.

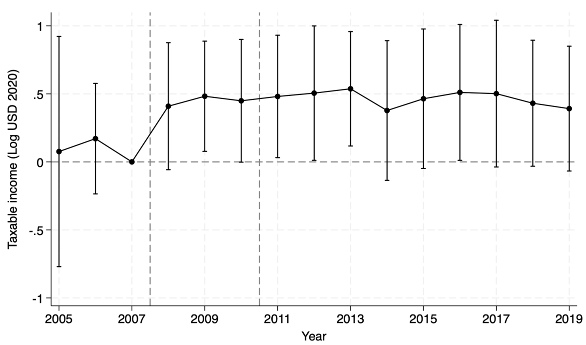
Figure C.6: Impacts of the outflows tax on exposed individuals
Robustness: exposure defined as being a $\geq 50\%$ indirect shareholder of a firm with a weak majority shareholder in a tax haven



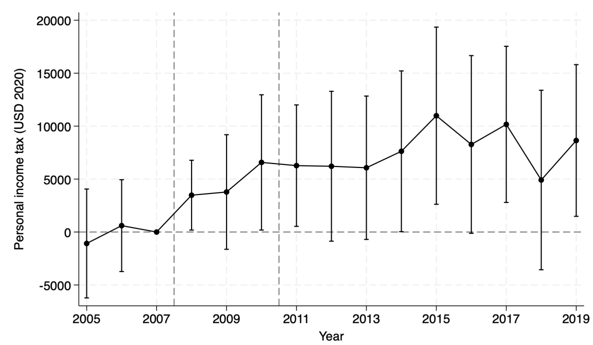
(a) Taxable income (time series)



(b) Taxable income (DD)



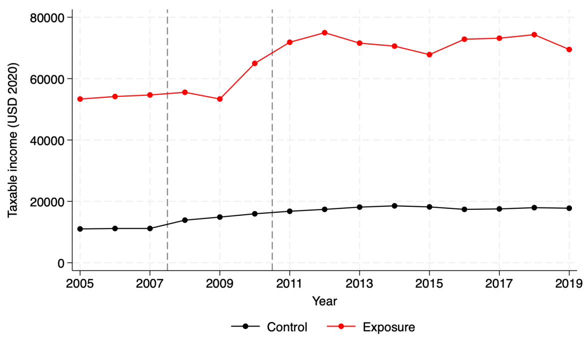
(c) Log taxable income (log)



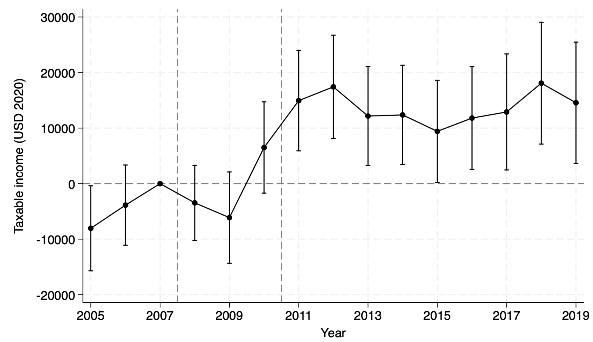
(d) Taxes paid

Note: These figures estimate the difference-in-differences design $y_{it} = \alpha_i + \delta_t + \sum_{k=2005}^{2019} \beta_k \cdot Exposure_i \cdot \mathbb{1}\{Year_t = k\} + \varepsilon_{it}$ that compares the evolution in outcomes of individuals named in the ICIJ leaks against those of observed non-tax-haven users. Panel (a) plots the time series evolution in taxable income for both groups and Panels (b)-(d) plot the difference-in-differences coefficients for estimations of this equation, with 2007 as the reference year. The dashed gray vertical lines demarcate the implementation of the outflows tax at a rate of 0.5% and the subsequent increase to 5% respectively. All specifications include individual-level fixed effects. Error bars represent 95% confidence intervals computed using standard errors clustered on the individual-level.

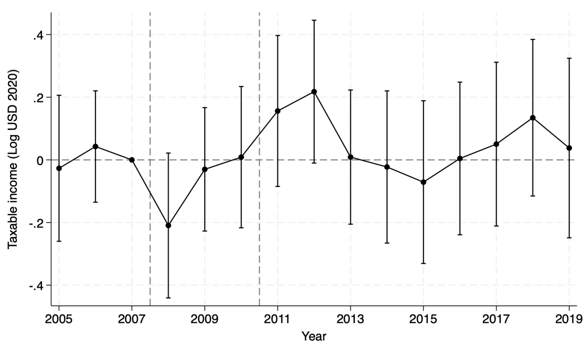
Figure C.7: Impacts of the outflows tax on exposed individuals
Robustness: exposure defined as being named in the ICIJ leaks and having opened an account before 2008



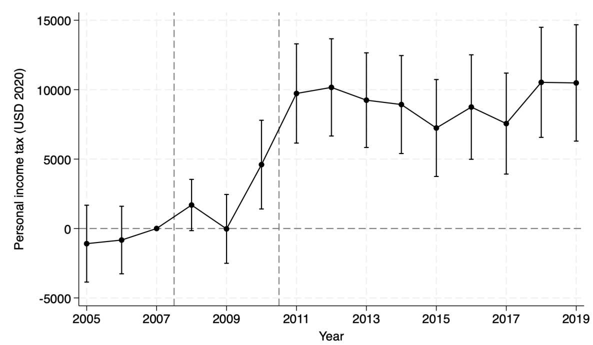
(a) Taxable income (time series)



(b) Taxable income (DD)



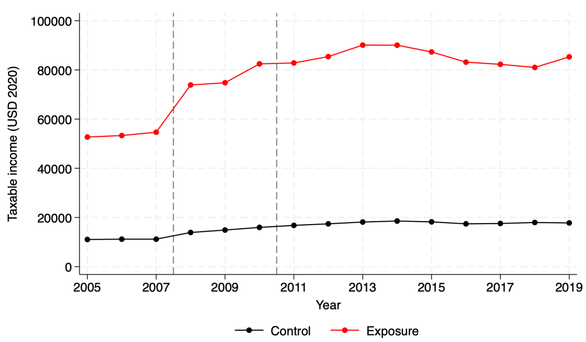
(c) Log taxable income (log)



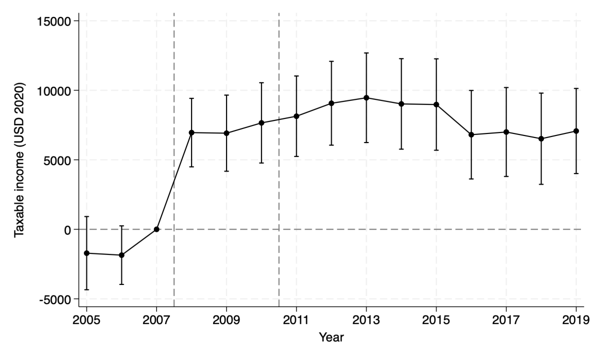
(d) Taxes paid

Note: These figures estimate the difference-in-differences design $y_{it} = \alpha_i + \delta_t + \sum_{k=2005}^{2019} \beta_k \cdot Exposure_i \cdot \mathbb{1}\{Year_t = k\} + \varepsilon_{it}$ that compares the evolution in outcomes of individuals named in the ICIJ leaks against those of observed non-tax-haven users. Panel (a) plots the time series evolution in taxable income for both groups and Panels (b)-(d) plot the difference-in-differences coefficients for estimations of this equation, with 2007 as the reference year. The dashed gray vertical lines demarcate the implementation of the outflows tax at a rate of 0.5% and the subsequent increase to 5% respectively. All specifications include individual-level fixed effects. Error bars represent 95% confidence intervals computed using standard errors clustered on the individual-level.

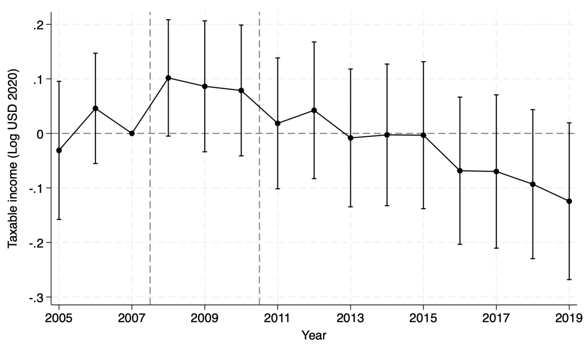
Figure C.8: Impacts of the outflows tax on exposed individuals
Robustness: exposure defined as having received any transfer from a tax haven before June 2011



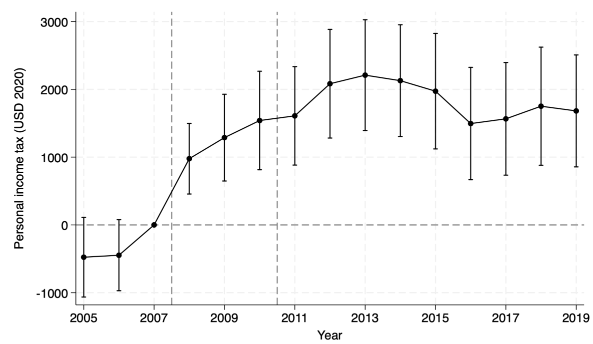
(a) Taxable income (time series)



(b) Taxable income (DD)



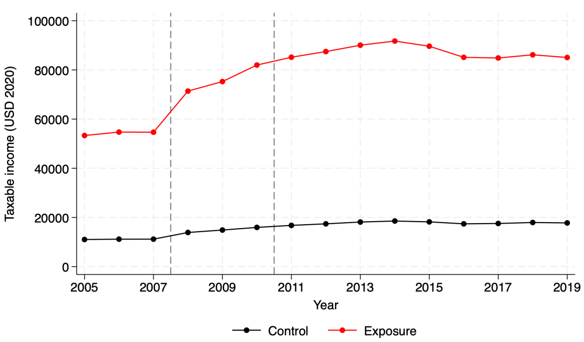
(c) Log taxable income (log)



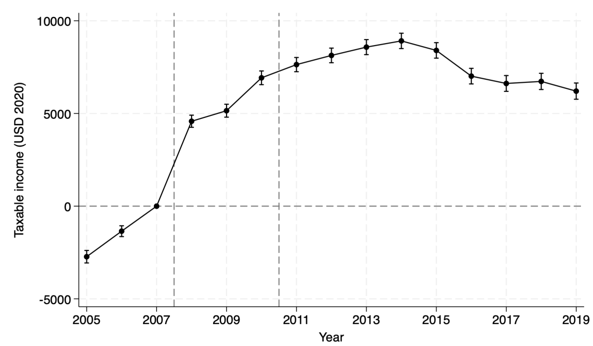
(d) Taxes paid

Note: These figures estimate the difference-in-differences design $y_{it} = \alpha_i + \delta_t + \sum_{k=2005}^{2019} \beta_k \cdot Exposure_i \cdot \mathbb{1}\{Year_t = k\} + \varepsilon_{it}$ that compares the evolution in outcomes of individuals named in the ICIJ leaks against those of observed non-tax-haven users. Panel (a) plots the time series evolution in taxable income for both groups and Panels (b)-(d) plot the difference-in-differences coefficients for estimations of this equation, with 2007 as the reference year. The dashed gray vertical lines demarcate the implementation of the outflows tax at a rate of 0.5% and the subsequent increase to 5% respectively. All specifications include individual-level fixed effects. Error bars represent 95% confidence intervals computed using standard errors clustered on the individual-level.

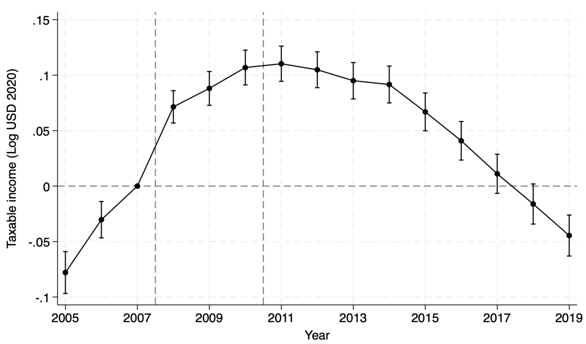
Figure C.9: Impacts of the outflows tax on exposed individuals
Robustness: exposure defined as having made any direct bank transfer to a tax haven



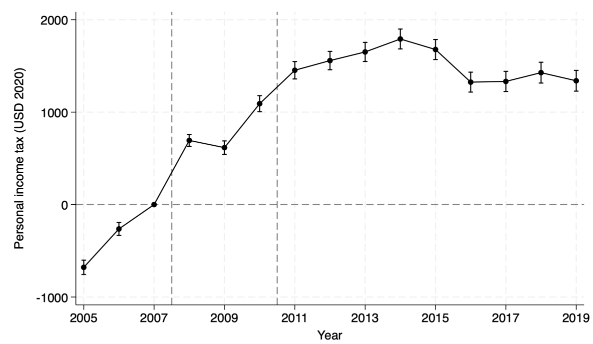
(a) Taxable income (time series)



(b) Taxable income (DD)



(c) Log taxable income (log)

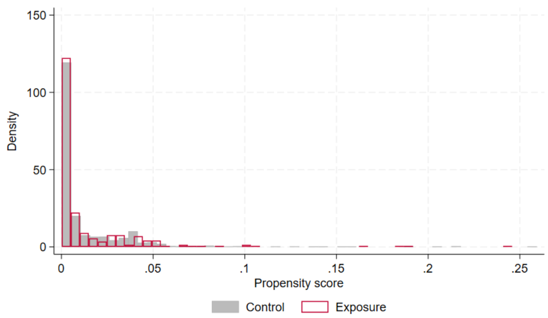


(d) Taxes paid

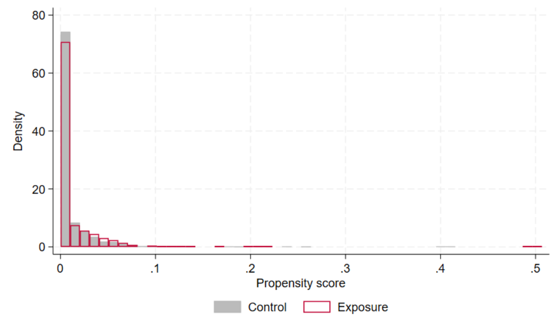
Note: These figures estimate the difference-in-differences design $y_{it} = \alpha_i + \delta_t + \sum_{k=2005}^{2019} \beta_k \cdot Exposure_i \cdot \mathbb{1}\{Year_t = k\} + \varepsilon_{it}$ that compares the evolution in outcomes of individuals named in the ICIJ leaks against those of observed non-tax-haven users. Panel (a) plots the time series evolution in taxable income for both groups and Panels (b)-(d) plot the difference-in-differences coefficients for estimations of this equation, with 2007 as the reference year. The dashed gray vertical lines demarcate the implementation of the outflows tax at a rate of 0.5% and the subsequent increase to 5% respectively. All specifications include individual-level fixed effects. Error bars represent 95% confidence intervals computed using standard errors clustered on the individual-level.

C.3 Individual responses: Propensity score and Mahalanobis matching results

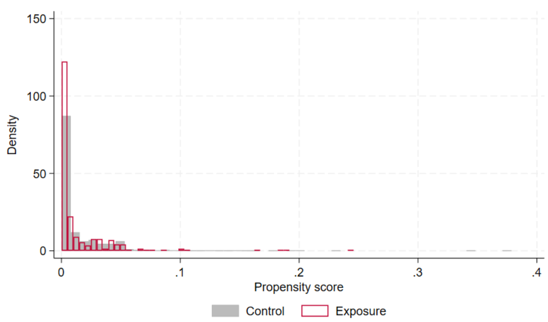
Figure C.10: Common support of exposure and control propensities among matched subsamples



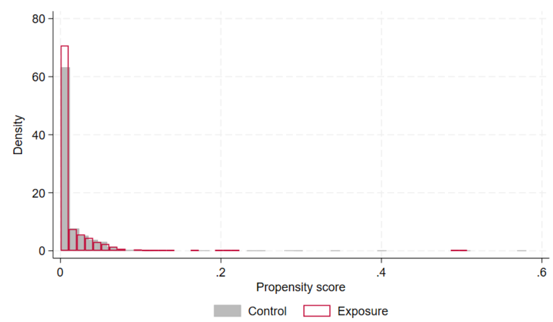
(a) Mahalanobis matching
Pre-2008



(b) Mahalanobis matching
Pre-2011



(c) Propensity score matching
Pre-2008



(d) Propensity score matching
Pre-2008

Note: These figures show the propensity score balance for the exposure and matched control groups for the four matching specifications employed in the paper for demonstrating robustness. Each of the four matching procedures is executed by computing propensity scores for exposed and unexposed individuals based on pre-reform earnings amounts and composition covariates. In all of the procedures, each exposure individual is matched to the five nearest-neighbor control individuals (with replacement).

