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The tax-price elasticity of offshore tax avoidance: Evidence from Ecuadorian transaction data

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WIDER Working Paper 2021/187

The tax-price elasticity of offshore tax avoidance

Evidence from Ecuadorian transaction data

Jakob Brounstein*

December 2021

Abstract: This study leverages a unique data set on the universe of transactions exiting the Ecuadorian economy to estimate the tax-price elasticity of demand for tax-sheltering activities using offshore fiscal havens. I determine this elasticity quasi-experimentally by comparing the evolution in funds sent by individuals and corporations to tax havens for different purposes (e.g. dividend payments, bank account deposits) versus similar transactions with non-tax havens around changes to the Ecuadorian *Impuesto a la Salida de Divisas*, which effectuated an ad valorem tax on transfers to tax havens. I document large responses of funds sent abroad for tax-avoidance and tax-evasive purposes to the tax price of transacting with fiscal havens. I also provide evidence that individuals with financial connections to tax havens declare additional capital income on their tax returns in the post-period, and due to the progressivity of the tax schedule pay a higher average income tax rate as a result.

Key words: tax evasion, tax avoidance, tax havens

JEL classification: F38, H23, H26, H30

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1 Introduction

What is the price elasticity of demand for international tax evasion and avoidance services? How does the use of fiscal havens to avoid and evade taxation impact inequality and national tax revenue collection? Can countries effectively mitigate offshore tax avoidance and evasion through unilateral policy action? The answers to these questions are key in designing effective policy aimed at mitigating offshore tax sheltering. Base erosion and profit shifting (both evasive and legal) for corporations as well as offshore tax avoidance and evasion on part of individuals have been identified as important components of global trends in inequality (Guyton et al. 2020; Tørsløv et al. 2020) and relative decreases in corporate income tax collections (Hines and Rice 1994; OECD 2015). Moreover, such activities have been identified and attributed in large part to the highest-earning taxpayers in the income distribution (Guyton et al. 2020). To this end, questions on the characteristics of tax evasion and broader tax strategy, inequality, and fiscal policy are closely linked.

Given its clandestine nature, it is often difficult to observe evasive and even legal tax strategy in a research setting. For this reason, most work studying international tax evasion on the part of corporations is forced to rely on infrequent and non-ideal data from leaks of tax evasion service providers or governmental audit/amnesty programmes (Alstadsæter et al. 2019; Johannesen et al. 2018; Kleven et al. 2011). These works provide new estimates on the magnitude of tax evasion and profit shifting on the part of individuals and multinational companies (MNCs) and illustrate how tax-strategic behaviour augments global inequalities. However, due to data limitations and a lack of salient shocks, there is an absence of work that focuses on assessing the effectiveness of policies aimed at mitigating offshore tax evasion or evaluating the demand characteristics of offshore tax evasion services. Notable exceptions to this trend include Wier (2020) and Langenmayr and Liu (2020), who study, respectively, the evolution of intra-group transfer mis-pricing in South Africa and broader corporate profit shifting from the UK in response to legislative reforms. However, these works focus solely on corporate profit shifting and do not characterize the use of offshore havens by individuals. Moreover, due to limitations of their respective data environments, they observe only a component of companies' multinational tax strategies.

I overcome these challenges by making use of the novel data and legislative environment in the country of Ecuador. The Ecuadorian environment is characterized by two unique features. First, the national tax authorities maintain a detailed database on the universe of transactions entering and exiting the Ecuadorian economy. These data, denominated on the transaction level, allow researchers to observe transaction amounts, the country of the foreign transacting party, and transaction purpose, among many other details. Second, the government imposes a tax on every transaction that results in an exit of currency from the economy. Importantly, this tax has seen a series of rate and base changes over the course of its lifetime, including a sub-component that explicitly focuses on tax havens for certain kinds of financial flows. These features allow me to observe tax avoidance and evasion activities in high detail and observe their reactivity to changes in the tax price of sending funds abroad.

In this work I develop several stylized facts surrounding the use and price elasticity of demand for potentially tax sheltering services in fiscal havens. Here, I place the focus on individual taxpayers (as opposed to corporate taxpayers).

First, I characterize the joint distribution of pre-tax income and tax haven bank account activity. I find that nearly all tax haven banking activity occurs on the part of the highest-earning taxpayers. I also develop evidence on the joint distribution of tax haven use and other parameters of interest, such as capital income, capital income share, and net worth, among other objects of interest.

Next, I study the impacts of a reform that penalizes the distribution of corporate dividends to tax havens. I employ a reduced-form framework to document large responses in the amounts of dividends sent to tax

havens in response to changes in the tax price of transactions. Linking the individual transaction data with annual personal income tax declarations, I find that individuals making deposits in bank accounts domiciled in tax havens significantly increase their tax payments following an increase in the price of transacting with tax havens. This result has important implications for the efficacy of unilateral policy in mitigating tax haven use, where the increase in domestic reporting among individuals engaged in tax strategy using fiscal havens suggests that these taxpayers did not fully engage in round-tripping behaviour or other tax strategy schemes to entirely circumvent the targeted outflows tax. I develop a model based on Allingham and Sandmo (1972) to rationalize these results within the trade-off of under-reporting income with a variable concealment cost and under-reporting income without the costly concealment mechanism.

Lastly, I exploit a kinked threshold in the outflows tax schedule to implement a bunching design that estimates individuals' tax price elasticity of demand for tax haven banking services. I also study the bunchers in a descriptive exercise in order to learn about the characteristics of these price-sensitive fiscal haven users. In a companion to this work I focus more explicitly on corporate profit shifting and the use of fiscal havens, including the relationship between tax incentives, international corporate ownership flows, and tax haven use.

This work also introduces the concept of *tax elusion* to discussions on tax evasion, tax avoidance, and public finance. Tax evasion refers to explicitly illegal tax strategy that results in an underpayment of true tax liability; examples include under-reporting wage income on income tax declarations or not declaring capital gains on offshore assets when required to do so. Tax avoidance resides on the other end of the spectrum of legality, representing strictly legal means of mitigating one's tax burden. However, the potentially nebulous legality of certain tax strategies often renders discussion on the subject ambiguous. Namely, a portion of avoidance activity may be disqualified or penalized by tax authorities upon further scrutiny. For example, a deduction fraudulently taken by a taxpayer, until explicitly and rigorously classified as fraudulent, is discussed as a matter of *legal* tax avoidance. Here, I employ the concept of *tax elusion* to refer to all tax strategy with ambiguous legality upon inspection, prior to any actual possible classification as illegal and tax fraudulent.

I proceed as follows. In Section 2 I discuss the fiscal context of Ecuador and the data environment. In Section 3 I present descriptive evidence on the use of tax havens for different purposes, as well as on the joint distribution of tax haven use and various economic outcomes such as income rank, capital income rank, and net worth. Section 4 develops reduced-form evidence on the price elasticity of dividend distributions to tax havens and explores individual taxpayers' responses to the increased taxation of financial flows to tax havens. Section 5 develops a simple model to illustrate the conceptual foundations of the individual responses to taxing financial flows to fiscal havens. Section 6 uses a bunching design to estimate the price elasticity of demand for offshore banking services in fiscal havens. Section 7 concludes.

2 Fiscal context and data

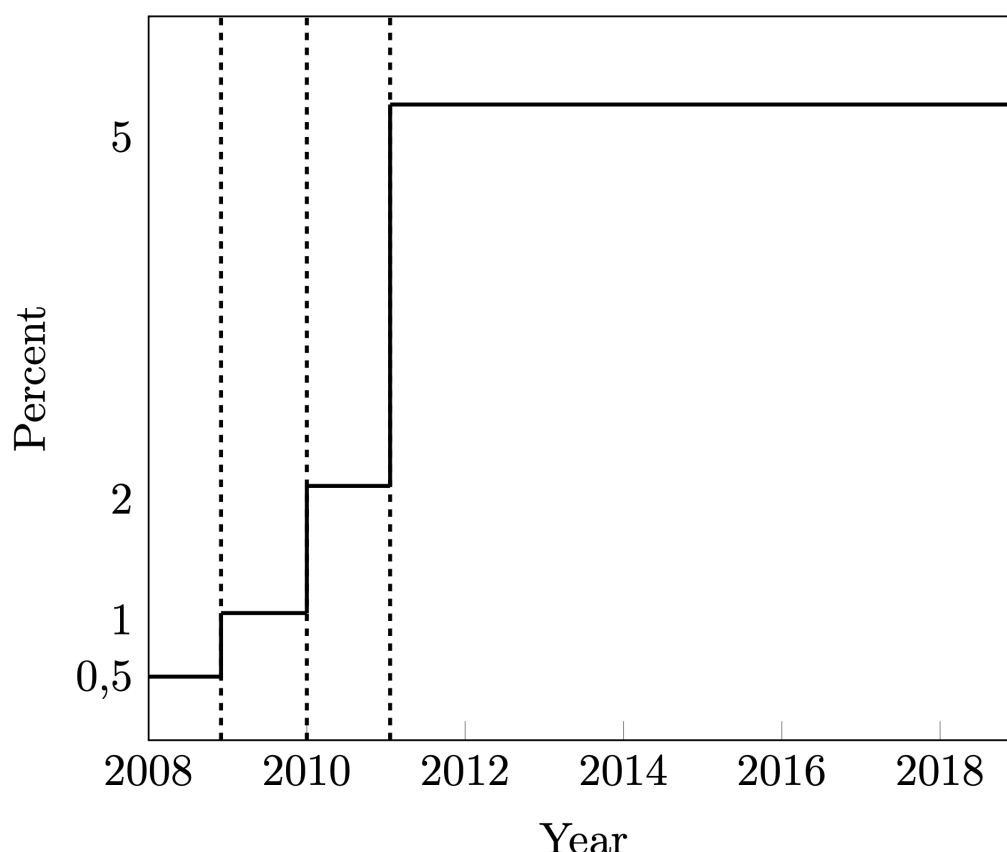
The unique data and fiscal environments of Ecuador are closely linked and understudied.¹ In this section I explain their features, their interrelations, and the idiosyncratic national economic context that gave rise to these features.

¹ All annualized monetary values are expressed in units of 2020 US dollars; all transaction-level and monthly monetary values are expressed in units of January 2020 US dollars. Nominal values are only used when explicitly noted.

A middle-income country, Ecuador dollarized in 1999 following a period of hyperinflation and general 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 their dollarization, 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.

Initially introduced as a 0.5 per cent tax per transaction for all currency exits from Ecuador, the ISD has seen several modifications to the tax base and rate (Figure 1). Since the ISD's installation, the Ecuadorian government has incrementally raised the rate until eventually reaching a statutory ad valorem rate of 5 per cent per transaction, where the tax has remained since the end of 2011.

Figure 1: ISD rate over time



Note: this figure plots the evolution of the statutory ISD rate that is levied on transactions exiting the Ecuadorian economy. This illustration does not take into account base modifications, such as exemptions for small amounts and transactions for certain purposes.

Source: public knowledge on the ISD rate evolution.

Additionally, the tax authorities have modified the ISD base in several instances depending on the transaction amount, the purpose of the transaction, and the destination country. Today, the ISD features an intricate exemption regime intended to avoid penalizing certain kinds of economic activities such as foreign direct investment into Ecuador and to discourage activity involving parties domiciled in tax havens, as determined by the tax authorities. The many ISD base and rate reforms are crucial for identifying the price reactivity of different tax haven activities.

2.1 MID transaction data

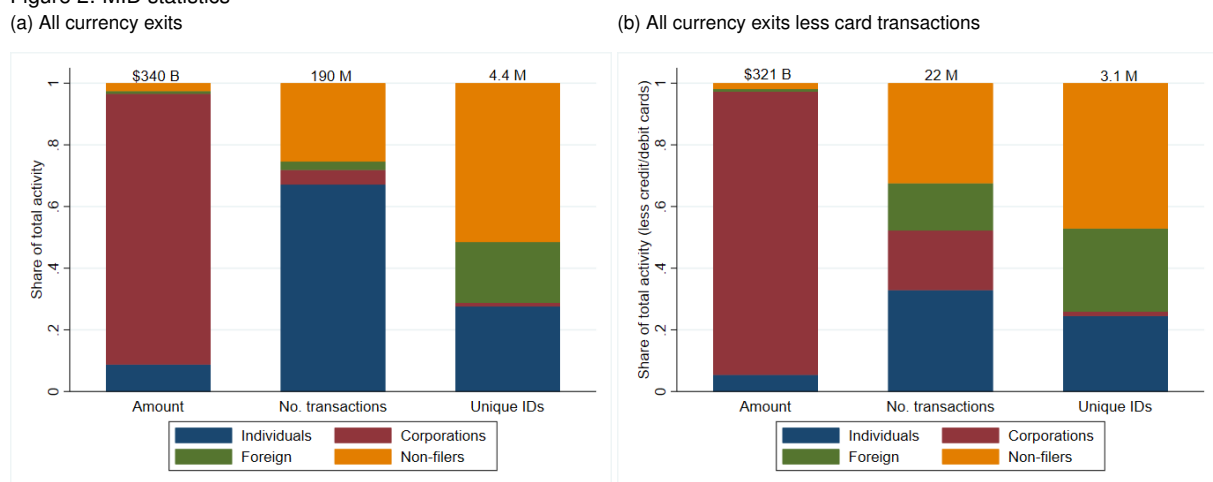
Importantly, to facilitate the collection and enforcement of the ISD, including the intricate exemption system, the tax authorities have installed comprehensive data infrastructure monitoring the universe of

transactions that result in US dollars entering or exiting the Ecuadorian economy, including a high level of detail on each transaction. The data set reporting these transactions, the *Anexo—Movimiento Internacional de Divisas* (MID) represents the central piece of data architecture underlying the enforcement of the ISD.

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, amounts, date and time of transaction, purpose/nature of transaction (e.g., deposit in savings/checking account, capital investment, education payment, etc.),² 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 data sets using national identifiers.³

From these data I isolate currency exits and focus particularly on corporate and personal income tax filer activity.⁴ Additionally, while the data assign every transaction to exclusively one of around 70 transaction purpose bins, I focus largely on financial transactions—namely dividend payments and bank account deposits, typically reserving other transaction bins as covariates for certain types of financial activities as well as other objects of interest in limited settings (e.g. credit amortization payments). For additional environmental context, Figure A1 in Appendix A displays the evolution of activity shares of the top nine purpose bins by amount disaggregated between corporations and personal income tax filers.

Figure 2: MID statistics



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 2020 dollars. Figure 2(b) excludes credit card transactions.

Source: author’s calculation based on MID data.

Figure 2 illustrates various metadata surrounding the MID universal transactions data set. The MID data distinguishes four groups: corporations, individuals that file income tax, individuals with automatic income tax filing or no income tax filing requirements, and foreigners. Importantly, income tax filers

² The MID transaction purposes field contains nearly 70 distinct categories, which are listed in Appendix C. Financial transactions and investments are universally registered with the Central Bank of Ecuador to ensure accurate reporting.