Table C.8: Balance on covariates:
Propensity score and Mahalanobis matching sample on pre-2008 characteristics
Five nearest-neighbor matching with replacement

	Main comparison			Propensity score 5 nearest neighbors With replacement			Mahalanobis matching 5 nearest neighbors With replacement		
	Exposure	Control	Dif.	Exposure	Control	Dif.	Exposure	Control	Dif.
Gross income	91915	23307	68607.63	91915	95989	-3601.346	91915	89168	-2747
	(97205.31)	(32703.22)	(5256.493)	(97205.31)	(103282.5)	(924.63)	(97205.31)	(95295.06)	(2943.229)
Taxable income	50121	10484	39636.74	50121	52086	-1237.472	50121	50039	81.59
	(49255.63)	(14597.98)	(2663.53)	(49255.63)	(51213.61)	(404.181)	(49255.63)	(50033.49)	(1120.465)
Capital income	8629	1211	7417.848	8629	7835	537.77	8629	7579	1049
	(33243.22)	(6932.061)	(1797.616)	(33243.22)	(32222.85)	(208.383)	(33243.22)	(29290.53)	(1531.016)
Indep. labor income	619.0	329.1	289.9	619.0	577.5	22.51	619.0	564.7	54.35
	(4679.01)	(2198.474)	(253.034)	(4679.01)	(4468.149)	(15.01)	(4679.01)	(5115.935)	(289.043)
Other income	2327	299.0	2027.941	2327	998.1	1301.771	2327	919.0	1407.924
	(10722.18)	(2663.014)	(579.802)	(10722.18)	(6496.146)	(543.201)	(10722.18)	(6305.485)	(518.773)
Has business income	0.0860	0.0490	.036	0.0860	0.0830	-0.00100	0.0860	0.0850	0.00100
	(.262)	(.194)	(.014)	(.262)	(.261)	(.002)	(.262)	(.255)	(.015)
Has foreign income	0.0230	0.00100	.022	0.0230	0.0220	0	0.0230	0.0140	0.00900
	(.141)	(.028)	(.008)	(.141)	(.137)	(0)	(.141)	(.111)	(.007)
Total deductions	1088	560.5	527.91	1088	1673	5.769	1088	1421	-332.6
	(4863.904)	(3298.493)	(263.058)	(4863.904)	(5925.9)	(38.927)	(4863.904)	(5440.956)	(268.903)
Deductions share of base	0.110	0.0940	.016	0.0950	0.0970	-0.00200	0.0950	0.102	-0.0150
	(.149)	(.15)	(.006)	(.143)	(.162)	(.009)	(.143)	(.172)	(.01)
PIT final taxbase	53489	11070	42419.12	53489	55406	926.03	53489	53712	-223.0
	(47716.05)	(14953.92)	(2580.286)	(47716.05)	(49252.7)	(311.825)	(47716.05)	(48118.06)	(556.902)
PIT > 0	0.761	0.401	.36	0.761	0.766	0.00200	0.761	0.783	-.022
	(.385)	(.446)	(.021)	(.385)	(.382)	(.003)	(.385)	(.379)	(.011)
Total PIT paid	9360	502.1	8858.113	9360	10394	330.314	9360	8713	647.1
	(14780.69)	(2550.145)	(799.256)	(14780.69)	(16314.97)	(81.474)	(14780.69)	(14134.82)	(349.555)
Final taxrate	0.109	0.0100	.098	0.143	0.101	.054	0.143	0.0920	.055
	(.127)	(.028)	(.005)	(.137)	(.12)	(.006)	(.137)	(.112)	(.006)
No. units	614	1,894,666		341	1,509		341	1,547	

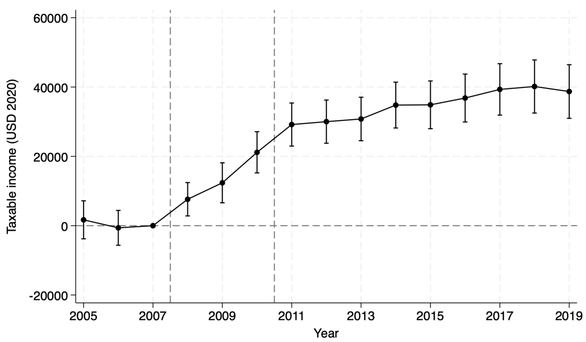
Note: This table displays summary statistics and covariate balance for exposure and control individuals using average pre-reform characteristics. Columns labeled "Exposure" and "Control" give group means as well as standard deviations in parentheses. Columns labeled "Dif." correspond with univariate cross-sectional regressions of each respective row variable on an indicator for exposure, here measured as being named in the ICIJ leaks, within the specified sample with soft parentheses containing hetreoskedasticity-robust standard errors. An observation here corresponds with a within-individual average between 2005 and 2007. The first three columns show the covariate balance for the comparison used in the main specification. The second set of three columns give the covariate balance using a sample of five nearest propensity score control neighbors matched to each exposure firm with replacement. The third set of three columns give the covariate balance using a sample of five nearest Mahalanobis score distance neighbor control neighbors matched to each exposure firm with replacement.

Table C.9: Balance on covariates:
Propensity score and Mahalanobis matching sample on pre-2011 characteristics
Five nearest-neighbor matching with replacement

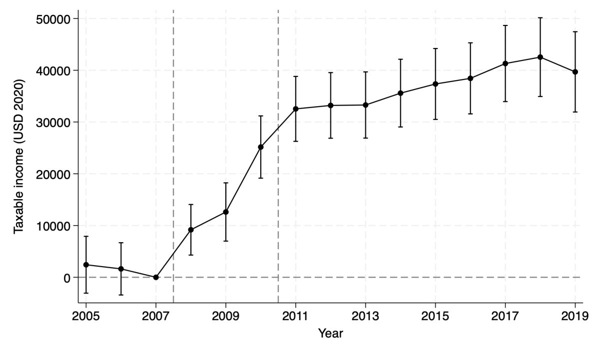
	Main comparison			Propensity score 5 nearest neighbors With replacement			Mahalanobis matching 5 nearest neighbors With replacement		
	Exposure	Control	Dif.	Exposure	Control	Dif.	Exposure	Control	Dif.
Gross income	91915	23307	68607.63	90964	84340	7549.946	90964	88267	2697
	(97205.31)	(32703.22)	(5256.493)	(90727.82)	(85306.91)	(901.224)	(90727.82)	(88456.14)	(2687.964)
Taxable income	50121	10484	39636.74	52334	50481	2248.537	52334	51958	376.2
	(49255.63)	(14597.98)	(2663.53)	(44826.5)	(44017.62)	(347.542)	(44826.5)	(45978.84)	(748.067)
Capital income	8629	1211	7417.848	11040	9920	1095.422	11040	8531	2509.124
	(33243.22)	(6932.061)	(1797.616)	(35104.93)	(34068.27)	(196.149)	(35104.93)	(32048.35)	(1362.257)
Indep. labor income	619.0	329.1	289.9	11866	11506	541.079	11866	11937	-70.47
	(4679.01)	(2198.474)	(253.034)	(18633.42)	(18865.24)	(185.285)	(18633.42)	(24712.31)	(925.781)
Other income	2327	299.0	2027.941	2276	1513	763.117	2276	1024	1252.331
	(10722.18)	(2663.014)	(579.802)	(8728.599)	(7642.891)	(413.198)	(8728.599)	(6590.88)	(416.817)
Has business income	0.0860	0.0490	.036	0.0670	0.0680	-0.00100	0.0670	0.0780	-0.0110
	(.262)	(.194)	(.014)	(.221)	(.226)	(.002)	(.221)	(.242)	(.012)
Has foreign income	0.0230	0.00100	.022	0.0210	0.0210	0	0.0210	0.0140	0.00700
	(.141)	(.028)	(.008)	(.119)	(.12)	(.001)	(.119)	(.111)	(.006)
Total deductions	1088	560.5	527.91	5116	4663	447.886	5116	5506	-389.2
	(4863.904)	(3298.493)	(263.058)	(5995.678)	(5524.328)	(128.983)	(5995.678)	(7173.376)	(302.89)
Deductions share of base	0.110	0.0940	.016	0.103	0.104	-0.00300	0.103	0.120	-.02
	(.149)	(.15)	(.006)	(.145)	(.145)	(.007)	(.145)	(.167)	(.008)
PIT final taxbase	53489	11070	42419.12	50143	48364	2153.173	50143	49708	435.1
	(47716.05)	(14953.92)	(2580.286)	(43890.68)	(42931.99)	(308.457)	(43890.68)	(44927.57)	(578.045)
PIT > 0	0.761	0.401	.36	0.762	0.759	0.00400	0.762	0.781	-.018
	(.385)	(.446)	(.021)	(.353)	(.353)	(.003)	(.353)	(.359)	(.009)
Total PIT paid	9360	502.1	8858.113	10862	10362	680.114	10862	10106	755.747
	(14780.69)	(2550.145)	(799.256)	(15646.29)	(15438.22)	(105.253)	(15646.29)	(15003.02)	(342.518)
Final taxrate	0.109	0.0100	.098	0.129	0.0980	.034	0.129	0.0920	.038
	(.127)	(.028)	(.005)	(.132)	(.115)	(.005)	(.132)	(.109)	(.005)
No. units	614	1,894,666		445	2,046		445	2,119	

Note: This table displays summary statistics and covariate balance for exposure and control individuals using average pre-reform characteristics. Columns labeled "Exposure" and "Control" give group means as well as standard deviations in parentheses. Columns labeled "Dif." correspond with univariate cross-sectional regressions of each respective row variable on an indicator for exposure, here measured as being named in the ICIJ leaks, within the specified sample with soft parentheses containing hetreoskedasticity-robust standard errors. An observation here corresponds with a within-individual average between 2005 and 2010. The first three columns show the covariate balance for the comparison used in the main specification. The second set of three columns give the covariate balance using a sample of five nearest propensity score control neighbors matched to each exposure firm with replacement.

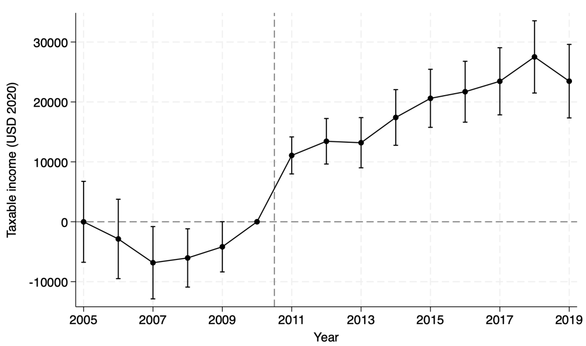
Figure C.11: Impacts of the outflows tax on ICIJ individuals' taxable income
Robustness: matching designs



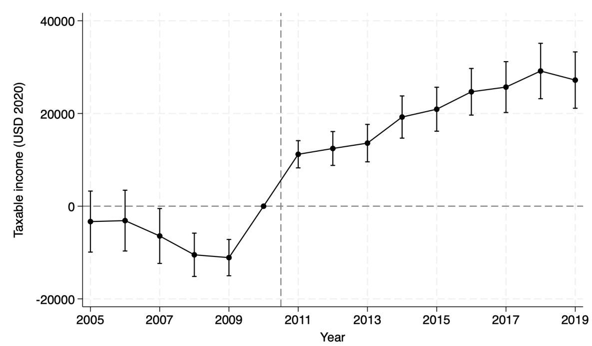
(a) Mahalanobis matching (pre-2008)



(b) Propensity score matching (pre-2008)



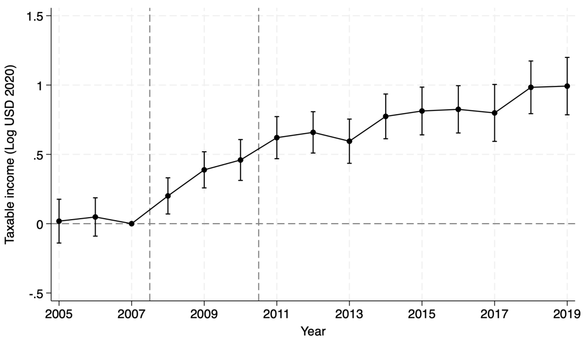
(c) Mahalanobis matching (pre-2011)



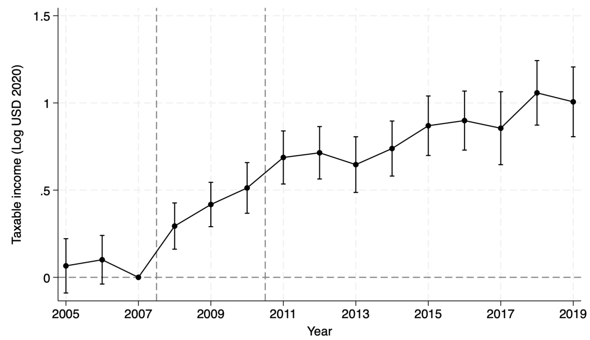
(d) Propensity score matching (pre-2011)

Note: These figures estimate the matched difference-in-differences designs $y_{it} = \alpha_i + \delta_t + \sum_{g \in \mathcal{G}} \theta_{g(i)} + \sum_{k=2005}^{2019} \beta_k \cdot Exposure_i \cdot \mathbb{1}\{Year_t = k\} + \varepsilon_{it}$ that compares the evolution in outcomes of individuals named in the ICIJ leaks against those of observed non-tax-haven users. All panels use a matching strategy that matches five control individuals to each exposure individual with replacement. Panel (a) performs this matching based on Mahalanobis distance scores of pre-2008 average characteristics; Panel (b) uses propensity score matching based on pre-2008 average characteristics; Panel (c) uses Mahalanobis matching based on pre-2011 average characteristics; Panel (d) uses propensity score matching based on pre-2011 average characteristics. The dashed gray vertical lines demarcate the implementation of the outflows tax at a rate of 0.5% (in panels (a)-(b)) and the subsequent increase to 5% respectively (in panels (a)-(d)). All specifications include individual-level fixed effects. Error bars represent 95% confidence intervals computed using standard errors clustered on the individual-level.

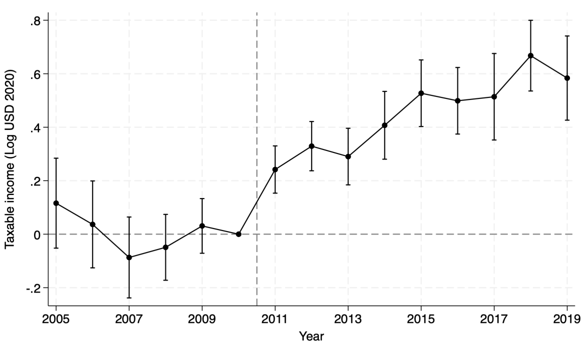
Figure C.12: Impacts of the outflows tax on ICIJ individuals' log taxable income
Robustness: matching designs



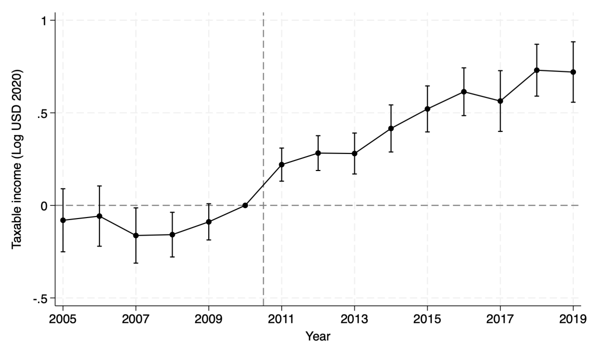
(a) Mahalanobis matching (pre-2008)



(b) Propensity score matching (pre-2008)



(c) Mahalanobis matching (pre-2011)



(d) Propensity score matching (pre-2011)

Note: These figures estimate the matched difference-in-differences designs $y_{it} = \alpha_i + \delta_t + \sum_{g\in\mathcal{G}} \theta_{g(i)} + \sum_{k=2005}^{2019} \beta_k \cdot Exposure_i \cdot \mathbb{1}\{Year_t = k\} + \varepsilon_{it}$ that compares the evolution in outcomes of individuals named in the ICIJ leaks against those of observed non-tax-haven users. All panels use a matching strategy that matches five control individuals to each exposure individual with replacement. Panel (a) performs this matching based on Mahalanobis distance scores of pre-2008 average characteristics; Panel (b) uses propensity score matching based on pre-2008 average characteristics; Panel (c) uses Mahalanobis matching based on pre-2011 average characteristics; Panel (d) uses propensity score matching based on pre-2011 average characteristics. Each panel plots the difference-in-differences coefficients for its respective design, with 2007 as the reference year. The dashed gray vertical lines demarcate the implementation of the outflows tax at a rate of 0.5% (in panels (a)-(b)) and the subsequent increase to 5% respectively (in panels (a)-(d)). All specifications include individual-level fixed effects. Error bars represent 95% confidence intervals computed using standard errors clustered on the individual-level.