³ The MID data feature four groups of ISD taxpayers: (1) Ecuadorian individuals and (2) Ecuadorian companies, which both have presence in other Ecuadorian tax data sets, and (3) foreign ISD taxpayers and (4) ISD taxpayers of unknown national origin, which cannot be linked to other Ecuadorian datasets.

⁴ The MID data also report currency entrances, but the Ecuadorian tax authorities have expressed concern over the comprehensiveness and representativeness of such transactions, given that currency entrances generate no tax revenues per the ISD.

and corporations represent a small proportion of the unique IDs present in the MID data but represent nearly the entirety of the corresponding economic activity. This detail is important for validating the comprehensiveness of the data environment, given the limitations to administrative data on individual earnings and activity due to the large presence of informal labour (Canelas 2019).

2.2 Income tax data

I combine these data with annual personal income tax and corporate income tax declarations from 2006 to 2019 and 2007 to 2019, respectively. Tables 1 and 2 display select descriptive statistics of individuals and companies, respectively, as according to their corresponding income tax declaration forms. The Ecuadorian tax authorities maintain detailed annual data on taxpayers, featuring information on wealth and net worth by asset class for individual taxpayers as well as reporting on financial, intra-group, and tax haven activity on the part of corporations.

Table 1: Corporate income tax declarations summary statistics

	Mean	SD	p5	p25	p50	p75	p95
Income	1.167e+06	4.110e+07	0	0	1,482	138,006	2.313e+06
Expenses	1.072e+06	3.350e+07	0	0	4,121	134,664	2.193e+06
Profit (pre-tax)	92,822	1.100e+07	-18,792	0	0	2,673	102,156
Taxable profit	93,481	1.050e+07	0	0	0	2,144	92,960
Div. (imputed)	114,581	1.150e+07	0	0	0	3,064	104,569
Assets	1.709e+06	5.820e+07	0	384.7	11,210	164,870	2.488e+06
Liabilities	978,212	3.490e+07	0	0	1,458	76,677	1.352e+06
K/L	303.6	69,596	0	0	0.290	2.040	20.98
Max age in panel	6.410	4.400	1	2	6	11	13
Years per firm	6.310	4.350	1	2	5	11	13
Reporting ratio	0.990	0.0500	0.920	1	1	1	1
Unique firms	263,891						
Total firm-years	1.666e+06						

Note: this table displays summary statistics for select variables in the form F101 corporate income tax data aggregated between 2007 and 2019. All nominal values are expressed in 2020 US dollars. The 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).

Source: author's calculations based on form F101 corporate income tax data.

Table 2: Personal income tax declarations summary statistics

	Mean	SD	p5	p25	p50	p75	p95	p99
Inc.	19,420	165,050	0	0	5,320	19,247	78,224	185,805
Cap. inc.	34,039	240,901	0	0	0	12,730	120,617	591,161
Taxes paid	930	18,395	0	0	0	173	3,163	13,479
Eff. tax rate	0.0100	0.0700	0	0	0	0	0.0600	0.340
Assets	7.040e+08	2.220e+12	0	0	0	0	284,552	2.980e+07
Max panel age	5.840	4.410	1	2	5	9	14	14
Years per ID	5.210	111.7	1	2	4	8	14	14
Reporting ratio	0.920	7.970	0.500	0.920	1	1	1	1
Unique ID	1.935e+06							
Total ID-years	1.037e+07							

Note: this table displays summary statistics for select variables in the form F102 personal income tax data aggregated between 2006 and 2019. All nominal values are expressed in 2020 US dollars. 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).

Source: author's calculations based on form F102 personal income tax data.

Importantly, while the corporate income tax data set covers the universe of formally incorporated business activity, the personal income tax declarations do not cover the entire Ecuadorian population within the formal labour market. These declarations systematically exclude individuals that both have only ever reported wage income and pay their taxes entirely through automatic withholding. Approximately one million taxpayers file manual personal income tax (form F102) every year; however, these manual filers represent only approximately 33 per cent of the formal labour force. Manual filing is required of individuals with salaried wage income greater than US\$1,000 per month or ever having reported ownership

connections to businesses, capital income, or asset or liability ownership. As such, this population can be construed as being a higher income/wealth demographic than automatic filers, which may compromise the external validity of some estimates to the broader population. Indeed, the median income of F102 filers is approximately twice that of the national average. However, these data are sufficient for the purposes of capturing the behaviours of the highest earners.⁵ Individuals do not typically shift between automatic and manual filing between years.

Moreover, the formal labour market only employs approximately 40 per cent of workers. Finally, Ecuador sees a labour market participation rate of around 45 per cent, so that the manual personal income tax filer data set can be understood to capture the activity of around 10 per cent of Ecuadorian people.

2.3 Additional data

I also make use of several other data sets to substantiate ownership linkages between individuals and companies, as well as multinational corporate ownership linkages. These include the following.

I use data on multinational ownership linkages from Orbis (via Bureau van Dijk) in order to identify Ecuadorian MNCs as well as Ecuadorian companies that maintain ownership linkages with affiliates domiciled in tax havens.⁶ These data, available from 2007 to 2019, report dyadic proportions of direct and indirect ownership between two companies as well as the directionality of ownership linkages for each year. I consider both ownership and subsidiary relations of strictly greater than 50 per cent indirect ownership as a cross-border controlling interest. I incorporate the ownership linkages data both as an object of interest in itself (e.g. how inter-corporate ownership flows evolve in response to changing tax incentives in Ecuador) as well as an independent variable (e.g. using the MID transaction data to study how inter-corporate transactions evolve in amount and nature in response to changes in ownership linkages).

I also make use of firm-shareholder data (the *Anexo de accionistas, partícipes, socios, miembros de directorio y administradores* (APS)) in order to connect Ecuadorian individuals with the businesses they own. These data feature observations on flow changes in company ownership, from which I construct stocks. The purpose of these data is to identify individual taxpayers with controlling ownership interests in companies engaging in substantial financial flows with tax havens or demonstrating ownership affiliations with corporations domiciled in tax havens. These data will effectively serve as a crosswalk between Ecuadorian companies and Ecuadorian individual owners.

Lastly, I incorporate publicly available data on the Ecuadorian domestic economic environment (e.g., domestic top tax rates, price levels, GDP).⁷ These data also include legislative shocks to the ISD that alter the tax's rate and base (including changes in exemptions involving transactions with fiscal havens) in order to study the price reactivity of sending funds to offshore bank accounts and foreign corporate affiliates.

⁵ Future versions of this work seek to incorporate additional data consisting of individuals paying labour income taxes solely through automatic withholdings (as reported in form F107). This separate, additional data set combined with the mandatory manually filed income tax declarations comprises the universe of formal income individual reporting in Ecuador.

⁶ I combine the Orbis data with the Ecuadorian tax administrative data using the national ID numbers that are common to both data sets.

⁷ Importantly, there is minimal evolution in the domestic tax environment throughout the period of interest. The top marginal personal income tax rate moved from 25 per cent to 35 per cent in 2008, where it has remained since. The corporate income tax began at 25 per cent and decreased at a rate of 1 pp per year between 2010 and 2013, settling at 22 per cent.

Importantly, among these data is the list of government-recognized tax havens, which change over time. This list differs from the standard lists of 53 and 55 tax havens cited by Hines and Rice (1994) and Tørsløv et al. (2020), respectively. The lists of countries and territories treated as tax havens by the Ecuadorian government at times contains upward of 90 locations and represents the definitive list of countries targeted by unilateral anti-tax-haven policy. Importantly, changes in this list of tax havens also provide another layer of causal identification in interaction with the government’s anti-tax-haven legislation incorporated into the ISD.

2.4 On elusion

This work formally introduces the concept of *tax elusion* as an object of study within tax-strategic behaviour. Canonically, studies of tax-strategic behaviour characterize activity either as *tax evasion*—tax strategy that is illegal and explicitly fraudulent (and demonstrated or evident as such)—or as *tax avoidance*—purely legal tax strategy. A challenge posed by this dichotomous treatment of tax strategy is the often ambiguous legal status of some tax strategy: behaviour that may constitute a legal avoidance response to taxation until given finer legal scrutiny, after which it might be classified as fraudulent.

I employ the term *tax elusion* to refer to the spectrum of tax strategy with ambiguous underlying legal status.⁸ My intention in defining the term here is not (immediately) to determine the proportion of tax elusion that can be confidently decomposed between illegal evasion and legal avoidance, but rather to emphasize the study of tax strategy in general whose legal foundation may prove ambiguous or largely circumstantial, particularly in consideration of increasingly sophisticated tax strategy as well as the real limitations of tax authorities to more closely scrutinize such activity. Moreover, in the absence of proper context, some of the activity does not represent tax strategy, but rather non-tax-related behaviour (e.g. direct import of goods from abroad); for one of the primary transaction categories of interest—deposits in foreign bank accounts—in the absence of legal auditing, one cannot make inference on the precise purpose of a given bank deposit beyond what can be inferred by links made in the domestic tax data environment (i.e. comparing funds deposited to income claimed on tax returns or studying the variation in tax-price reactivity based on the presence of intra-corporate ownership flows).

3 Individual fiscal haven use

The novelty of universal transaction data allows me to answer many basic, descriptive questions regarding tax haven use. However, the data do see important limitations in that they do not permit studying or directly diagnosing round-tripping behaviour—that is, the vicarious use of tax havens by first sending funds to a non-haven country, which are eventually redirected to a tax haven.⁹ To this end, a central goal of this work will be to inform, through more indirect means, the prevalence of round-tripping behaviour and diagnose whether such behaviour responds to changes in the ISD that target tax havens.

⁸ The term *elusion* sees more common use in Romance languages, translating loosely into English as a deluding act. The term ‘*elusion fiscal*’ actually exists in common usage in Spanish as the general translation from English of ‘*tax avoidance*’.

⁹ Additionally, while the MID data record all transactions that leave and enter the country via automatic reporting in coordination between the Ecuadorian Central Bank (which, in the absence of fulfilling monetary policy functions serves to study the Ecuadorian macroeconomy and organize joint financial policy with the banking industry) and the universe of Ecuadorian financial intermediaries, there do exist means of evading the ISD and thus engaging in transactions that are not observed in the MID data set. In particular, the Ecuadorian tax authorities identify physical transport of cash as a likely source of ISD evasion, although they 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 limited by screening devices at airports and lack thereof at non-airport borders.

First, I present descriptive statistics constructed entirely from the transaction data. Then, I link the universal transaction data with income tax returns in order to characterize the joint distributions of income and other economic characteristics and fiscal haven use.

3.1 Transaction data

The transaction data provide 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?

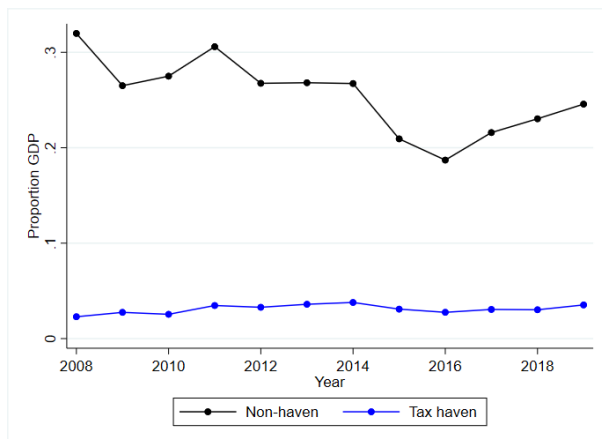
For this exercise, I use the country-list of tax havens from Tørsløv et al. (2020), which consists of the 53 countries listed in Hines and Rice (1994) plus Belgium and the Netherlands.¹⁰

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 quasi-experimental changes in the tax environment dealing with outflows and tax havens.

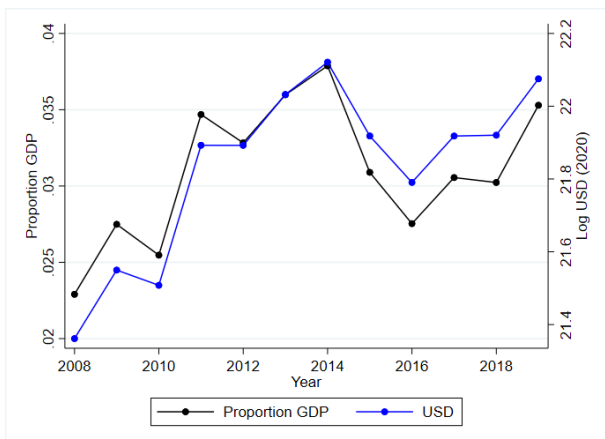
Figure 3 begins this investigation, depicting Ecuadorian yearly outflows between tax havens and non-haven countries. As a proportion of GDP, funds sent to tax havens remain relatively constant throughout the time period, rising as a share of total funds sent abroad from approximately 10 per cent to 15 per cent. However, the transaction data allow disaggregating these flows by purpose and taxpayer type. The two panels of Figure 4 display the evolution of the most prominent uses of tax havens by Ecuadorian corporations and income tax filing individuals, respectively.

Figure 3: Currency exits over time

(a) By tax haven status



(b) Activity in tax havens



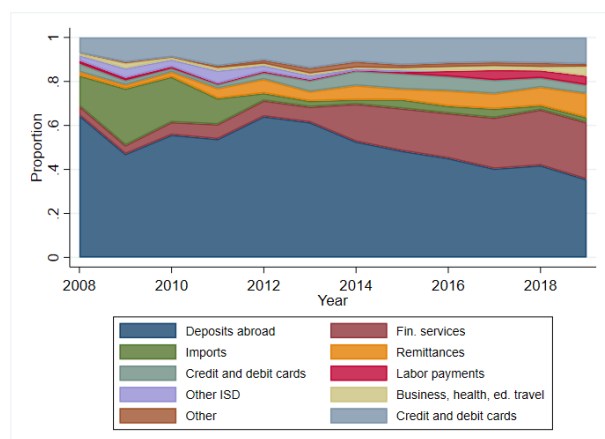
Note: the proportion GDP variables for time t is defined as the ratio of the sum of all MID currency exits (by haven status) in year t divided by Ecuadorian GDP in year t . Currency values are presented in January 2020 US dollars.

Source: author's calculation based on MID data and Ecuadorian personal income tax return filings.