C.4 Individual difference-in-differences results for other income types

Table C.11: Robustness of individual responses for independent income:
Panel (a): Imputed independent income

	Binary				Levels			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Exposure × Year ≥ 2011	0.0532	0.0751	0.0999	0.113	8791	15692	14539	4527
	(.02228)	(.02588)	(.02611)	(.02281)	(2320)	(2583)	(2580)	(2191)
Exposure × Year ∈ [2008, 2010]	0.0321	0.0206	0.0356	0.115	2720	5655	6094	2027
	(.02155)	(.02473)	(.02495)	(.02209)	(1960)	(2148)	(2142)	(1910)
Year ≥ 2011	0.0614	0.0216	-0.00527	-0.0338	2222	-7710	-5690	-984
	(.001019)	(.01609)	(.01695)	(.0009285)	(29.46)	(1305)	(1391)	(24.77)
Year ∈ [2008, 2010]	0.0197	0.0294	0.00195	-0.0446	1587	-804.1	-2967	-32.02
	(.000976)	(.01436)	(.01552)	(.0009762)	(27.13)	(1030)	(1073)	(24.82)
Pre-period exposure mean	0.744	0.744	0.744	0.744	35713	35713	35713	35713
Individual FEs	Y	Y	Y	N	Y	Y	Y	N
Matching	No	Mahalanobis	Propensity score	No	No	Mahalanobis	Propensity score	No
N	9,055,978	21,211	20,238	9,490,665	9,055,978	21,211	20,238	9,490,665
Adjusted R2	0.494	0.414	0.377	0.00237	0.574	0.656	0.655	0.00488

Panel (b): Observed independent income

	Binary				Levels			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Exposure × Year ≥ 2011	0.127	0.0999	0.109	0.164	46757	32475	32923	38278
	(.01625)	(.02236)	(.01975)	(.01389)	(2763)	(3108)	(3054)	(2069)
Exposure × Year ∈ [2008, 2010]	0.108	0.0450	0.0428	0.169	33766	14885	15908	30943
	(.0189)	(.02518)	(.02272)	(.01764)	(2485)	(2881)	(2818)	(2080)
Year ≥ 2011	0.631	0.657	0.656	0.535	9185	20656	22316	5757
	(.0009175)	(.02061)	(.01567)	(.0007382)	(28.71)	(1482)	(1427)	(16.05)
Year ∈ [2008, 2010]	0.593	0.663	0.666	0.529	8548	27657	25751	6737
	(.0009062)	(.01927)	(.01484)	(.0008521)	(27.83)	(1592)	(1359)	(20.82)
Pre-period exposure mean	0.0239	0.0239	0.0239	0.0239	1352	1352	1352	1352
Individual FEs	Y	Y	Y	N	Y	Y	Y	N
Matching	No	Mahalanobis	Propensity score	No	No	Mahalanobis	Propensity score	No
N	9,055,978	21,211	20,238	9,490,665	9,055,978	21,211	20,238	9,490,665
Adjusted R2	0.547	0.584	0.570	0.113	0.559	0.612	0.603	0.0265

Panel (c): Observed independent labor income

	Binary				Levels			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Exposure × Year ≥ 2011	0.125	0.0400	0.0473	0.104	16786	7679	7980	12948
	(.02211)	(.02631)	(.02563)	(.01656)	(1769)	(2008)	(1972)	(1236)
Exposure × Year ∈ [2008, 2010]	0.191	0.0770	0.0930	0.203	21894	9629	10945	20197
	(.02365)	(.02903)	(.0281)	(.02168)	(1965)	(2353)	(2296)	(1706)
Year ≥ 2011	0.218	0.264	0.270	0.181	2953	7933	8907	1716
	(.000823)	(.0171)	(.01679)	(.0006079)	(18.19)	(1002)	(986.7)	(10.61)
Year ∈ [2008, 2010]	0.264	0.396	0.367	0.235	3328	15713	13772	2668
	(.0008231)	(.01743)	(.01546)	(.0007283)	(19.33)	(1249)	(1089)	(14.94)
Pre-period exposure mean	0.0144	0.0144	0.0144	0.0144	569.5	569.5	569.5	569.5
Individual FEs	Y	Y	Y	N	Y	Y	Y	N
Matching	No	Mahalanobis	Propensity score	No	No	Mahalanobis	Propensity score	No
N	9,055,978	21,211	20,238	9,490,665	9,055,978	21,211	20,238	9,490,665
Adjusted R2	0.510	0.511	0.500	0.0252	0.456	0.534	0.532	0.00837

Note: This table displays results from a series of difference-in-differences designs that permute over dependent variables, fixed effects, and matching specifications. Panel (a) uses as a dependent variable imputed independent income, computed as the difference between taxable income and perfectly observed formal wage income. Panel (b) uses independent income as observed on the F102 personal income tax form. Panel (c) uses independent labor income (e.g. self-employment and liberal occupation income) as observed on the F102 personal income tax form as a disaggregation of independent income. Matching specifications include Mahalanobis and P-score matching procedures of each exposed taxpayer to five control taxpayers with replacement based on 2005-2007 average characteristics. Exposure and constant estimates are omitted for legibility. Standard errors are clustered on the individual-level.

Table C.13: Panel (a): Imputed capital income

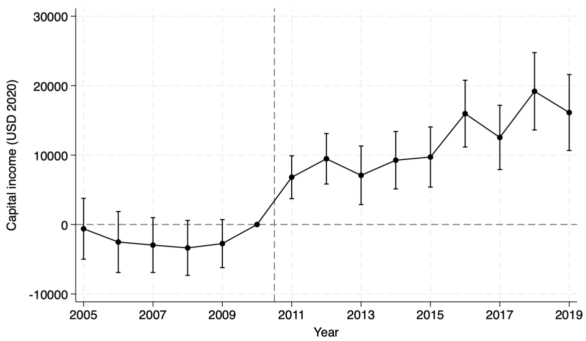
	Binary				Levels			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Exposure × Year ≥ 2011	0.0565	0.0564	0.0686	0.103	21326	18071	17843	18634
	(.0169)	(.02172)	(.02027)	(.01365)	(1891)	(2081)	(2069)	(1390)
Exposure × Year ∈ [2008, 2010]	0.00723	0.0140	0.00358	0.0668	7339	2839	2340	7129
	(.01958)	(.02514)	(.02377)	(.01831)	(1279)	(1426)	(1424)	(1007)
Year ≥ 2011	0.577	0.602	0.580	0.495	5556	10303	10811	3697
	(.000887)	(.01901)	(.0168)	(.0007041)	(21.96)	(1001)	(959.8)	(13.1)
Year ∈ [2008, 2010]	0.481	0.484	0.507	0.427	4733	8866	9653	3705
	(.0009154)	(.01847)	(.01595)	(.0008422)	(21.15)	(793.9)	(767.7)	(16.13)
Pre-period exposure mean	0.0239	0.0239	0.0239	0.0239	666.8	666.8	666.8	666.8
Individual FEs	Y	Y	Y	N	Y	Y	Y	N
Matching	No	Mahalanobis	Propensity score	No	No	Mahalanobis	Propensity score	No
N	9,055,978	21,211	20,238	9,490,665	9,055,978	21,211	20,238	9,490,665
Adjusted R2	0.433	0.416	0.417	0.0833	0.457	0.471	0.476	0.0133

Panel (b): Observed capital income

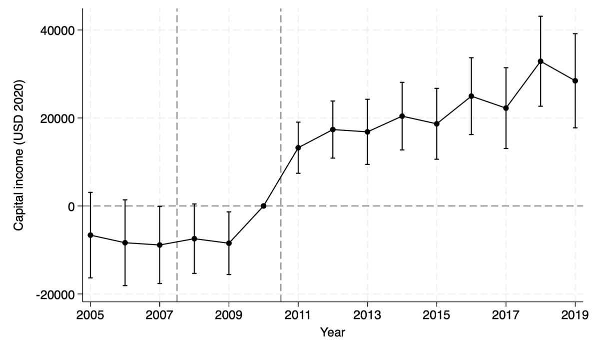
	Binary				Levels			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Exposure × Year ≥ 2011	0.187	0.164	0.154	0.175	37180	36568	37910	28257
	(.02413)	(.02811)	(.02749)	(.02311)	(4454)	(4837)	(4742)	(3494)
Exposure × Year ∈ [2008, 2010]	0.0456	0.0482	0.0268	0.0339	6772	5234	5943	3424
	(.01786)	(.01962)	(.01943)	(.01724)	(2441)	(2320)	(2292)	(1973)
Year ≥ 2011	0.183	0.229	0.218	0.0992	1078	4765	3223	-445.6
	(.0007063)	(.01907)	(.01714)	(.000576)	(23.82)	(2108)	(1677)	(17.76)
Year ∈ [2008, 2010]	-0.000444	0.0174	0.0349	-0.0174	165.3	2573	1602	-391
	(.0004924)	(.01184)	(.01085)	(.0004282)	(18.44)	(1189)	(1036)	(15.5)
Pre-period exposure mean	0.206	0.206	0.206	0.206	9905	9905	9905	9905
Individual FEs	Y	Y	Y	N	Y	Y	Y	N
Matching	No	Mahalanobis	Propensity score	No	No	Mahalanobis	Propensity score	No
N	9,055,978	21,211	20,238	9,490,665	9,055,978	21,211	20,238	9,490,665 Adjusted R2
0.469	0.509	0.520	0.0238	0.513	0.548	0.547	0.00673	

Note: This table displays results from a series of difference-in-differences designs that permute over dependent variables, fixed effects, and matching specifications. Panel (a) uses as a main dependent variable imputed capital income, which is computed as the difference between reported independent income and the reported independent labor and non-capital other income categories on the F102 personal income tax form. Panel (b) uses capital income as observed on the F102 personal income tax form, corresponding with the aggregation of income from businesses, royalties, abroad, financial returns, dividends, and shareholder profits. The first four columns of each panel use a binary version of the dependent variable to indicate a positive value; the last four columns use a levels parameterization of the dependent variable. Matching specifications include Mahalanobis and P-score matching procedures of each exposed taxpayer to five control taxpayers with replacement based on 2005-2007 average characteristics. Exposure and constant estimates are omitted for legibility. Standard errors are clustered on the individual-level.

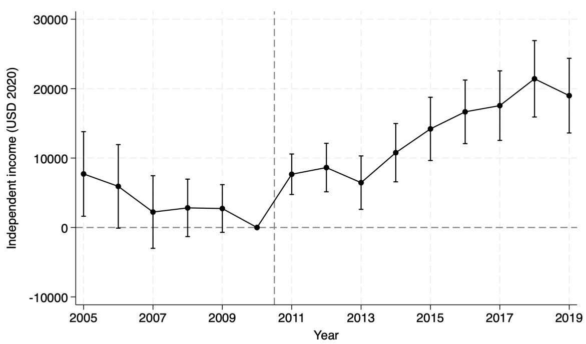
Figure C.13: Impacts of the outflows tax on ICIJ individuals
Additional line items



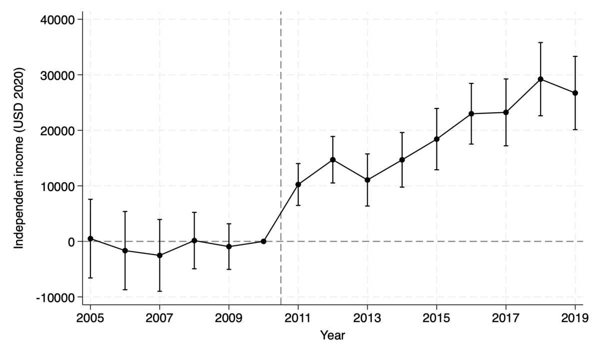
(a) Imputed capital income



(b) Observed independent income



(c) Imputed independent income



(d) Observed independent income

Note: These figures estimate the difference-in-differences design $y_{it} = \alpha_i + \delta_t + \sum_{j \in \mathcal{J}} \theta_j \cdot \mathbb{1}\{g(i) = j\} + \sum_{k=2005}^{2019} \beta_k \cdot Exposure_i \cdot \mathbb{1}\{Year_t = k\} + \varepsilon_{it}$ that compares the evolution in outcomes of individuals named in the ICIJ leaks against those of observed non-tax-haven users. The control group is constructed here by matching each exposued individual to five non-tax haven users using a Mahalanobis covariate distance based on pre-2010 within-individual average characteristics. Each panel uses a different dependent variable, as indicated by the respective subtitle. Panel (a) uses imputed capital income as the dependent variable, where the imputation is performed by subtracting the reported disaggregations of independent labor income from the total independent income concept (which are suspected to feature mismeasurement); Panel (b) plots the suspected-mismeasured independent income concept. Panel (c) uses imputed independent income as the dependent variable, where the imputation is performed by subtracting perfectly observed formal wages from taxable income; Panel (d) plots the suspected-mismeasured independent income concept. The dashed gray vertical line demarcates the increase increase of the outflows tax rate to 5%. All specifications include individual-level fixed effects. Error bars represent 95% confidence intervals computed using standard errors clustered on the individual-level.

C.5 Firm responses

Table C.14: Difference-in-differences: Firm outlays responses
Non-matched comparison

	Labor payments		Non-labor expenses		Dividend and profit distributions		
	Levels	Log	Levels	Log	Levels	Log	Binary
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Exposure $\times$ Year $\geq$ 2011	67.48	0.00196	-165.3	0.0235	30.30	0.0663	-0.0392
	(28.89)	(.06579)	(205.2)	(.08715)	(20.58)	(.09949)	(.01827)
Year $\geq$ 2011	31.52	0.432	57.87	-0.171	10.85	-0.420	0.0299
	(1.226)	(.007548)	(10.28)	(.01269)	(1.273)	(.01739)	(.002191)
Constant	66.03	3.421	642.8	4.198	32.10	1.068	0.391
	(.4381)	(.004117)	(4.08)	(.006091)	(.5113)	(.008388)	(.001109)
Pre-period exposure mean	244	4.258	2881	5.261	165.3	2.608	0.513
Individual FEs	Y	Y	Y	Y	Y	Y	Y
Mahalanobis matching	N	N	N	N	N	N	N
N	1,119,544	438,809	1,091,277	639,558	938,429	371,223	938,429
Adjusted R2	0.885	0.845	0.891	0.776	0.682	0.752	0.502

Note: This table displays results from a series of difference-in-differences designs that permute over dependent variables and fixed effects specification. Panel (a) estimates two-way fixed effect regressions of taxable income for different definitions of individual-level tax haven connectedness. The dependent variable is indicated above the column number. The Exposure $\times$ Post coefficients are estimated relative to the 2005-2007 average difference as the reference group. Standard errors are clustered on the individual-level.

Table C.15: Firm response in dividend and profit distributions:
Comparison of imputation methods

	Levels		Log		Binary	
	Accounting imputation	Accounting + legal imputation	Accounting imputation	Accounting + legal imputation	Accounting imputation	Accounting + legal imputation
	(1)	(2)	(3)	(4)	(5)	(6)
Exposure $\times$ Year $\geq$ 2011	3.505	3.478	0.0570	0.0363	-0.0299	-0.00370
	(23.96)	(16.73)	(.2077)	(.1185)	(.0208)	(.007868)
Year $\geq$ 2011	38.99	28.32	0.388	-0.463	0.0102	-0.00321
	(18.31)	(13.59)	(.158)	(.1179)	(.0169)	(.005463)
Constant	142.4	75.33	3.375	2.335	0.527	0.146
	(7.458)	(7.587)	(.07271)	(.05054)	(.008547)	(.003548)
Pre-period exposure mean	165.3	88.69	2.971	2.608	0.513	0.159
Individual FEs	Y	Y	Y	Y	Y	Y
Mahalanobis matching	Y	Y	Y	Y	Y	Y
N	24,928	26,912	3,819	13,374	24,928	26,912
Adjusted R2	0.732	0.792	0.813	0.789	0.482	0.802

Note: This table displays results from a series of difference-in-differences designs that permute over dependent variables and fixed effects specification. Panel (a) estimates two-way fixed effect regressions of taxable income for different definitions of individual-level tax haven connectedness. The dependent variable is indicated above the column number. The Exposure $\times$ Post coefficients are estimated relative to the 2005-2007 average difference as the reference group. Standard errors are clustered on the individual-level.

Appendix D Additional descriptive evidence on tax havens from outflows data

The transaction data provides a unique opportunity to learn about the use of fiscal havens from a descriptive perspective. What amount of funds are sent to tax havens? What kinds of taxpayers are sending funds to tax havens and for what statutory purpose? For this exercise, I use the country-list of tax haven from T. Tørsløv, L. Wier, and Zucman (2022), which consists of the 53 countries listed in Hines and Rice (1994) plus Belgium and the Netherlands.

There are two important points of compromise for assessing the external and internal validity of these descriptive results. First, the Ecuadorian economic setting is not likely to generalize perfectly to the case of high-income or OECD countries. Second, the descriptive material here does not engage with the quasiexperimental changes in the tax environment dealing with outflows and tax havens: these results are purely correlative/descriptive.

Figure D.2 shows Ecuadorian yearly outflows between tax havens and non-haven countries. As a proportion of GDP, funds sent to tax havens remain relatively constant throughout the time period, rising as a share of total funds sent abroad from approximately 10% to 15%. However, the transaction data allows me to disaggregate these flows by purpose and taxpayer type. The two panels of Figure D.3 display the evolution of the most prominent uses of tax havens by Ecuadorian corporations and income tax filing individuals respectively.

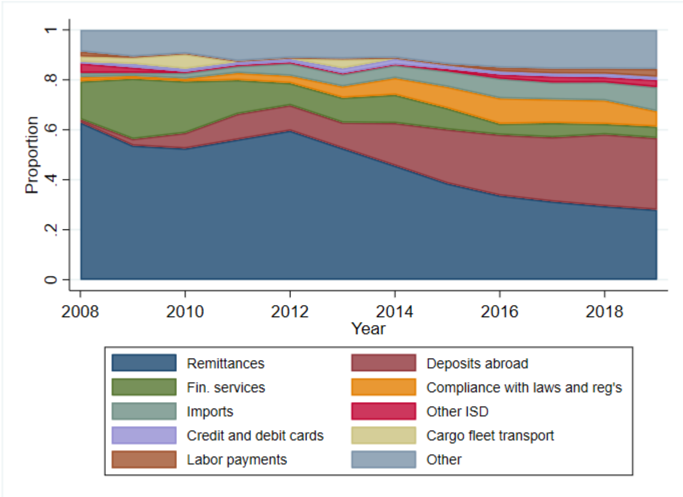
The figures illustrate a prominent role of deposits in bank accounts for both individuals and corporations as a share of their respective activity in tax havens, growing considerably over time namely for individuals. Other financial activities such dividend and profit distributions and financial service payment also assume a large proportion of Ecuadorian taxpayers' activity in fiscal havens that has grown to over 50% by 2019 for both corporations and manual income tax filers.

The data also allow the investigation of precisely *which* countries are the most important for hosting the prominent tax haven activities. With this information, we can identify Panama as the most important tax haven for offshore banking status (confirming similar findings in Bomaire and Le Guern Herry (2022))[36], followed by Luxembourg and Switzerland, and the Bahamas. These top havens absorbed over USD 200 million in bank deposit from Ecuador in 2019.

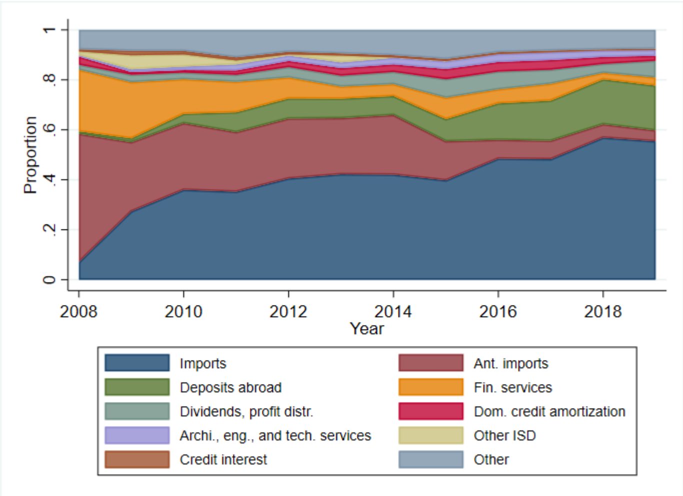
[36] Rose and Spiegel (2007) study on the determinants of bilateral offshore financial center status; the findings here replicate their importance of common language as a key determinant of an offshore tax strategic relationship.

Figure D.1: Top outflows over time

(a) Corporations



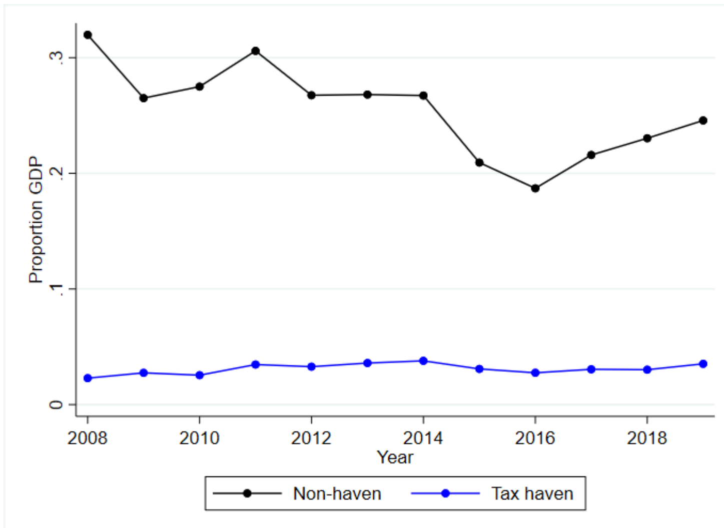
(b) Personal income tax filers



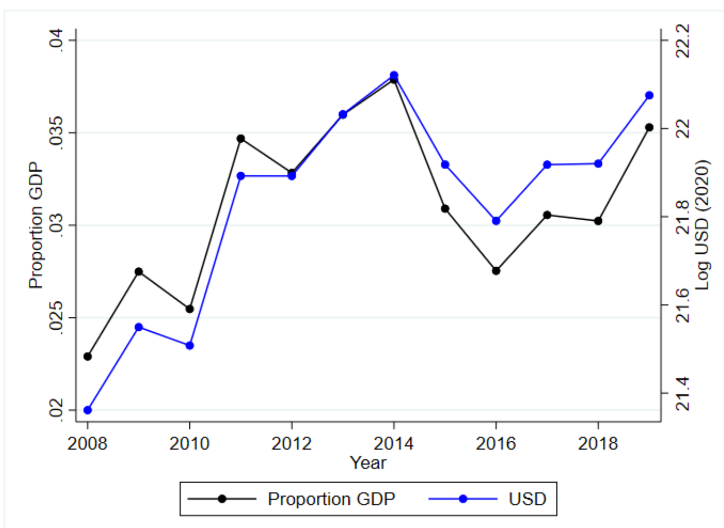
Note: This figure displays the evolution over time of the relative shares by volume of the top 9 purpose bins for corporations and individual income tax filers separately. The top 9 purpose bins are identified by summing and ranking activity all activity by purpose bin for 2008-2020. NB: The bin "Other ISD" refers to bin 56 in Table B.3 (constructed as an alternative to the other purpose bins in Table B.3), and the bin "Other" aggregates the activity in the purpose bins outside of the top 9 by volume.

Figure D.2: Currency exits over time

(a) By tax haven status



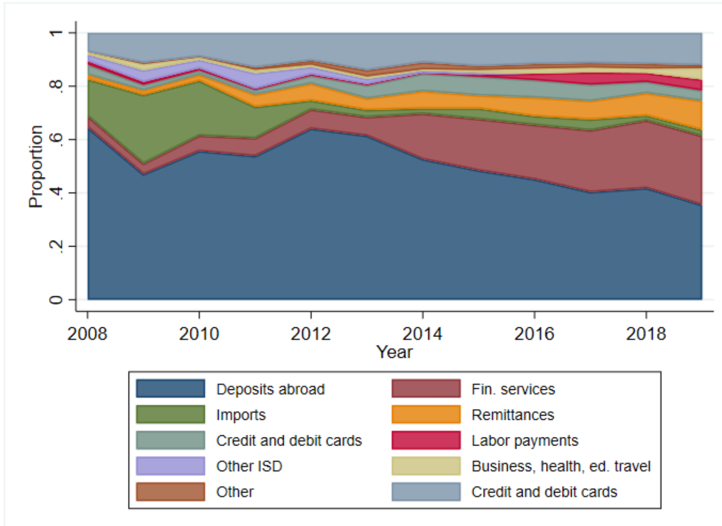
(b) Activity in tax havens



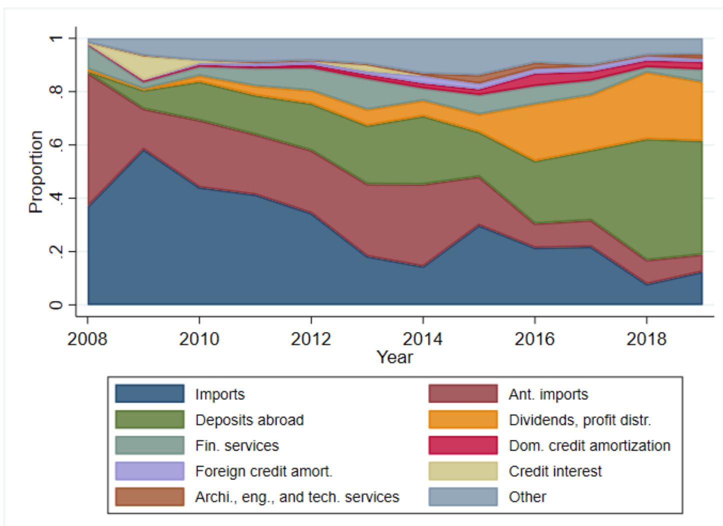
Note: These figures show total currency exits by tax haven destination status. Proportion GDP variables for time t is defined as the ratio of the sum of all MID currency exits (by haven status) in year t divided by Ecuadorian GDP in year t. Currency values are presented in January 2020 USD.

Figure D.3: Top tax haven activities over time

(a) Corporations



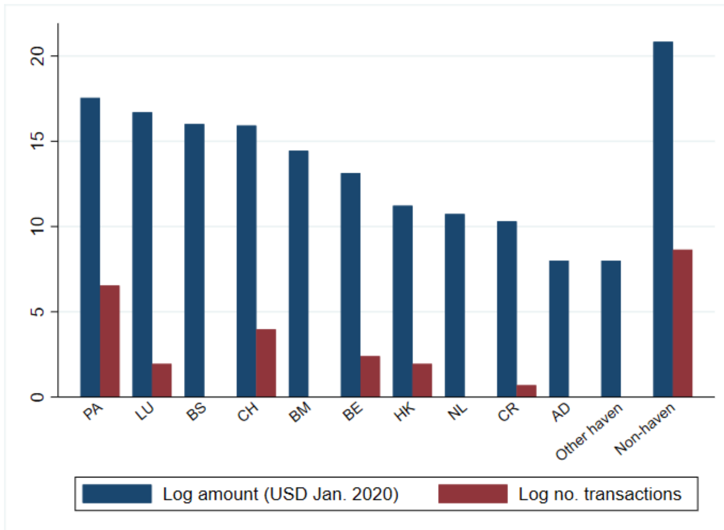
(b) Individuals



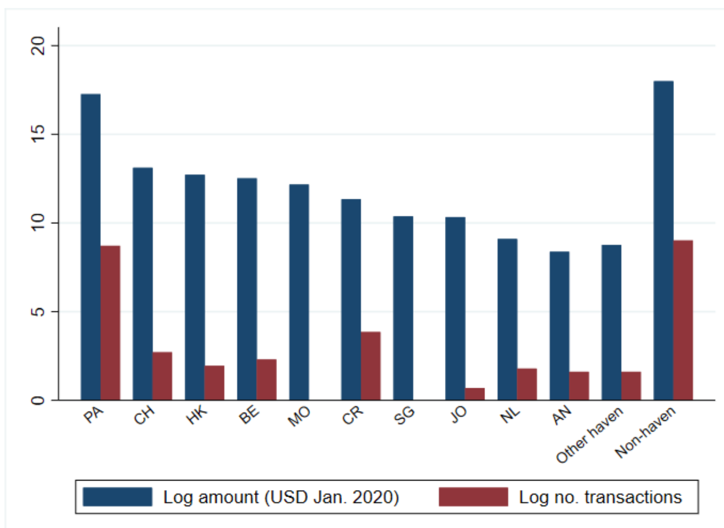
Note: These figures show the evolution of top activities associated with currency exits to tax havens as recorded in the MID data. The bin "Other ISD" refers to the other-denominated MID purpose bin, and the bin "Other" aggregates the activity in the purpose bins outside of the top 9 by all-time transaction volume. Panel (a) depicts outflow purpose trends for corporations, and panel (b) shows this trend for manual personal income tax filers.

Figure D.4: Top haven locations for foreign account deposits (2019)

(a) Corporations



(b) Individuals



Note: These figures show the top tax haven destinations of outflows by USD amount and number of transactions. Country categories are determined as the top 9 tax haven locations by total foreign account deposit volume in 2019 by taxpayer type. The "Other haven" group represents the aggregation of all of the remaining T. Tørsløv, L. Wier, and Zucman (2022) fiscal haven countries; "non-haven" represents the aggregation all foreign account deposits in non-haven countries. Panel (a) shows the top tax haven destinations for corporations, and panel (b) shows the top destinations for manual personal income tax filers.

As an additional descriptive activity of interest, I examine the share of outflows disaggregated by haven status and "avoidance" purpose. In this exercise, I assign 30 of the transaction buckets as potential tax strategic transactions in an ad hoc manner based on their reported purpose. These activities generally reflect financial flows and intangible corporate services that are understood to potentially facilitate multinational tax strategy.[37][38] While these activities do not necessarily reflect explicit tax strategic intent, this exercise illustrates the qualitative differences in the nature of outflows toward tax havens versus non-haven countries.

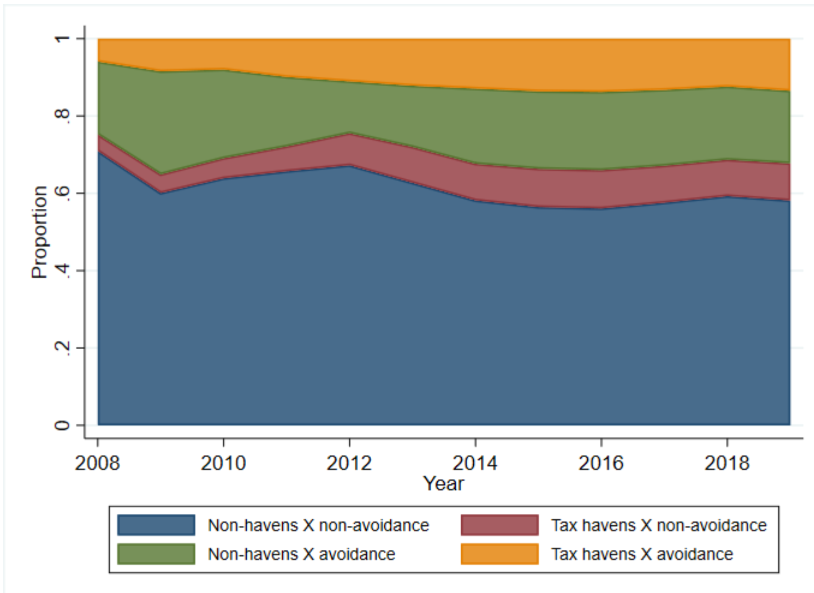
Figure D.5 illustrates the results of this descriptive exercise separately for corporations and manual personal income tax filers. Most notably, the relative shares of avoidance-labeled and non-avoidance activities switched between tax havens and non-havens. For both corporations and individuals, I categorize the majority of activity as with tax strategic intent, versus for non-havens where non-avoidance outflows greater outnumber tax-avoiding activity outflows by volume. Moreover, for individuals, one can observe a significant relative decline in the amount of avoiding activity outflows to non-tax havens that is largely absorbed by non-avoiding transactions with non-haven destinations. Lastly, the overall share of avoidance activity with tax-haven destinations appears relatively constant throughout the time frame for individuals, but growing over time in relative share for corporations.

[37] In broad groups, the "avoidance" activities include: 1) reinsurance premia and insurance indemnization, 2) financial, telecom, IT, architectural, mining, audiovisual, legal/accounting, cultural, market research, and RD services, 3) brand, patent, and royalty payments, 4) credit, interest, and dividend payments/amortization, 5) capital gains sent abroad, 6) bank deposits and financial/capital investments broad, and 7) intra-group transactions.

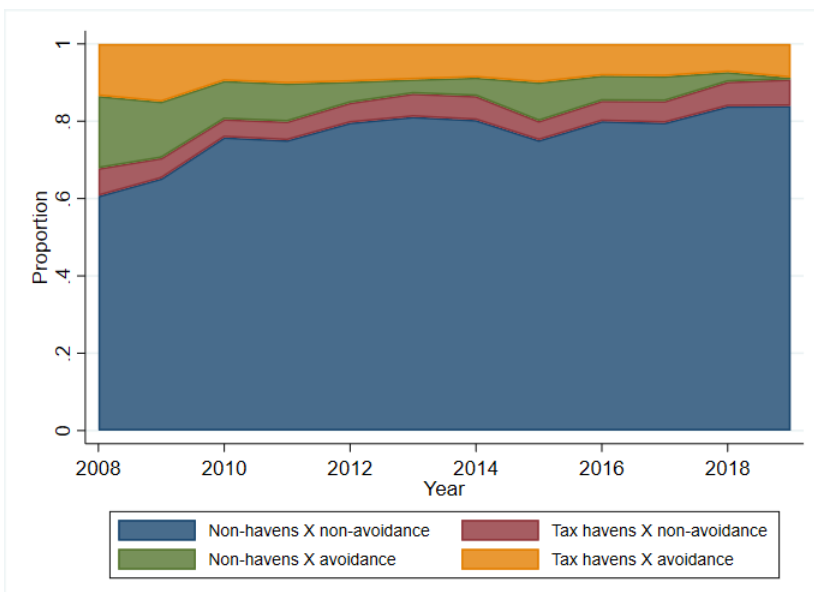
[38] Multinational tax strategic activity tends to focus on concentrating costs and financial obligations that result in increased domestic cost statements in tandem with increased funds located in low tax jurisdictions. For example, multinational profit shifting often consists of intragroup price manipulations or intragroup lending at high interest rates.

Figure D.5: Use of tax havens and non-havens for avoidance purposes

(a) Corporations



(b) Individuals



Note: This chart shoes the disaggregation of outflows by tax-haven destination status and "avoidance" activity status separately for corporations and manual personal income tax filers in Ecuador. Tax haven designation is based on the 55 countries in T. Tørsløv, L. Wier, and Zucman (2022) The category of "avoidance activities" consist of the union of several transaction purpose bins reflecting kinds of financial flows and intangible service payments typically associated with multinational tax strategy.