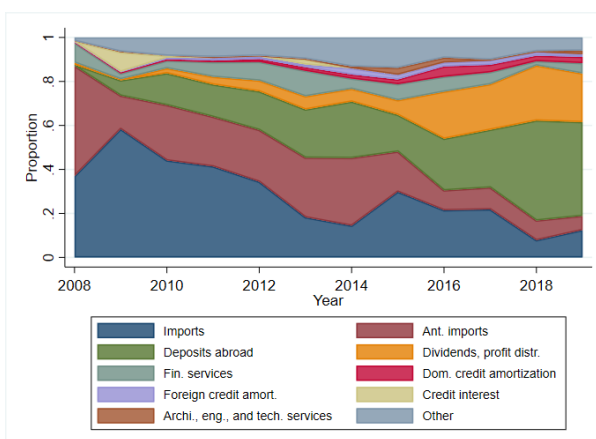
¹⁰ While the later quasi-experimental variation makes use of the changing list of tax havens as recognized by the Ecuadorian government, I prefer using a time-invariant list of more commonly recognized countries for transparency and simplicity of interpretation.

Figure 4: Top tax haven activities over time

(a) Corporations



(b) Individuals



Note: the bin 'Other ISD' refers to bin 56 in Table C1 (constructed as an alternative to the other purpose bins in Table C1), and the bin 'Other' aggregates the activity in the purpose bins outside of the top nine by volume.

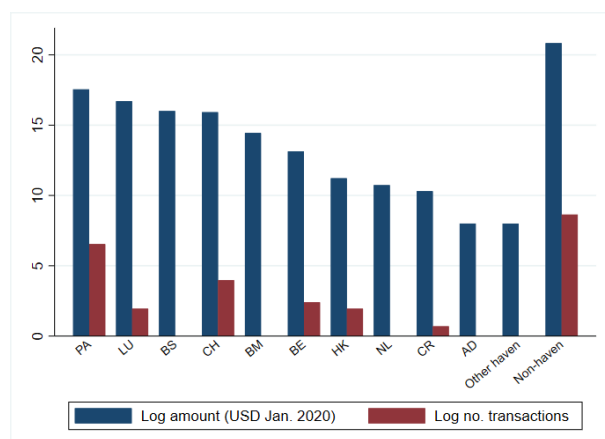
Source: author's calculation based on MID data and Ecuadorian personal income tax return filings.

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 for individuals. Other financial activities such as 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 per cent by 2019 for both corporations and income tax filers.

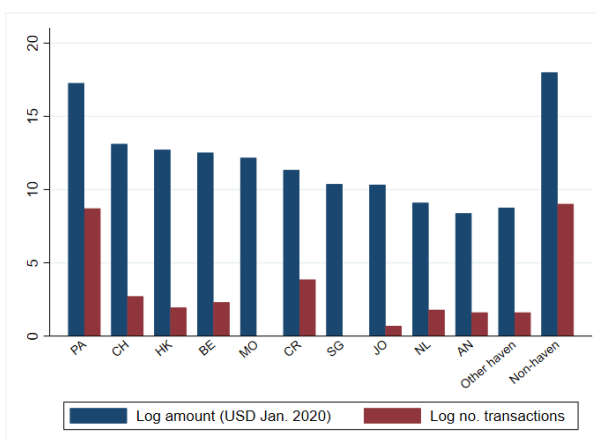
The data also allow the investigation of precisely *which* countries are the most important for hosting the prominent tax haven activities, shown in Figure 5. With this information we can identify Panama as the most important tax haven for offshore banking status,¹¹ followed by Luxembourg and Switzerland, and the Bahamas. These top havens absorbed over US\$200 million in bank deposit from Ecuador in 2019.

Figure 5: Top haven locations for foreign account deposits (2019)

(a) Corporations



(b) Individuals



Note: country categories are determined as the top nine 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 Tørsløv et al. (2020) fiscal haven countries; 'non-haven' represents the aggregation all foreign account deposits in non-haven countries.

Source: author's calculation based on MID data and Ecuadorian personal income tax return filings.

¹¹ Rose and Spiegel (2007) study the determinants of bilateral offshore financial centre status; the findings here replicate their importance of common language as a key determinant of an offshore tax-strategic relationship.

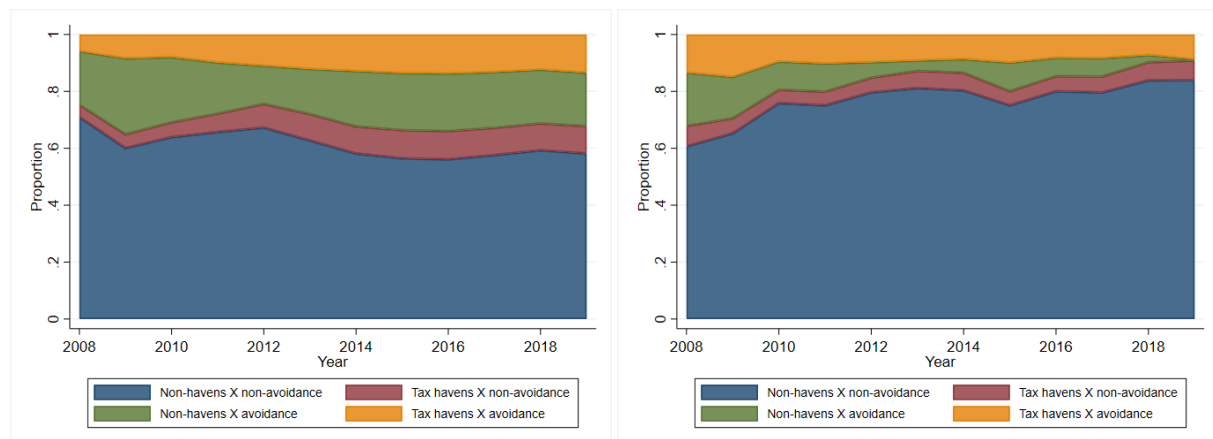
As an additional descriptive activity of interest, I examine the share of outflows disaggregated by haven status and ‘avoidance’ purpose. In this exercise, I assign 30 of the transaction buckets as potential tax-strategic transactions in an ad hoc manner based on their reported purpose. These activities generally reflect financial flows and intangible corporate services that are understood to potentially facilitate multinational tax strategy. In broad groups, the ‘avoidance’ activities include: (1) reinsurance premia and insurance indemnization; (2) financial, telecommunications, IT, architectural, mining, audiovisual, legal/accounting, cultural, market research, and R&D 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.¹² While these activities do not necessarily reflect explicit tax-strategic intent, this exercise illustrates the qualitative differences in the nature of outflows towards tax havens versus non-haven countries.

Figure 6 illustrates the results of this descriptive exercise separately for corporations and manual personal income tax filers. Most notably, the relative shares of avoidance-labelled and non-avoidance activities switched between tax havens and non-havens. For both corporations and individuals, I categorize the majority of activity as having tax-strategic intent, versus for non-havens where non-avoidance outflows greatly 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.

Figure 6: Use of tax havens and non-havens for avoidance purposes

(a) Corporations

(b) Individuals



Note: this chart illustrates 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 Tørsløv et al. (2020). The category of ‘avoidance activities’ consists of the union of several transaction purpose bins reflecting certain kinds of financial flows and intangible service payments typically associated with multinational tax strategy.

Source: author’s calculation based on MID data.

3.2 Haven use within the income distribution

In this setting, I can learn about the use of tax havens for hosting bank deposit transactions within the income distribution as well as leverage the panel structure of the data to study how haven use varies within individuals given changes in income rank. I now link the MID foreign account deposit data to annual personal income tax returns in order to study the distribution of offshore fiscal haven use

¹² 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 often consists of intra-group price manipulations or intra-group lending at high interest rates.

within the income distribution and other characteristics of the relationship between income economic demographics and foreign bank account deposits in tax havens.