Appendix E A model of optimal outflows taxation

E.1 Setup

Given the evident success of the outflows tax in mitigating offshore tax evasion, how high should the optimal outflows tax be set? As a standard optimal tax result, when the government has access to a linear income tax as well as the ability to linearly tax avoidance and underreporting activities, a revenue-maximizing tax administration rate will set the tax on underreporting activity equal to the income tax (Piketty and Saez (2013); Chetty (2009); Feldstein (1999)).[39] However, the outflows tax administered by the Ecuadorian environment is approximately an order of magnitude lower than the top marginal income tax rate. I develop a simple adaptation of the model environment of Piketty and Saez (2013) to demonstrate that this discrepancy can be rationalized by the negative welfare effects of price spillovers of the outflows tax to exposed goods and services in tradeable industries.[40]

The intuition for the optimal tax result is straightforward. In absence of information constrains and enforcement frictions, the outflows tax would only affect tax strategic use of tax havens. However, in the presence of information constraints, the tax affects perfectly non-tax-strategic consumption—namely imported goods and goods produced using intermediate inputs that are affected by the tax ("false positives"). The price spillovers of the outflows tax generates negative welfare externalities that drives the optimal outflows tax rate lower than the linear income tax rate.

Consider an economy with two types of agents. All agents generate utility composite of domestic consumption c_d and consumption exposed to the outflows tax c_n and disutility in labor supply $\psi(y)$, which generates labor income. All agents also receive a lump sum demogrant R shared equally among the population funded through taxation. Agents of type 1 comprise a proportion $(1-\lambda)$ of the population, maximizing

$$U^1(c_d^1, c_n^1, y^1) = u(c_d^1, c_n^1) - \psi(y^1) \tag{5}$$

[39] This result holds similarly for a social welfare-maximizing social planner when 1) social marginal welfare weights are decreasing in income, and 2) underreporting activity increases in income.

[40] I refrain from modeling the negative corporate income tax collection spillovers of the outflows tax, which are second order (where the outflows tax distorts input composition, which weakly lowers corporate profits, which serves as the corporate income tax base.

such that

$$c_d^1 + p_n(\gamma)c_n^1 = (1-\tau)y^1 + R. \tag{6}$$

Here, domestic consumption serves as the numeraire, and the price of the exposed good c_n is expressed as a function of the outflows tax.[41] Composite consumption utility $u(c_d, c_n)$ concavely increases in both of its arguments and $\psi(\cdot)$ convexly increases in labor income earned.

Agents of type two comprise a proportion λ of the population and have access to an underreporting technology χ that allows them to circumvent labor income taxation, so that their labor income tax base z can be written as $z^2 = y^2 - \chi^2$. They face disutility cost $d(\chi^2)$ of underreporting, where $d(\cdot)$ is convexly increasing. Underreporting activity in this setting can be interpreted as directing funds abroad as outflows and is taxed at a linear rate γ. The utility maximization problem of agents of type 2 can be expressed as:

$$U^2(c_d^2, c_n^2, y^2, \chi^2) = u(c_d^2, c_n^2) - \psi(y^2) - d(\chi^2) \tag{7}$$

such that

$$c_d^2 + p_n(\gamma)c_n^2 = (1-\tau)y^2 + (\tau-\gamma)\chi^2 + R. \tag{8}$$

Agents' utility-maximizing decisions are characterized by the following envelope conditions:

$$(1-\tau)\mu^i = \psi'(y^i) \tag{9}$$

$$(\tau-\gamma)\mu^2 = d'(\chi^2), \tag{10}$$

where μ^i represents the Lagrange multiplier on the budget constraint of an agent of type i. Both types allocate consumption across goods such that $u_{c_d^i} = \frac{u_{c_n^i}}{p_n(\gamma)}$.

The demogrant, funded through total tax collections and allocated equally among the population

[41] I refrain from modeling the microfoundations of the pass-through of the outflows tax to producers of x_n. See Fajgelbaum et al. (2019) and Edmond, Midrigan, and Xu (2015).

of measure one, can be expressed as

$$R = (1-\lambda)\tau y^1 + \lambda(\tau z^2 + \gamma\chi^2) \tag{11}$$

$$= \tau Z + \gamma\chi, \tag{12}$$

where $Z := (1-\lambda)y^1 + \lambda z^2$, since type 1 agents do not have access to the underreporting technology so that $y^1 \equiv z^1$. Here, $\chi := (1-\lambda)\chi^1 + \lambda\chi^2 = \lambda\chi^2$, since $\chi^1 \equiv 0$. The fiscal environment induces Marshalling earnings functions $y^i(1-\tau, R, p_n(\gamma))$, defining an analogous aggregate earnings function $Y = Y(1-\tau, R, p_n(\gamma))$. Underreporting amount χ is an increasing function of the tax rate differential $\tau - \gamma$, so that $\chi = \chi(\tau-\gamma)$. These functions define an aggregate reported earnings function $Z = Z(1-\tau, \gamma, p_n(\gamma))$.

E.2 Optimal tax rates

A social planner maximizes

$$SWF = (1-\lambda)\omega^1 G(U^1(c_d^1, c_n^1, y^1)) + \lambda\omega^2 G(U^2(c_d^2, c_n^2, y^2, \chi^2)), \tag{13}$$

for Pareto weights $\omega^i \geq 0$. $G(\cdot)$ is a concavely increasing social welfare function. The social planner optimizes the linear income tax rate and the outflows tax rate to maximizes social welfare.

Optimizing the linear income tax rate by differentiating and applying the envelope theorem results in the equivalence:

$$\frac{\partial SWF}{\partial \tau} = 0 \implies \frac{\partial R}{\partial \tau} = (1-\lambda)g^1 z^1 + \lambda g^2 z^2, \tag{14}$$

where g^i is the normalized social marginal welfare weight of an agent of type i defined as

$$g^i := \frac{\mu^i\omega^i G'(U^i)}{(1-\lambda)\mu^1\omega^1 G'(U^1) + \lambda\mu^2\omega^2 G'(U^2)}.$$

Further developing the social planner's first order condition in τ yields

$$1 - \frac{\tau}{1-\tau}e + \frac{\gamma}{1-\tau} \cdot sh_Z^2 \cdot (e_2 - \frac{y^2}{z^2}e_Y^2) = \frac{(1-\lambda)g^1 z^1 + \lambda g^2 z^2}{Z} := \bar{g}, \tag{15}$$

where $e = \frac{1-\tau}{Z}\frac{\partial Z}{\partial(1-\tau)} = \frac{Y}{Z}\frac{\partial Y}{\partial(1-\tau)} \cdot \frac{1-\tau}{Y} + \frac{1-\tau}{Z}\frac{\partial \chi}{\partial(\tau-\gamma)} \geq \frac{Y}{Z}e_Y$, $e_Y = \frac{1-\tau}{Y}\frac{\partial Y}{\partial(1-\tau)}$, and $sh_Z^2 = \frac{\lambda z^2}{Z}$.

Rearranging yields the optimal linear income tax

$$\tau^* = \frac{1 - \bar{g} + \gamma sh_Z^2(e^2 - \frac{y^2}{z^2}e_y^2)}{1 - \bar{g} + e} = \frac{1 - \bar{g} + \gamma(e - \frac{Y}{Z}e_Y)}{1 - \bar{g} + e} \tag{16}$$

This result generalizes the revenue-maximizing linear income tax rate derived in Piketty and Saez (2013) for broader social welfare considerations.[42] In particular, the optimal linear income tax in this setting consists of the sum of the standard optimal linear income tax rate a second piece that reflects the importance and tax-sensitivity of underreporting relative to labor earnings.

Deriving the optimal outflows tax involves accounting for the spillover effects of the outflows tax onto to the price of tradable consumption $p_n(\gamma)$ as well as labor supply effects from changing price levels. Differentiating the social welfare function, applying envelope conditions, and setting equal to zero gives:

$$\frac{\partial R}{\partial \gamma} = (1-\lambda)g^1 c_n^1 \frac{\partial p_n(\gamma)}{\partial \gamma} + \lambda g^2 (c_n^2 \frac{\partial p_n(\gamma)}{\partial \gamma} + \chi^2) \tag{17}$$

$$\implies \gamma^* = \tau - \frac{1}{\tilde{e}_{\chi,\tau-\gamma}} \cdot \left(\tilde{e}_{p_n(\gamma),\gamma} \frac{Y}{\chi} \left(\bar{g}_{c_n} \frac{\mathcal{C}_n}{Y} - \tau \varepsilon_{Y,p_n(\gamma)} \right) + \lambda g^2 - 1 \right), \tag{18}$$

for semi-elasticities $\tilde{e}_{a,b} := \frac{\partial a}{\partial b}\frac{1}{a}$, by-type expenditure on the tradable good $\mathcal{C}_n^i := c_n^i p_n(\gamma)$, and $\bar{g}_{c_n} := g^1 sh_{\mathcal{C}_n}^1 + g^2 sh_{\mathcal{C}_n}^2 = \frac{(1-\lambda)g^1\mathcal{C}_n^1 + \lambda g^2 \mathcal{C}_n^2}{\mathcal{C}_n}$.

This result gives an expression for an optimal linear tax on underreporting activities that is less than the linear income tax. This difference results from the welfare considerations of price spillovers of the outflows tax, which affects consumer welfare and labor supply. Observe that Equation (17) nests the more general and well-known optimal linear underreporting tax conditions (e.g. ignoring welfarist considerations and labor supply impacts of the outflows tax yields an optimal tax rate $\gamma = \tau$).[43]

From Equation (18) we can yield intuition for how optimal outflows tax rate differs from the linear

[42] Additionally, the first part of Equation (16) gives an expression that more granularly considers the behavioral characteristics of the specific group of underreporting taxpayers.

[43] Letting $\tilde{e}_{p_n(\gamma),\gamma} \equiv 0$ in Equation (18) does not yield this result, as it would involve implicitly dividing by zero.

income tax rate based on environmental parameters. First, the semi-elasticity $\tilde{e}_{\chi,\tau-\gamma}$ determines a somewhat counterintuitive elasticity rule: the outflows tax *increases* in the sensitivity of underreporting taxpayers to the tax rate differential. However, the intuition is simple: a greater elasticity implies that taxpayers will engage in substantial underreporting at even small gaps of $\tau - \gamma$, which drives the optimal outflows tax higher, closer to eliminating the income-underreporting tax rate differential.

The second piece, $-\tilde{e}_{p_n(\gamma),\gamma}\frac{Y}{\chi}\bar{g}_{c_n}\frac{\mathcal{C}_n}{Y}$ reflects the negative welfare impact of prices spillovers of the outflows tax onto the tradable-industry good weighted by both the first stage of how much the tradable-industry good price actually responds to the outflows tax and the aggregate importance of income underreporting. The third piece, $\tilde{e}_{p_n(\gamma),\gamma}\frac{Y}{\chi}\tau\varepsilon_{Y,p_n(\gamma)}$ reflects the impact of price changes on tax collections through labor income taxation (with similar weighting as to the second piece). However, the labor supply impacts of the price change could be positive or negative based on the complementarity of substitutibility of the tradable-industry good with leisure. The last piece λg^2 reflects the negative welfare impact of the outflows tax on underreporters.

E.2.1 Joint optima

Solving Equation (16) and Equation (18) completely for τ and γ yields joint optima:

$$\gamma^* = \nabla \cdot \left(\tau^*_{\chi=0} \cdot \left(1 + \frac{Y}{\chi}\frac{\varepsilon_{Y,p_n}\tilde{e}_{p_n,\gamma}}{\tilde{e}_{\chi,\tau-\gamma}}\right) - \frac{1}{\tilde{e}_{\chi,\tau-\gamma}} \cdot \left(\frac{\mathcal{C}_n}{\chi}\tilde{e}_{p_n,\gamma}\bar{g}_{c_n} + \lambda g_2 - 1\right)\right), \tag{19}$$

$$\nabla = \frac{1-\bar{g}+e}{1-\bar{g}+e-\left(e-\frac{Y}{Z}e_Y\right)\cdot\left(1+\frac{\varepsilon_{Y,p_n}\tilde{e}_{p_n,\gamma}}{\tilde{e}_{\chi,\tau-\gamma}}\right)} \tag{20}$$

$$\tau^* = \tau^*_{\chi=0} + \frac{e-\frac{Y}{Z}e_Y}{1-\bar{g}+e}\cdot\gamma^*, \tag{21}$$

where $\tau^*_{\chi=0} = \frac{1-\bar{g}}{1-\bar{g}+e}$ refers to the social welfare maximizing linear income tax rate in the absence of income underreporting. The intuition underlying these formulae remains largely identical, with some additional insight. The optimal outflows tax γ^* sees an inflation factor ∇ based on the difference between the aggregate reported income elasticity and an adjusted aggregate earnings elasticity. The inflation factor ∇ also increases in the ratio of the net labor supply elasticity (with respect to the outflows tax rate) to the underreporting semi-elasticity (with respect to the tax rate differential). Additionally, the revenue-raising outflows tax rate begins at $\tau^*_{\chi=0}$ as a baseline adjusted by a factor that considers the relative fiscal importance of labor supply responses and underreporting responses to the outflows tax.

E.3 Calibration

We proceed with by building some numerical intuition for the expression of optimal outflows taxation given the linear income tax rate. Assume the following simplifications for calibration purposes:

1. $\lambda = 0.005$ (i.e. half a percent of the population have access to the underreporting technology)
2. $\omega^2 = 0$, so that $g^1 = 1$ (i.e. the government does not consider the welfare of underreporters)
3. There is no labor supply response to tradable price increase ($\varepsilon_{Y,p_n(\gamma)} = 0$)
4. $Y/\chi = 24$
5. $\mathcal{C}_n/Y = 0.17$, in line with empirically-realized imports-to-GDP ratios.
6. $\frac{\mathcal{C}_n^1}{\mathcal{C}^n} = 0.95$, i.e. that the 0.5% of tax haven users represent a share of tradable consumption outsized by a factor of 10.
7. The ad valorem outflows tax induces a price structure for the tradable good $p_n(\gamma) = (1 + \theta\gamma)p$, for some assumed composite pass-through rate $\theta \geq 0$, so that the semi price elasticity $\tilde{e}_{p_n(\gamma),\gamma} = \frac{\theta}{1+\theta\gamma}$. I assume that half of the tax is passed onto the price of the tradable good (i.e. $\theta = 0.5$) so that $\tilde{e}_{p_n(\gamma),\gamma} = \frac{1}{2+\gamma}$.[44]

These simplifications induce a quadratic structure of the optimal outflows tax with the following solutions:

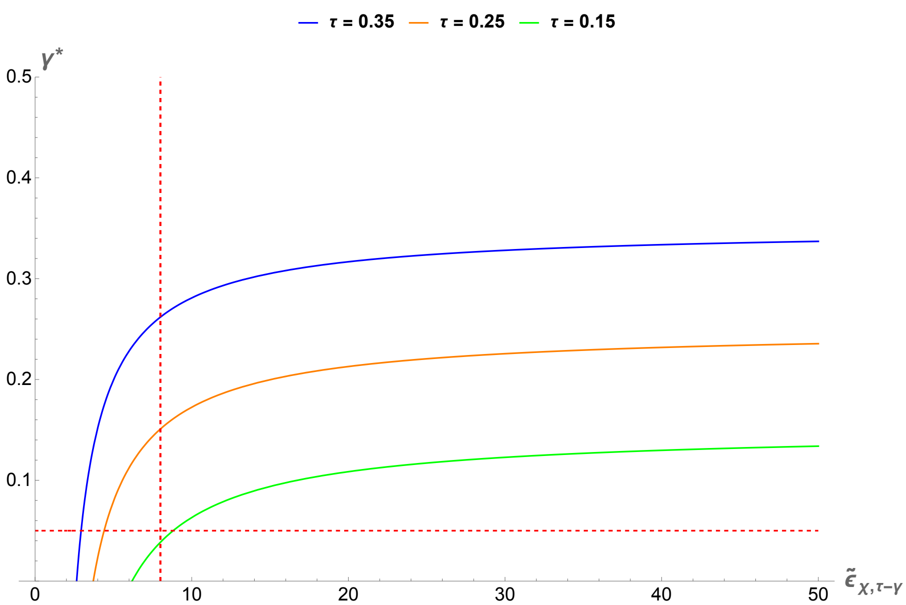
$$\gamma^* = \frac{-(1 - \frac{1}{2\tilde{e}_\chi} - \frac{\tau}{2}) \pm \sqrt{(1 - \frac{1}{2\tilde{e}_\chi} - \frac{\tau}{2})^2 + 2(\tau - \frac{0.93}{\tilde{e}_\chi})}}{2 \cdot \frac{1}{2}} \tag{22}$$

Using values of $\tau = 0.35$, the top marginal income tax rate in Ecuador, and $\tilde{e}_\chi = \frac{-40\%}{-.05} = 8$ yields an estimated optimal outflows tax of 25% (discarding the alternate negative solution). Effective

[44] To more directly consider the role of government information asymmetries in distinguishing tax strategic and non-strategic outflows, one could decompose $\theta := \xi \cdot \eta$, where $\xi \in [0, 1]$ reflects the level of government information asymmetry and $\eta \geq 0$ represents the composite pass-through of the tax to tradable consumption. Clearly in this setting, the outflows tax converges to the linear income tax when $\xi = 0$ and converges to the expression in Equation (18) for $\xi = 1$.

income tax rates average to around $2-3\%$ for the median taxpayer and around 15% for tax haven users, which would imply an optimal rate quite close to the empirically implemented rate of 5%.

Figure E.1: Optimal outflows tax rate calibration



This figure displays calibrations of the optimal tax rate on underreporting activity. derived from a model based on Piketty and Saez (2013) that features positive price spillovers caused by the tax. The y-axis plots the optimal rate that corresponds with a given semi-elasticity of underreporting with respect to the difference between the linear income tax and the linear tax on underreporting activity. Each curve displays this calibration for a different linear income tax rate τ. The dashed red horizontal line indicates the empirical outflows tax rate of 5% in Ecuador starting November 2011. The dashed red vertical line represents the lower bound of the empirically realized semi-elasticity of income reporting with respect to the income-underreporting tax rate differential.

Appendix F A model of agent underreporting responses to the outflows tax

To what extent does the tax outflows tax reduce outflows to tax havens? What are the effects of an outflows tax on consumer behavior when there are multiple underreporting mechanisms? To what extent does this reduction in outflows result in increased domestic reporting and tax collections versus substitution to other underreporting channels?

To answer these questions, I augment the Allingham and Sandmo (1972) framework by incorporating a pecuniary cost of sheltering funds, analogous to as induced by the ISD foreign transaction tax. This pecuniary cost structure generalises the framework in Guyton et al. (2021) where taxpayers face a fixed cost to concealing income. This model also shares similarities with the model of optimal income shifting with pecuniary costs in Agostini et al. (2018); however, my framework incorporates a stochastic risk of detection that varies between reporting vehicles and well as an environment where individuals can engage in an income-concealing activity with more general cost that varies in funds concealed.[45] This framework also accommodates multiple underreporting channels.

F.1 Baseline model

Consider a taxpayer that earns exogenous income z, normalized here to one. The individual generates utility linear in consumption and pay taxes on their reported income at a linear rate τ.

However, taxpayers can underreport income in two ways: by sending money to tax havens or by other means. Each of these underreporting mechanisms is associated with a cost as function of the underreporting amount, normalized here to the underreporting share of their true income $e_i = \chi_i/z$ for amount underreported $0 \leq \chi_i \leq z$: $\xi_i(e_i)$ convexly increasing in e_i, for $i \in \{h, o\}$ for tax-haven and other evasion respectively.[46] Denote $0 \leq e = e_h + e_o \leq 1$.

[45] This framework can be modified by incorporating bilateral tax rate differentials so as to nest the model setting of corporate profit shifting in Huizinga and Laeven (2008), and thus can be equally applied to studying profit shifting (both legal and evasive).

[46] Relatively little is known about these costs from a systematized, empirical perspective. Anecdotal evidence from websites marketing offshore banking services domiciled in tax havens suggests offshore sheltering costs may be linear in funds sheltered with a variable cost less than parity and a substantial fixed cost. Other sources suggest only a fixed cost associated with sheltering; indeed, this is the cost structure modeled in Guyton et al. (2021) and strongly suggested by zero-profit bunching among UK multinational firms in Bilicka (2019). An alternate setup to this model would rely on the concavity of the utility function in consumption and risk aversion in order to rationalize an interior optimum underreporting behavior.

Let γ represent an outflows tax to tax havens, so that the costs of evading a proportion of income e_i can be expressed as

$$c_h(e_h) = \xi_h(e_h) + \gamma \cdot e_h$$

and

$$c_o(e_o) = \xi_o(e_o).$$

However, there is a probability $\rho(e_h, e_o)$ that an individual will be audited (denoted event $E = 1$), increasing in both arguments. In the audited state, the tax authorities will discover the entirety of the underreported income and require the individual to pay the full tax plus a fine $\pi > 0$.

In the unaudited state $E = 0$, an individual consumes

$$c = 1 - \tau \cdot (1 - e) - (\xi_h(e_h) + \gamma e_h + \xi_o(e_o)),$$

and in the audited state $E = 1$, an individual consumes

$$c = 1 - \tau - \pi \cdot e - (\xi_h(e_h) + \gamma e_h + \xi_o(e_o)).$$

Taxpayers optimize over underreporting amounts e_h and e_o to maximize expected utility:

$$(1 - \rho(e_h, e_o))\Big(1 - \tau \cdot (1 - e) - \xi_h(e_h) - \gamma e_h - \xi_o(e_o)\Big) + \rho(e_h, e_o)\Big(1 - \tau - \pi \cdot e - \xi_h(e_h) - \gamma e_h - \xi_o(e_o)\Big),$$

subject to a non-negative consumption requirement for the audited state:

$$1 - \tau - \pi \cdot e - (\xi_h(e_h) - \gamma e_h - \xi_o(e_o)) \geq 0$$

and the requirement that individuals cannot underreport more than their income

$$0 \leq e_h + e_o \leq 1,$$

with $e_h,\ e_o \geq 0$. The first order conditions for each type of underreporting are associated with the first order conditions:

$$\underbrace{(1-\rho(e_h^*,e_o^*))\tau - \rho(e_h^*,e_o^*)\pi - (\xi_h'(e_h^*)+\gamma)}_{\text{Expected marginal net benefit}} \quad = \quad \underbrace{\frac{\partial\rho(e_h^*,e_o^*)}{\partial e_h}\cdot(\tau+\pi)e^*}_{\text{Marginal net penalty-weighted audit probability inc.}}$$

and

$$\underbrace{(1-\rho(e_h^*,e_o^*))\tau - \rho(e_h^*,e_o^*)\pi - \xi_o'(e_o^*)}_{\text{Expected marginal net benefit}} \quad = \quad \underbrace{\frac{\partial\rho(e_h^*,e_o^*)}{\partial e_o}\cdot(\tau+\pi)e^*}_{\text{Marginal net penalty-weighted audit probability inc.}}.$$

Given equal marginal benefits to each underreporting channel (the decrease in tax payments), the agent optimizes by setting equal their effective marginal costs:

$$\xi_h'(e_h^*)+\gamma+\frac{\partial\rho(e_h^*,e_o^*)}{\partial e_h}\cdot(\tau+\pi)e^* = \xi_o'(e_o^*)+\frac{\partial\rho(e_h^*,e_o^*)}{\partial e_o}\cdot(\tau+\pi)e^*. \tag{23}$$

The intuition for the first-order responses of the two evasion margins is straightforward. Agents optimize the two evasion channels so as to equilibrate the sums of their marginal pecuniary costs and penalty-weighted marginal probabilities of detection associated with each channel.

The specific level of each evasion channel 1) decreases with the purely pecuniary costs of evasion, 2) increases with the expected marginal gross benefit of evasion, and 3) decreases with marginal detection probability. The expected marginal net benefit is the difference between the expected marginal gross benefit (the savings on unpaid taxes) less the pecuniary costs of evasion. The marginal net penalty-weighted audit probability increase corresponds with the increase in detection probability associated with a marginal increase in evasion weighted by the penalty under detection.[47]

As a heuristic, we can take detection probability functions with shape restrictions $\rho(0,0) = 0$,

[47] See Section F.1.1 for a demonstration of the solutions for rationalizing an interior solution to the individual optimal underreporting allocation problem.

$\rho(e_h, 1-e_h) = \rho(1-e_o, e_o) = 1$, and $\frac{\partial\rho(e_h,1-e_h)}{\partial e_h} = \frac{\partial\rho(1-e_o,e_o)}{\partial e_o} = 0$, giving regularity conditions:

$$\tau \geq \xi_h'(0) + \gamma$$
$$\tau \geq \xi_o'(0)$$
$$\pi + \xi_h'(e_h) + \gamma \geq 0$$
$$\pi + \xi_o'(e_o) \geq 0.$$

The implicit function theorem gives the comparative statics for an interior optimum:

$$\begin{bmatrix} \frac{\partial e_h^*}{\partial\gamma} \\ \frac{\partial e_o^*}{\partial\gamma} \end{bmatrix} = \frac{1}{\tau+\pi} \begin{bmatrix} \rho^*_{e_h e_h} e^* + 2\rho^*_{e_h} + \frac{\xi_h''(e_h^*)}{\tau+\pi} & \rho^*_{e_h e_o} e^* + \rho^*_{e_o} + \rho^*_{e_h} \\ \rho^*_{e_o e_h} e^* + \rho^*_{e_o} + \rho^*_{e_h} & \rho^*_{e_o e_o} e^* + 2\rho^*_{e_o} + \frac{\xi_o''(e_o^*)}{\tau+\pi} \end{bmatrix}^{-1} \cdot \begin{bmatrix} -1 \\ 0 \end{bmatrix} \tag{24}$$

Here I suppress arguments and Leibniz notation of derivatives for visibility. Finally, denote

$$\begin{aligned}\Lambda = \Big(\rho^*_{e_h e_h}\rho^*_{e_o e_o} - \rho^{*2}_{e_o e_h}\Big)e^{*2} \qquad + \\ \Big(\frac{\rho^*_{e_h e_h}\xi_o^{*\prime\prime} + \rho^*_{e_o e_o}\xi_h^{*\prime\prime}}{\tau+\pi} + 2\big(\rho^*_{e_h e_h}\rho^*_{e_o} - \rho^*_{e_h e_o}(\rho^*_{e_h} + \rho^*_{e_o}) + \rho^*_{e_o e_o}\rho^*_{e_h}\big)\Big)e^* \qquad + \\ \frac{\xi_h^{*\prime\prime}\xi_o^{*\prime\prime}}{(\tau+\pi)^2} + 2\Big(\rho^*_{e_h}\rho^*_{e_o} + \frac{\rho^*_{e_h}\xi_o^{*\prime\prime} + \rho^*_{e_o}\xi_h^{*\prime\prime}}{\tau+\pi}\Big) - ({\rho^*_{e_h}}^2 + {\rho^*_{e_o}}^2),\end{aligned}$$

so that

$$\begin{bmatrix} \frac{\partial e_h^*}{\partial\gamma} \\ \frac{\partial e_o^*}{\partial\gamma} \end{bmatrix} = \frac{1}{\Lambda\cdot(\tau+\pi)} \begin{bmatrix} -\frac{\xi_o^{*\prime\prime}}{\tau+\pi} - 2\rho^*_{e_o} - \rho^*_{e_o e_o} e^* \\ \rho^*_{e_h} + \rho^*_{e_o} + \rho^*_{e_o e_h} e^* \end{bmatrix}. \tag{25}$$

In the general case, the shape of the function $\rho(e_h, e_o)$ requires regularity conditions in order to ensure $\Lambda > 0$ and that an interior optimum is indeed a maximum. Imposing conditions on the shape of the audit probability function alleviates these regularity requirements: for example, by imposing linearity in both arguments (e.g. $\rho(e_h, e_o) = k_h e_h + k_o e_o$, for constants $k_i \geq 0$ and $\rho(0,0) = 0,\ \rho(e_h, 1-e_h) = 1$). Otherwise, Λ represents a quadratic form in total optimal evasion, giving regularity conditions for an interior solution.

The interior optimum exhibits various responses to changes in the tax havens outflows tax rate γ. Given a marginal increase in γ, haven outflows change according to several forces. First, heuristically treating detection probability as constant, haven outflows decrease according to $-\xi_o^{*\prime\prime}/\Lambda =$

$-\frac{1}{\nu\xi_h^{*\prime\prime}}$ for some positive constant ν; that is, an increase in γ enacts a greater decrease in tax evasive haven outflows given relatively lower curvature of the cost function at the initial optimum. The intuition is simple: at higher cost curvatures, the increase in the linear haven outflows tax matters less for determining overall costs and disincentivizing haven outflows. On a pragmatic level, this result suggests that adjustments to γ induce large changes if the tax haven usage cost schedule exhibits near-linearity. In this respect, greater a statutory penalty $\tau + \pi$ dampens this behavioral response.

Increases in γ also induce behavioral responses based on the shape of the detection probability function. The second and third terms here reflect substitution responses to non-haven-evasion. Making no restrictions on the relationship between the curvature of this function and the marginal audit probabilities, the substitution responses channeled through the marginal audit probability and the curvature of the detection probability function in non-haven evasion are approximately proportionate to the terms $\frac{1}{\rho^*_{e_o}}$ and to $\frac{1}{g(\rho^*_{e_h}, \rho^*_{e_h e_h}, \xi_h^{*\prime\prime})}$ for some function g increasing in all arguments. Greater marginal detection probability in non-haven evasion mitigates substitution, as do greater curvatures of the cost schedule and the audit probability function (as smaller responses can accommodate greater risk adjustments).

Substitution responses $\frac{\partial e_o^*}{\partial \gamma}$ are determined entirely based on the shape of the audit probability function. Namely, substitution responses are attenuated with greater marginal audit probability values as well as with greater mixed-term curvature associated with the audit probability function (i.e. the mixed second-order partial derivatives $\frac{\partial \rho^*_{e_o}}{\partial e_h}$ and $\frac{\partial \rho^*_{e_h}}{\partial e_o}$).

Overall, the net impact of a change in γ on evasion $\frac{\partial e^*}{\partial \gamma}$ is the sum of these two changes. The numerator of this sum is

$$-\frac{\xi_o^{*\prime\prime}}{\tau + \pi} - (\rho^*_{e_o} - \rho^*_{e_h}) - (\rho^*_{e_o e_o} - \rho^*_{e_o e_h})e^*.$$

The interpretation is straightforward. The tax γ depresses **total** evasion e^* insofar as 1) a high curvature of the non-haven cost function mitigates absorption of displaced tax strategic haven outflows and the low curvature of the tax-haven-evasion cost function requires greater-magnitude responses to generate commensurate cost reductions, 2) the marginal audit probability increase for non-haven-evasion exceeds that for haven-evasion (indicating a net increase in the probability of detection given substitution to non-haven-evasion), and 3) the curvature of the detection probability in non-haven-evasion exceeds that for the mixed partial (substitution responses are on-net mitigated by the greater increase in marginal audit probability in non-haven-evasion than in haven-evasion). We could arrive at similar conclusions with increasing pecuniary costs of using the other evasion technology.

F.1.1 Demonstration of interior solution conditions for individuals underreporting allocation

We see the conditions under which the taxpayer set optimal evasion to an interior solution. Take the marginal utilities at order pairs $(0, 0)$ and $(e_h, 1 - e_h)$.

At $(0, 0)$, the agent exhibits marginal utilities:

$$U_{e_h}(0,0) = (1 - \rho(0,0))\tau - \rho(0,0)\pi - \xi_h'(0) - \gamma$$

and

$$U_{e_o}(0,0) = (1 - \rho(0,0))\tau - \rho(0,0)\pi - \xi_o'(0),$$

so that this corner solution is associated with positive marginal utility if

$$\tau \geq \rho(0,0)(\tau + \pi) + \xi_h'(0) + \gamma$$

or

$$\tau \geq \rho(0,0)(\tau + \pi) + \xi_o'(0).$$

On the other hand, individuals will settle on an evasion share less than their full income if their marginal utility at points corresponding with $e = 1$ is negative.

$$U_{e_h}(e_h, 1 - e_h) = (1 - \rho(e_h, 1 - e_h))\tau - \rho(e_h, 1 - e_h)\pi - \xi_h'(e_h) - \gamma - \frac{\partial \rho(e_h, 1 - e_h)}{\partial e_h}$$

and

$$U_{e_o}(1 - e_o, e_o) = (1 - \rho(1 - e_o, e_o))\tau - \rho(1 - e_o, e_o)\pi - \xi_o'(e_o) - \frac{\partial \rho(1 - e_o, e_o)}{\partial e_o},$$

so that this corner solution is associated with negative marginal utility if either

$$(1-\rho(e_h,1-e_h))\tau \leq \rho(e_h,1-e_h)\pi + \xi_h'(e_h) + \gamma + \frac{\partial\rho(e_h,1-e_h)}{\partial e_h}$$

or

$$(1-\rho(1-e_o,e_o))\tau \leq \rho(1-e_o,e_o)\pi + \xi_o'(e_o) + \frac{\partial\rho(1-e_o,e_o)}{\partial e_o}.$$

Appendix G Anti-haven dividends reform

In this section I estimate the tax-price sensitivity of dividends and profit distributions sent to tax havens. A reform to the outflows tax in November 2011 targeted dividends to tax havens by simultaneously raising the outflows tax rate and exempting all non-tax haven dividend payments and corporate profit distributions. In the period leading up this reform, all profit distributions abroad faced a tax rate of 2%, whereas in the post-period, dividend payments to non-fiscal-havens (e.g. the US), faced a tax rate of 0% and those sent to parties domiciled in tax havens were subject to an outflows tax rate of 5%. Simultaneously, as an anti-avoidance provision, the Ecuadorian tax authorities also extended the 5% transaction tax rate to majority-stake shareholders, as observed in the APS business ownership data. This kind of provision prevents "round-tripping" behavior where an individual that owns a business would send profit distributions to another controlled entity in a non-haven, and then to a tax haven. Finally, all other transaction purposes saw rate increases from 2% to 5% regardless of haven-status.