I begin with regressions of various parameterizations of tax haven use on income rank. Figure 7 estimates linear probability models of making a tax haven bank account deposit of the form

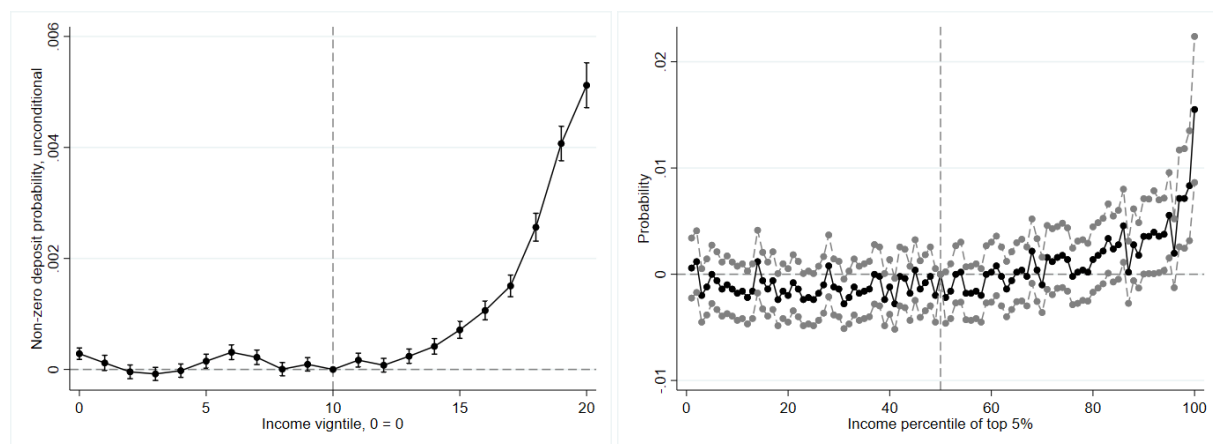
$$\mathbb{1}\{y_{it} > 0\} = \beta_0 + \beta_r R_{it} + \varepsilon_{it}$$

I estimate this reduced form first for all personal income tax filers, aggregating the MID data to the ID–year level. R_{it} represents the income rank of individual i in year t , so that this specification studies the change in the unconditional probability of making a tax haven bank deposit in a given year solely based on pre-tax income rank.

Figure 7: Probability of making a tax haven bank deposit

(a) All filers, $\mathbb{P}(y_{p50,t} > 0) \approx 0.0007$

(b) Top 5 percent, $\mathbb{P}(y_{p50,t} > 0) \approx 0.005$



Note: both panels specify the rank effects relative to the middle quantile. Panel (a) constructs its vigintiles 1–20 conditional on positive pre-tax income, grouping all zero-income declarations in the ‘0’ bin. Panel (b) zooms in on the top vigintile bin of panel (a), estimating tax haven use probability along percentiles of this income rank bin.

Source: author’s calculation based on MID data and Ecuadorian personal income tax return filings for 2008–19.

Figure 7 illustrates, unconditionally, the disproportionate access of higher earners to private means of saving in fiscal havens. Figure 8 displays a similar finding, but instead binning along alternate measures of capital income and net worth, indicating even greater concentration of tax haven bank deposits within the highest activity ranks. Because the MID data cannot account directly for round-tripping behaviour, these probabilities at any given percentile can be understood as lower bounds.¹³

In the Ecuadorian setting, tax haven use for hosting foreign bank account activity appears relatively confined to higher earnings and wealth demographics. With an unconditional probability of less than one-tenth of 1 per cent of the median manual income tax filer making a tax haven bank deposit in a given year, tax haven bank account use doesn’t increase beyond a single-digit percentage point probability for an individual in a given year until around the top 1 per cent of filing earners. Panel (b) of Figure 8 zooms in on the top vigintile bin of panel (a) to find that within the top 5 per cent of earners, tax haven use only increases considerably at the very top—increasing significantly from zero relative to the top 2.5 percentile baseline within the top 0.05 per cent of earners, who demonstrate a more than 1 in 50 probability of sending funds to a tax haven bank account in a given year. The sharp skew

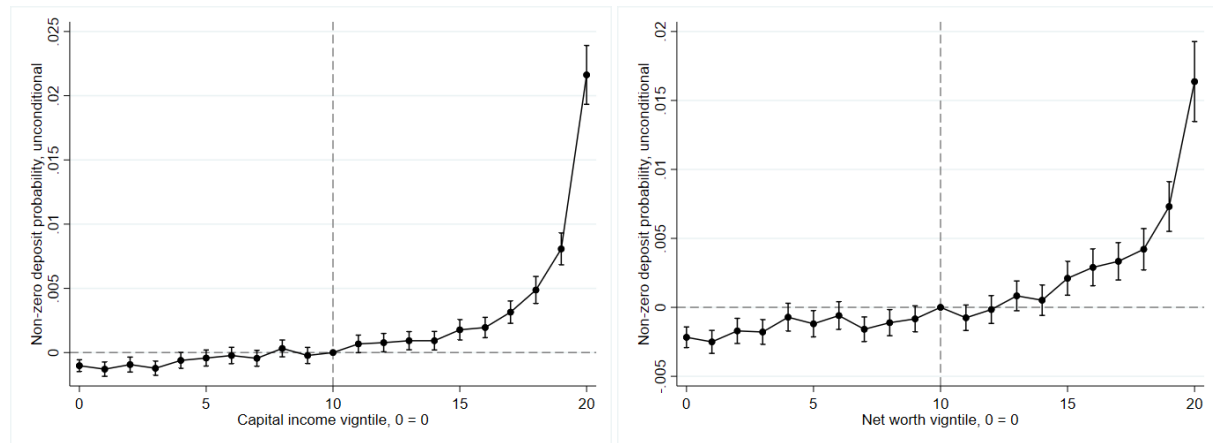
¹³ Importantly, this limitation is not necessarily present in other works that rely on offshore disclosures, such as Johannesen et al. (2018) and Alstadsæter et al. (2019). These works feature administrative data settings where individual nationals of their respective countries holding previously undisclosed assets in offshore tax havens must disclose those assets to the tax authorities; round-tripping is less relevant in these settings unless nationals hold offshore assets under presumed foreign ownership (e.g. a Swedish taxpayer owning an appreciating asset in the Cayman Islands vicariously through a non-Swedish account).

mirrors findings from other descriptive works describing the joint distribution of earnings/wealth rank and offshore haven use (Guyton et al. 2020; Kleven et al. 2011; Londoño-Vélez and Ávila Mahecha 2020). However, contextualized within the entire range of earners in Ecuador, tax haven use appears even more skewed. With manual personal income tax filers earners representing around 10 per cent of the population, assuming that all offshore tax haven use occurs on the part of these generally higher earning and wealthier taxpayers, tax haven use is most concentrated among the top one-tenth of 1 per cent of Ecuadorian earners.

Figure 8: Probability of making a tax haven bank deposit

(a) By capital income rank, $\mathbb{P}(y_{p50,t} > 0) \approx 0.002$

(b) By net worth rank, $\mathbb{P}(y_{p50,t} > 0) \approx 0.003$



Note: both panels specify the rank effects relative to the tenth vigintile and construct vigintiles 1–20 as conditional on positive activity, grouping all zero declarations in the '0' bin. Net worth is defined as reported assets less reported liabilities.