Using the universe of dividend payment and profit distribution transactions leaving Ecuador, I estimate a series of difference-in-differences designs around changes in the ISD regime. Additionally, incorporating the data on non-dividend transactions, I estimate a triple-differences design, whose third difference group includes the evolution of non-dividend transactions around the dividend reform. By carefully designing counterfactual groups of countries and transaction types, I estimate the sensitivity of dividend payments to tax havens to changes in the transaction cost. Prior evidence suggests that companies respond strongly to tax incentivize pertaining to their dividend distribution policies practices (e.g. Bach et al. (2024)), so *a priori* one might expect a similarly large response toward offshore profit distributions for tax strategic purposes.

Directing dividend payments to tax havens likely represents an instance of personal income tax strategy. Namely, individuals aiming to reduce their personal income tax base can establish recipient bank accounts and domiciles in tax havens that receive dividend payments (in addition to other kinds of payments) from related business. By distributing dividends to a related bank account domiciled in a fiscal haven and not declaring said income domestically, an individual with ownership connections with a business can shelter income from personal income taxation.

Table G.1: Descriptive statistics on profit distributions abroad

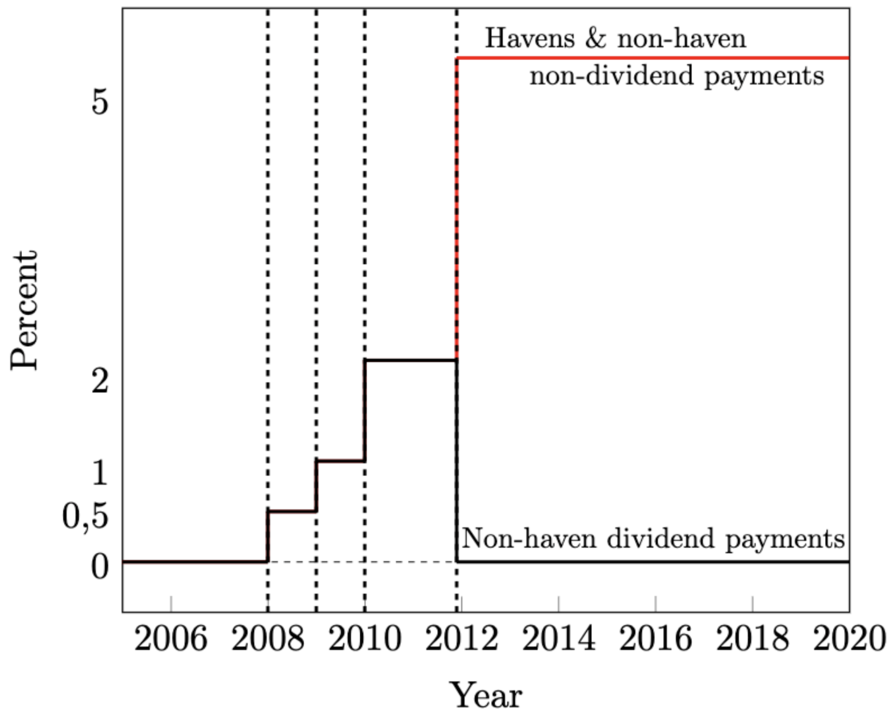
	Tax havens (25)	**Non-havens (73)**
Volume (1000s USD 2020m1)		
Mean amount per transaction	145.39	397.04
Median amount per transaction	45.44	28.71
Mean amount per id-quarter	305.12	865.12
Median amount per id-quarter	76.96	59.52
Mean amount per quarter	4860.07	107678.5
Median amount per quarter	3949.21	73838.44
Total volume	68040.91	1615177
Total volume per country	2721.64	22125.71
Number of transactions		
Mean no. transactions per id-quarter	2.10	2.18
Median no. transactions per id-quarter	1	1
Mean no. transactions per quarter	33.43	271.2
Median no. transactions per quarter	33	243
Total no. of transactions	468	4068
Total no. of transactions per country	18.72	55.73
Number of unique transactors		
Mean no. transactors per quarter	15.93	124.47
Median no. transactors per quarter	15	132
Total no. of transactors	223	1867

This table shows descriptive statistics aggregated from between 2008q1 and 2011q3 pertaining to how Ecuadorian taxpayers sent dividend payments and similar profit distributions abroad. Tax haven status refers whether a country was recognized in 2011 as a tax haven by the Ecuadorian government. The number in parentheses accompanying the labels "Havens" and "Non-havens" refer to the number of such countries receiving at least one transaction in the sample time frame.

G.1 Main dividends response design

Difference-in-difference design. I aim to compare the evolution of dividends sent to bank accounts in tax havens versus in non-havens around changes in the cost of sending funds abroad.

Figure G.1: Outflows tax rate on tax haven status and purpose



This figure displays the evolution of the statutory outflows tax rate by tax haven status of the destination country and purpose of the transaction. This illustration does not take into account smaller base modifications, such as exemptions for small amounts and select imports.

To do so, I estimate regressions of the following generalized difference-in-differences specification:

$$y_{ijt} = \beta_0 + \gamma \mathbb{1}\{Haven_j\} + \sum_{k=2008q1}^{2019q4} \delta_k \cdot \mathbb{1}\{Quarter_t = k\} + \sum_{k=2008q1}^{2019q4} \beta_k \cdot \mathbb{1}\{Quarter_t = k\} \cdot \mathbb{1}\{Haven_j\} + \varepsilon_{ijt},$$

with alternate specifications including company, country, and time fixed effects. Here, y_{ijt} represents dividends (by various parameterizations) sent by company i to country j at time t. Parameterizia-tions of dividend activity include levels and log Dollar amounts[48] and number of transactions as well as an indicator for whether at a non-zero number of transactions occur between a given individual and country during period t. Additional alternate designs explore aggregations to the annual level as well as disaggregations to the intensive margin of transaction behavior. In annual-level designs, I use 2011 as the base year. For quarter-level designs, to mitigate the roles of seasonal cyclicality and short-run anticipation of the policy in light of its announcement earlier in the summer of 2011 in affecting dividend payout behavior, I use quarter 4 of 2010 as the base period.

[48] Prior to aggregating transactions, I winsorize Dollar values above the 99th percentile in the transaction distribution.

Under the assumption of non-anticipatory responses to the reform and parallel trends in the evolution of profit distribution activity between havens and non-havens, coefficients $\{\hat{\beta}_k\}$ quantify the effect of the reform on dividend payments to tax havens relative to non-havens. Note that because the outflows tax rates to *both* tax havens and non-havens change at the same time, the coefficients $\{\hat{\beta}_k\}$ do not quantify the impact of the tax on the amount of dividend flows to havens, but rather the impact of a relative cost-preference (a "tax wedge") on the relative flows between havens on non-havens. While this object is potentially of less canonical interest, I begin with this reform, as it illustrates a clear change in incentives for tax haven usage. To estimate more standard elasticities of dividend flows with respect to the tax rate, I later compare dividend and specific classes of previously exempt non-dividend transactions within a fixed country group.

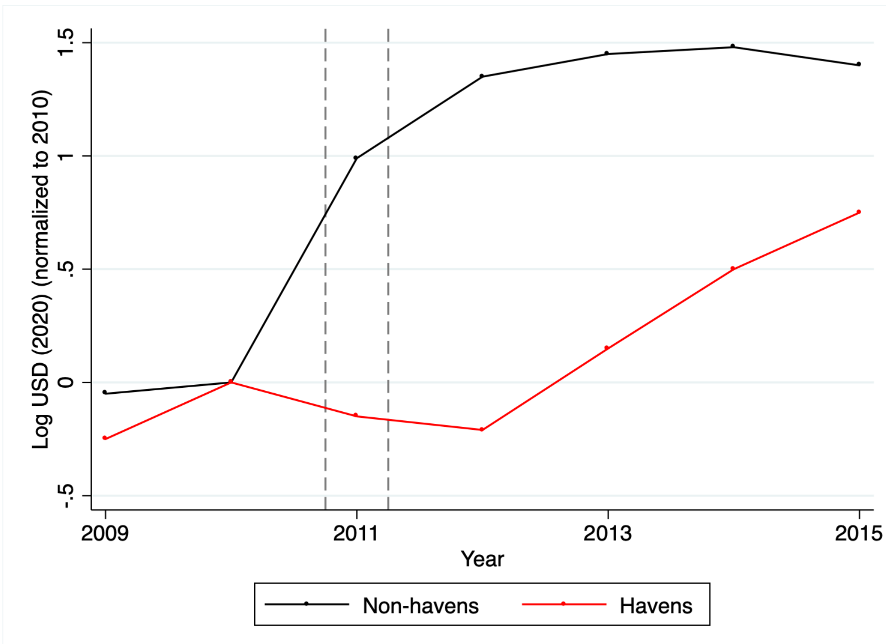
Assuming a constant cost of transacting with non-haven and haven countries θ_0 and θ_1 respectively, the proportion change in the cost ratio can be expressed as

$$\frac{\frac{1.05 \cdot \theta_1}{1.00 \cdot \theta_0} - \frac{1.02 \cdot \theta_1}{1.02 \cdot \theta_0}}{\frac{1.02 \cdot \theta_1}{1.02 \cdot \theta_0}} = .05,$$

i.e. the reform induces a change such that the relative cost of interacting with tax haven relative to with a non-haven increases by 5%.

Figure G.2 displays the evolution of aggregate dividend payments between tax havens and non-havens. In the pre-reform period, payments to havens and non-havens evolve identically; immediately following the reform, the difference in quarterly aggregate payments increases to around a whole log point—a near-tripling of the pre-period gap in payments between the two groups, although this initial aggregate gap appears to diminish later on.

Figure G.2: Evolution in dividend payments abroad by tax haven status of destination country



This figure displays log aggregates of USD in dividend outflows to tax havens and non-haven countries over time, with each time series normalized to 2010 levels. The two dashed lines surround 2011, the first year with exposure to the reform. The distinction of "tax haven" here refers to the group of countries considered tax havens by the Ecuadorian government.

Results. Figure G.3 displays the coefficients $\{\hat{\beta}_k\}$ from the above reduced form. Panel (a) displays the response in levels USD, illustrating a large drop in quarterly dividend payments to tax havens of around USD 1000 per firm-country-quarter (around USD 25k per firm-quarter). On the intensive margin, Panel (b) shows a decrease in the volume sent to tax havens relative to non-havens of about 2/3. Figure G.5 shows these coefficients for the differences-in-differences model that includes two-way fixed effects by firm and quarter.[49]

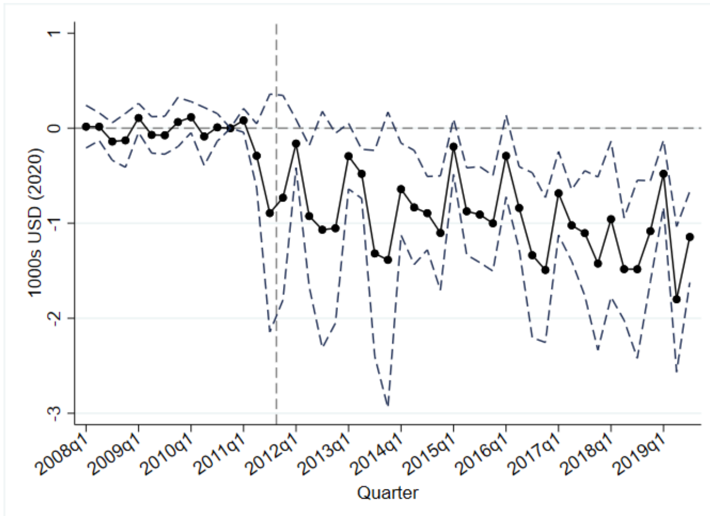
Figure G.6 studies how firms respond to the reform in terms of their extensive-margin dividend payout practices. Panel (a) studies this response in levels, whereas Panel (b) studies an "intensive" version of this response. Contrasting these estimates reveals the presence of firms that cease paying out dividends to tax havens—either by ceasing any profit distribution payouts or by having their tax haven-domiciled shareholders relinquish shareholder status. However, there appears no change in the extensive-margin payout behavior among firms that do not cease paying out dividends entirely.

Table G.2 summarizes these results, implying a high level of responsiveness of firms to changes in incentives in sending funds to tax havens. Interestingly, contrasting columns (7) and (8), including firm-level fixed effects eliminates the intensive-margin response in terms of of number of transactions. This contrast indicates the presence of substantial extensive margin movement—i.e. firms that entirely cease paying out dividends to shareholders in tax havens. In contextualizing the external validity of this result, it is important to emphasize the role of the ISD rate increase to 5% for all other non-dividend-related transactions regardless of the tax haven status of the destination country in precluding other avoidance responses. The hypothetical absence of the 5% increase for non-dividend transactions regardless of tax haven status of the destination would open up the possibility of substitution to intragroup profit shifting and other avoiding activities.

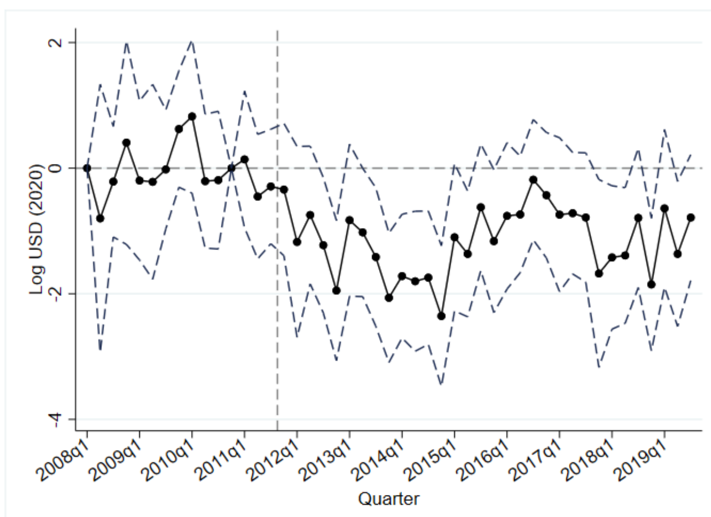
[49] Section G.3 replicates these designs aggregated to the annual level.

Figure G.3: Dividend reform: tax havens versus non-havens (Volume)

(a) Levels USD



(b) Log USD



These figures display the difference-in-differences coefficients $\{\hat{\beta}_k\}_{k=2008q1}^{2019q4}$ from the reduced form

$$y_{ijt} = \beta_0 + \gamma \mathbb{1}\{Haven_j\} + \sum_{k=2008q1}^{2019q4} \delta_k \cdot \mathbb{1}\{Quarter_t = k\} + \sum_{k=2008q1}^{2019q4} \beta_k \cdot \mathbb{1}\{Quarter_t = k\} \cdot \mathbb{1}\{Haven_j\} + \varepsilon_{ijt},$$

where y_{ijt} represents firm i's profit distributions to country j aggregated within quarter t. This specification uses 2010 quarter 4 as the base period. Dividend transactions are winsorized above the 99th percentile in transaction amount prior to aggregation. Panel (a) uses levels USD as the dependent variable; Panel (b) uses log USD. Dashed navy lines represent 95% confidence intervals based on firm-clustered standard errors.

Table G.2: Dividend reform: Tax havens versus non-havens

	(1) Amt.	(2) Amt.	(3) Log amt.	(4) Log amt.	(5) Transactions	(6) Transactions	(7) Log trans.	(8) Log trans.
Taxhaven × Post	-235.2**	-235.2**	-1.03**	-0.48*	-0.35**	-0.35**	-0.18*	-0.047
	(35.3)	(35.3)	(0.22)	(0.21)	(0.033)	(0.033)	(0.084)	(0.11)
Taxhaven	-96.7**	-96.7**	0.20	-0.20	-0.29**	-0.29**	0.030	-0.40**
	(26.3)	(26.3)	(0.20)	(0.18)	(0.026)	(0.026)	(0.086)	(0.11)
Post	240.2**		0.42**		0.39**		0.14**	
	(35.3)		(0.077)		(0.032)		(0.028)	
Constant	102.0**	262.1**	11.3**	12.2**	0.32**	0.58**	0.60**	0.91**
	(26.3)	(18.9)	(0.079)	(0.015)	(0.029)	(0.017)	(0.029)	(0.0085)
Observations	85104	85104	7990	5845	85104	85104	7990	5845
Adjusted R^2	0.003	0.153	0.011	0.732	0.016	0.241	0.005	0.496
TWFE		X		X		X		X

Firm-clustered standard errors in parentheses

$^{+}$ $p < .10$, * $p < .05$, ** $p < .01$

This table displays the estimated coefficients from the difference-in-difference model:

$$y_{ijt} = \beta_0 + \gamma Haven_j + \delta \cdot \mathbb{1}\{Year_t \geq 2011\} + \beta_k \cdot \mathbb{1}\{Year_t \geq 2011\} \cdot Haven_j + \varepsilon_{iet},$$

for individual i, country j, and quarter t. The model compares the change in tax haven dividend activity with non-haven dividend activity response to a decrease in the dividends outflows tax from 2% to 0% (while import payments remained exempt). This model is estimated on the universe of corporate foreign dividend payments aggregated to the firm-quarter-haven level. "TWFE" refers to two-way fixed effects on the firm- and year-level. The coefficients correspond with levels of firm-year-haven activity.

G.2 Exempt imports counterfactual

In order to capture a price elasticity of tax haven dividend payments with respect to the transaction cost, I estimate a series of difference-in-differences designs that use business imports of primary and secondary goods—which have been exempt from the outflows tax since July 2008—as a counterfactual group for comparison with dividend and profit distribution outflows to tax havens.