Source: author's calculation based on MID data and Ecuadorian personal income tax return filings for 2008–19

This finding on the prevalence of haven use across the income distribution is analogous to results from both OECD countries and developing contexts. For example, Alstadsæter et al. (2019) find a high skew in wealth rank in the probability of Swedish taxpayers appearing in the 'Panama Papers', with the top half of one-tenth of 1 per cent exhibiting an approximately 1 per cent probability. For Colombian taxpayers, the top half of one-tenth of 1 per cent of the wealth distribution also demonstrates a probability of this amount of appearing in the Panama Papers.¹⁴ While my estimates do not rank individuals by wealth, I consider them largely analogous.¹⁵

Beyond the probability of haven use for foreign banking activity, how does the magnitude of haven use vary within the income distribution? To answer this question, I estimate the following regression:

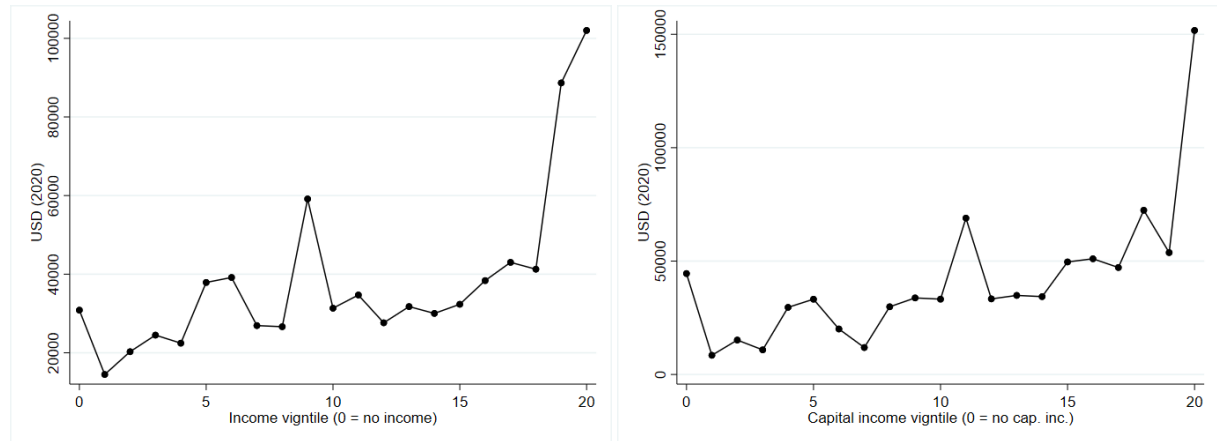
$$\mathbb{E}[y_{it}|V_{it}|y_{it} + y_{non-haven,it} > 0]$$

This reduced form follows as a similar specification to the previous unconditional income ranks; however, it now conditions on the presence of any tax haven banking activity and estimates the difference in levels of currency deposited. Figure 9 indicates that amounts of funds sent to tax havens are increasingly large towards the upper end of the income distribution, with depositors in the top 10 per cent of this conditional distribution of filers depositing hundreds of thousands of US dollars annually in bank accounts domiciled in fiscal havens.

¹⁴ I apply a population-wide rank to estimates from Londoño-Vélez and Ávila Mahecha (2020) that considers that the filers represent the top fifth of the Colombian population in terms of wealth.

¹⁵ Panel (b) of Figure 8 plots the joint distribution of wealth rank and haven use; however, administrative wealth data in Ecuador are heavily censored below extremely high levels; most household wealth is not considered by administrative data sources, and reported wealth holdings only largely consist of securities and business ownership.

Figure 9: Funds deposited (2020 US dollars), conditional on any tax haven banking activity
(a) By income vigintile (b) By capital income vigintile



Note: this graph specifies the rank effects relative to the tenth vigintile and construct vigintiles 1–20 as conditional on positive pre-tax income, grouping all zero declarations in the ‘0’ bin.

Source: author’s calculation based on MID data and Ecuadorian personal income tax return filings for 2008–19.

Lastly, the panel structure of the data allow me to study a relatively novel question: how does tax haven use vary by income within fixed individuals? That is, by what degree does varying an individual’s income render her more or less inclined to use banking services domiciled in fiscal havens? To answer this question, I estimate the following individual fixed effects regression:

$$\mathbb{1}\{y_{it} > 0\} = \beta_i + \beta_r R_{it} + \varepsilon_{it}$$

where β_r is identified from movements of income rank within individuals. Due to potential endogeneity of income rank outcomes and fiscal haven use, the coefficients should not be interpreted as causal; that is, individual movements in income rank may change based on fiscal haven use.¹⁶ Additionally, these fixed effects regressions are estimated based on the income rank movements observed within individuals, which may be more ostensibly smaller, local rank movements rather than rank changes of several deciles.

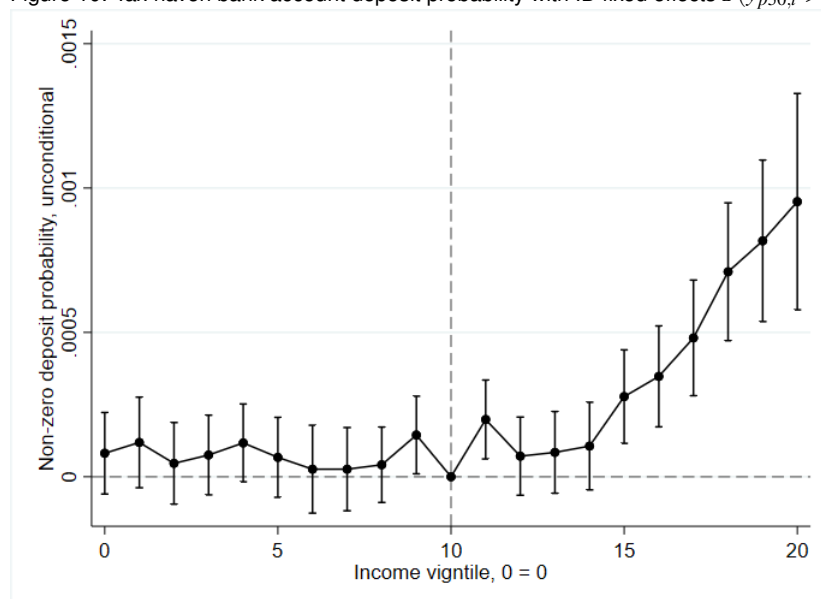
Figure 10 indicates that within fixed individuals, income rank movements have significant effects on tax haven usage. Individual rank movements beyond the 15th conditionally positive pre-tax income vigintile are associated with linear increases in the probability of making a positive tax haven bank deposit in a given year. This finding implies the possible role of social capital in extending access to elusive tax strategy. However, the magnitudes of these changes are significantly smaller than those observed in the no-absorb baseline, indicating that variation is more important across individuals than within individuals.

Importantly, none of the tax haven bank account transactions have yet been construed as explicitly fraudulent in nature. As an attempt to establish any of the transactions as explicitly fraudulent in nature, future versions of this work will compare these personal bank account deposits to items on income tax declarations, namely income, assets, and deductions claimed. Other strategies include tagging Ecuadorian taxpayers that appear in the Panama Papers for some precedent of tax-evasive behaviour.¹⁷

¹⁶ There are several levels of potential endogeneity in this setting. Illicit tax haven use implies income not accounted for in domestic ranks, which lowers income rank. If illicit tax haven use allows for additional claiming of capital gains domestically, haven use may induce increases in income rank. Lastly, the change in probability in tax haven use given change in income rank may reflect change in demand for/ability to access offshore banking services as income changes.