Recall that the central specification in the previous section evaluates the change in dividend outflows to tax havens and non-havens following a change in the outflows tax rates to *both* groups of countries. In this way the estimated response does not correspond with a "straightforward" estimate of the impact of the tax on dividend flows. Using exempt import transactions as a counterfactual group here therefore produces estimates of an elasticity of tax haven dividend outflows with respect to the price of offshore tax haven usage. I let subscript e index transactions and I estimate equations of the form

$$y_{iet} = \beta_0 + \gamma Div_{ie} + \sum_{k=2008q1}^{2019q4} \delta_k \cdot \mathbb{1}\{Quarter_t = k\} + \sum_{k=2008q1}^{2019q4} \beta_k \cdot \mathbb{1}\{Quarter_t = k\} \cdot Div_{ie} + \varepsilon_{iet}, \quad (26)$$

where Div_{ie} represents an indicator for whether firm i's transaction represents a dividend transaction. The counterfactual scenario advanced by this specification imposes an assumption that absent of the reform, dividend payments to and imports from havens (or non-havens, separately) would evolve identically; I validate this assumption empirically by demonstrating parallel trends between the two activity classes for both country groups.

I estimate Equation (26) on the universe of corporate import and dividend transactions to tax havens aggregated to the firm-quarter level and stratify my sample by tax haven status. Because import payments saw exemption since July 2008, since which the ISD rate increased three times, I restrict the pre-period to the year 2010, during which the outflows tax rate had stayed constant at 2%. I end the estimation in 2015, when further changes to the Ecuadorian tariff regime contaminate the control group.

Figure G.4 (a) shows the results for this design within non-tax havens. Given a decrease of the outflows tax rate from 2% to 0%, I observe a significant increase in dividend payments to non-havens on the order of around half of a log point. Panel (b) shows this result for tax havens, corresponding with about a 0.5 log point decrease in dividends payments to tax havens relative to imports from tax havens (albeit with substantially less precision). Taken with the decrease of the net-of-tax return from 0.98 to 0.95 (about a 3% decrease) for havens and .98 to 1 for non-havens (about a 2% increase), these changes correspond with quite large proportional responses—elasticities above 10. These elasticities are very large, and somewhat unprecedented in prior literature. For instance, Bach et al. (2024) document net-of-tax elasticities of dividend payments of around 3. However, such dividend payments likely reflect highly tax-strategic activity. With very few Ecuadorian firms making profit distribution payments, we might anticipate such large dividend responses and view them more in the context of tax strategy rather than corporate-financial behavior.

Figure G.4: Dividend reform (tax havens):
Exempt imports counterfactual

(a) Non-havens (Log USD (2020)

(b) Tax havens (Log USD 2020)

These figures show the difference-in-differences coefficients from the model:

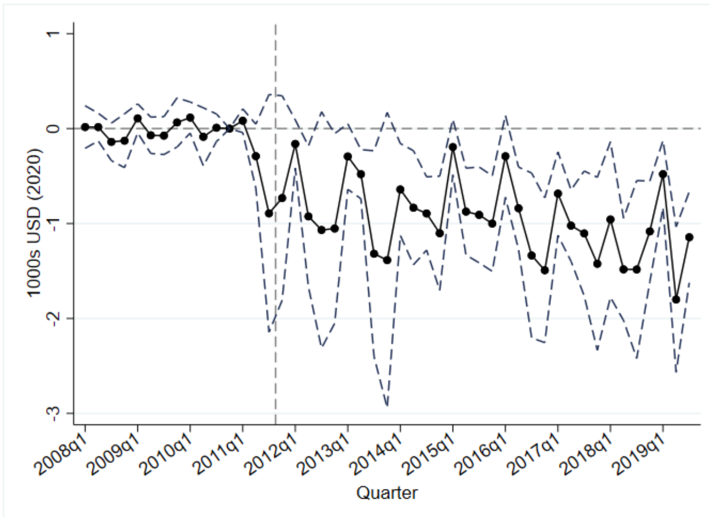
$$y_{iet} = \beta_0 + \gamma Div_{ie} + \sum_{k=2008q1}^{2019q4} \delta_k \cdot \mathbb{1}\{Quarter_t = k\} + \sum_{k=2008q1}^{2019q4} \beta_k \cdot \mathbb{1}\{Quarter_t = k\} \cdot Div_{ie} + \varepsilon_{iet},$$

that compares the change in tax haven dividend payments to the change in corporate import payments for primary and secondary goods in response to an increase in the dividends outflows tax from 2% to 5% (while import payments remained exempt). This model is estimated on the universe of corporate import and dividend transactions to tax havens aggregated to the firm-quarter level. Coefficients are estimated relative to 2010 quarter 4. Panel (a) isolates firm activity within tax havens; Panel (b) isolates activity within non-havens. Dashed navy lines represent 95% confidence intervals based on firm-clustered standard errors. The dashed vertical line represents the date of the policy change.

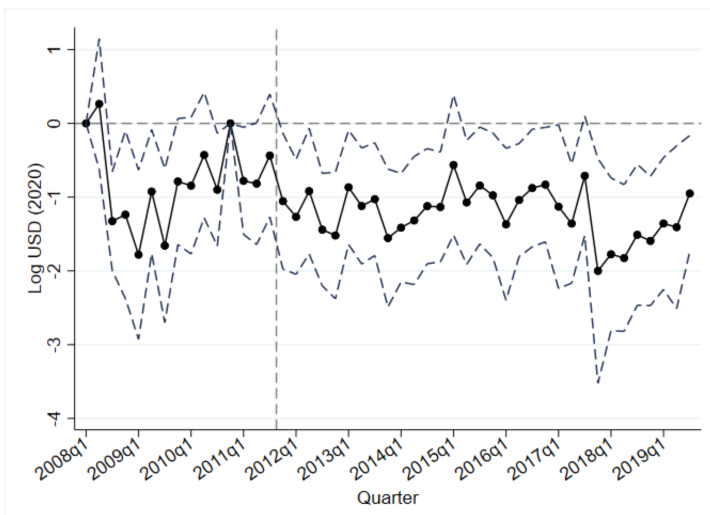
G.3 Additional dividend reform designs and results

Figure G.5: Dividend reform: tax havens versus non-havens (Volume)
Two-way fixed effects

(a) Levels USD



(b) Log USD



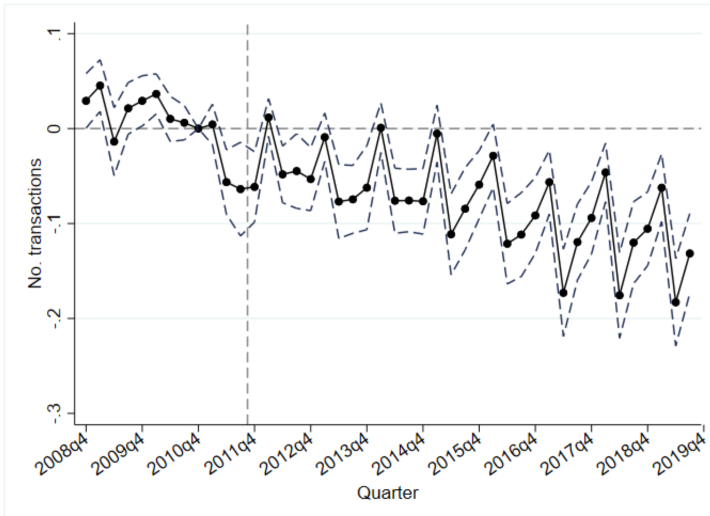
These figures display the difference-in-differences coefficients $\{\hat{\beta}_k\}_{k=2008q1}^{2019q4}$ from the reduced form with two-way fixed effects

$$y_{ijt} = \alpha_i + \sum_{k=2008q1}^{2019q4} \delta_k \cdot \mathbb{1}\{Quarter_t = k\} + \sum_{k=2008q1}^{2019q4} \beta_k \cdot \mathbb{1}\{Quarter_t = k\} \cdot \mathbb{1}\{Haven_j\} + \varepsilon_{ijt},$$

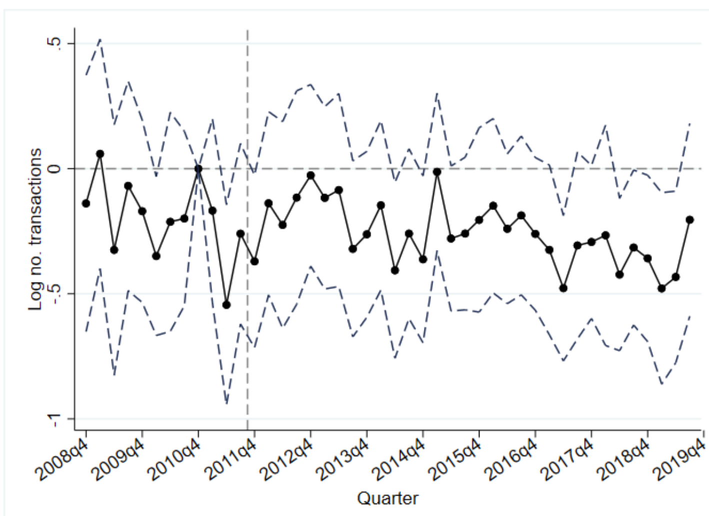
where y_{ijt} represents firm i's profit distributions to country j aggregated within quarter t. This specification uses 2010 quarter 4 as the base period. Dividend transactions are winsorized above the 99th percentile in transaction amount prior to aggregation. Panel (a) uses levels USD as the dependent variable; Panel (b) uses log USD. Dashed navy lines represent 95% confidence intervals based on firm-clustered standard errors.

Figure G.6: Dividend reform: tax havens versus non-havens (no. transactions)
Two-way fixed effects

(a) Number of transactions



(b) Log number of transactions



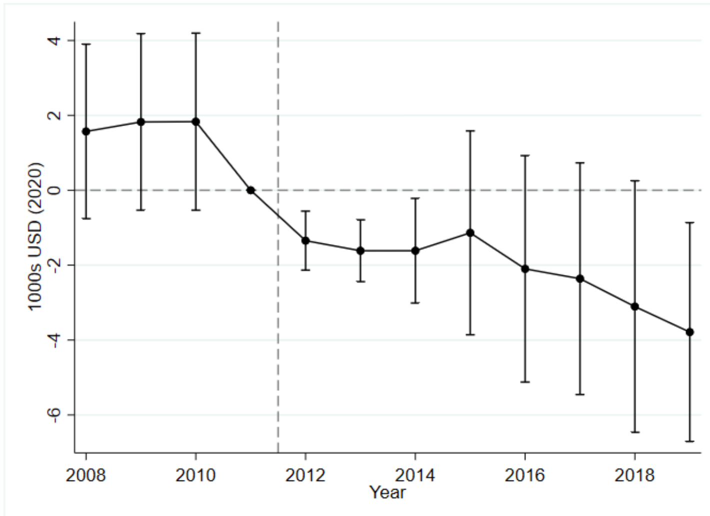
These figures display the difference-in-differences coefficients $\{\hat{\beta}_k\}_{k=2008q1}^{2019q4}$ from the reduced form with two-way fixed effects

$$y_{ijt} = \alpha_i + \sum_{k=2008q1}^{2019q4} \delta_k \cdot \mathbb{1}\{Quarter_t = k\} + \sum_{k=2008q1}^{2019q4} \beta_k \cdot \mathbb{1}\{Quarter_t = k\} \cdot \mathbb{1}\{Haven_j\} + \varepsilon_{ijt},$$

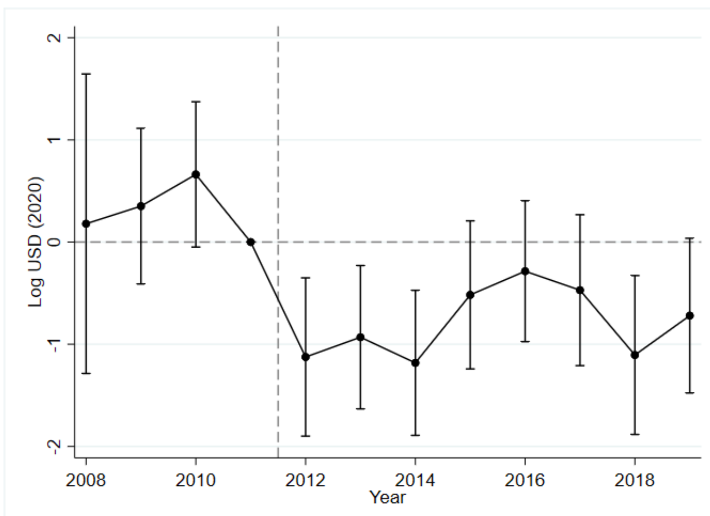
where y_{ijt} represents firm i's number of profit distribution transactions to entities domiciled in country j aggregated within quarter t. This specification uses 2010 quarter 4 as the base period. Panel (a) uses the number of transactions as the dependent variable; Panel (b) uses the log number of transactions. Dashed navy lines represent 95% confidence intervals based on firm-clustered standard errors.

Figure G.7: Dividend reform: tax havens versus non-havens (Volume)

(a) Levels USD



(b) Log USD



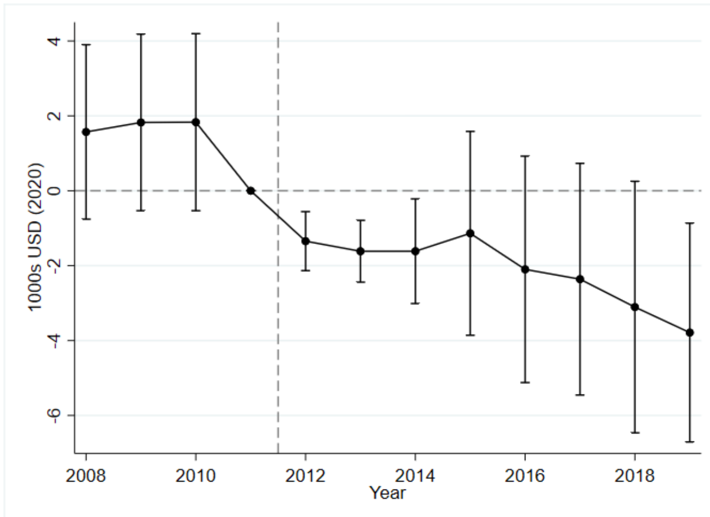
These figures display the difference-in-differences coefficients $\{\hat{\beta}_k\}_{k=2008}^{2019}$ from the reduced form

$$y_{ijt} = \beta_0 + \gamma \mathbb{1}\{Haven_j\} + \sum_{k=2008}^{2019} \delta_k \cdot \mathbb{1}\{Year_t = k\} + \sum_{k=2008}^{2019} \beta_k \cdot \mathbb{1}\{Year_t = k\} \cdot \mathbb{1}\{Haven_j\} + \varepsilon_{ijt},$$

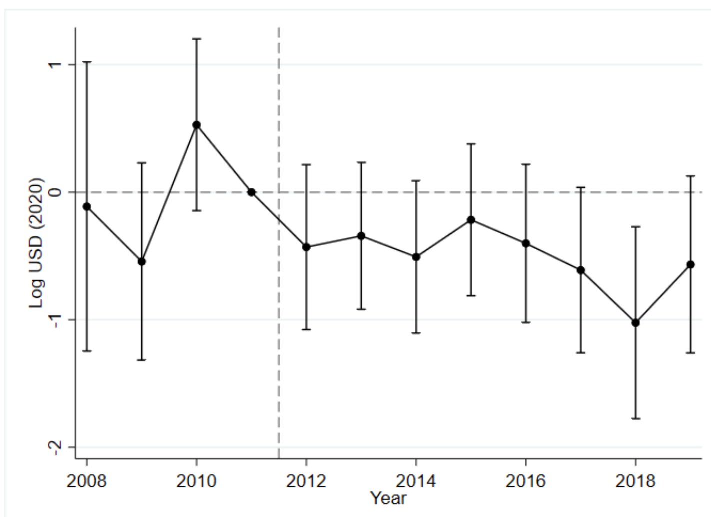
where y_{ijt} represents firm i's profit distributions to country j aggregated within year t. This specification uses 2011 as the base period. Dividend transactions are winsorized above the 99th percentile in transaction amount prior to aggregation. Panel (a) uses levels USD; Panel (b) uses log USD as the dependent variable. Error bars represent 95% confidence intervals based on firm-clustered standard errors.

Figure G.8: Dividend reform: tax havens versus non-havens (Volume)
Two-way fixed effects

(a) Levels USD



(b) Log USD



These figures display the difference-in-differences coefficients $\{\hat{\beta}_k\}_{k=2008}^{2019}$ from the reduced form

$$y_{ijt} = \alpha_i + \sum_{k=2008}^{2019} \delta_k \cdot \mathbb{1}\{Year_t = k\} + \sum_{k=2008}^{2019} \beta_k \cdot \mathbb{1}\{Year_t = k\} \cdot \mathbb{1}\{Haven_j\} + \varepsilon_{ijt},$$

where y_{ijt} represents firm i's profit distributions to country j aggregated within year t. This specification uses 2011 as the base period. Dividend transactions are winsorized above the 99th percentile in transaction amount prior to aggregation. Panel (a) uses levels USD; Panel (b) uses log USD as the dependent variable. Error bars represent 95% confidence intervals based on firm-clustered standard errors.