¹⁷ Several works make use of the Panama Papers and similar offshore financial centre banking leaks to tie individual taxpayers to tax-fraudulent behaviour (e.g. Alstadsæter et al. 2019; Londoño-Vélez and Ávila Mahecha 2020). However, individual

Figure 10: Tax haven bank account deposit probability with ID fixed effects $\mathbb{P}(y_{p50,t} > 0) \approx 0.001$



Note: this figure estimates the fixed effects regression $\mathbb{1}\{y_{it} > 0\} = \beta_i + \beta_r R_{it} + \varepsilon_{it}$. The coefficients identify the change in probability of making a tax haven bank deposit given an income rank change in a fixed individual. This graph specifies the rank effects relative to the tenth vignile and construct vigniles 1–20 as conditional on positive pre-tax income, grouping all zero declarations in the ‘0’ bin.

Source: author’s calculation based on MID data and Ecuadorian personal income tax return filings.

However, taken more broadly, the data do clearly portray a picture of the distribution and magnitude of tax haven use for banking services. The descriptive evidence here describes the use of banking services in offshore financial centres as an activity that is highly skewed towards the highest earner and wealth demographics, as in both developing and developed contexts. Simultaneously, conditional on engaging in tax haven banking transactions, the highest earners deposit upward of US\$100,000 per year, potentially mitigating the tax base of the top 5 per cent of those earners by US\$2 billion per year.

4 Dividend and profit distribution reform

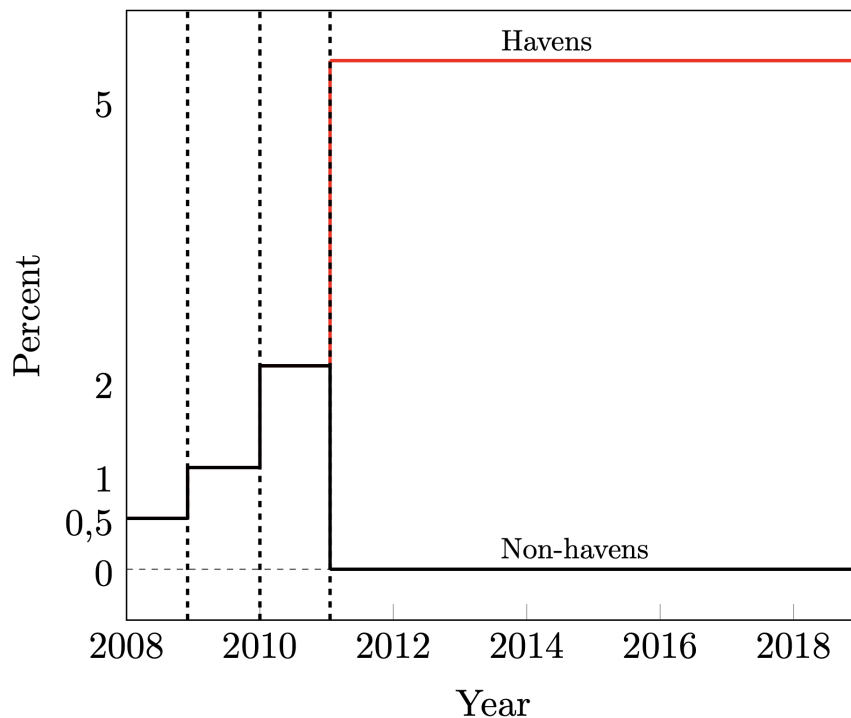
In this section I estimate the tax-price elasticity of dividends sent to tax havens. Importantly, dividend payments to tax havens do not typically represent an instance of *corporate* profit shifting, with dividends and distributions out of profits having already been subject to corporate income taxes, but rather individual tax evasion. Namely, individuals aiming to reduce their capital income tax base can establish recipient bank accounts and domiciles in tax havens that receive dividend payments from related businesses. By distributing dividends to a related bank account domiciled in a fiscal haven, an individual with ownership connections with a business can illicitly shelter capital income from personal income taxation.

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. Furthermore, 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. This design also allows me to estimate substitution responses.

appearance in the Panama Papers itself does not constitute an act of tax evasion; rather, tax-evasive behaviour is established in combination with audits and comparison to comparable mandatory declarations.

A reform to the ISD in late November 2011 targeted dividends to tax havens by simultaneously raising the ISD tax rate and exempting all non-tax haven dividend payments and corporate profit distributions (Figure 11). In the period leading up to this reform, all profit distributions abroad faced an ISD rate of 2 per cent, whereas in the post-period, dividend payments to non-fiscal-havens (e.g. the United States) faced an ISD rate of 0 per cent and those sent to parties domiciled in tax havens were subject to an ISD tax rate of 5 per cent.

Figure 11: ISD tax rate on dividend outflows by tax haven status



Note: this figure displays the evolution of the ISD rate on dividend outflows over time by tax haven status of the destination country.

Source: author's computation based on publicly available information on ISD legislation.

4.1 Corporate response

By focusing on the evolution of funds sent to bank accounts in tax havens around changes in the cost of sending funds abroad (as observable in the MID data), I implicitly identify the responses of demand for sheltering dividends in tax havens. I estimate regressions of the following generalized difference-in-differences specification:

$$y_{ijt} = \beta_0 + \beta_1 \ln(1 - \tau_{jt}) + \alpha_i + \alpha_j + \alpha_t + \Gamma X_{ijt} + \varepsilon_{ijt}$$

Here, y_{ijt} represents dividends sent by company i to country j at time t . τ_{jt} is the ISD tax for transactions with country j , and X_{ijt} is a vector of individual, transacting-country, and time-varying characteristics.

Variation in τ_{jt} results from two sources: first, legislative reforms to the statutory ISD tax regime alter the tax rate and base over time based on each transaction's purpose and tax haven status of the foreign party country. Second, within the tax haven targeting regime of the ISD, the *de jure* list of government-recognized tax havens that are subject to the dis-preferred ISD tax regime experiences some change over time from eliminations and additions of countries from/to the list.¹⁸

¹⁸ Ultimately, identification of the tax-price responses of dividend payments and related economic responses originates from variation in the effective price of sending funds abroad. However, considering the Allingham and Sandmo conception of tax-

In the case where y_{itj} represents the log of funds sent abroad, β_1 identifies the elasticity of sheltered dividends with respect to the net-of-tax-price gap between tax havens and non-haven destination countries, given individual i transacting with country j at time t . Importantly, given that both rates to tax havens and to non-havens change in the post-period, the quasi-experiment does not allow for the identification of a simple net-of-tax elasticity of dividends sent to tax havens.¹⁹ In addition to such responses on the intensive margin of US dollars sent, I also study the evolution in levels of US dollars, number of transactions in logs and levels, and probability of engaging a non-zero number of tax haven dividend transactions.

The time denomination of these designs is not trivial. The MID data report such dividend payments at the transaction level; for this reason, I study intensive margin responses on the transaction level, but extensive margin designs require a degree rectangularization at some level of time aggregation. To this end, I do so primarily on the yearly level (in preference over quarterly and monthly levels) for several reasons. Dividend payments are sent out quarterly; using more granular time denominations such as the monthly and daily levels fails to capture the relevant time denomination of response. However, I generally prefer the yearly over quarterly divisions. By aggregating to the yearly level, I can circumvent intra-year seasonality in dividend payments that is largely evident in the quarterly data. Additionally, using quarterly data reduces computational feasibility of the larger triple-difference designs.²⁰

Due to the time–country–purpose varying nature of the ISD regime, for extensive margin designs I rectangularize the data on the taxpayer–time–purpose–country level. The granularity of this rectangularization procedure renders estimation potentially computationally infeasible.²¹

Figure 12 displays the distribution of dividend payments to parties abroad. The evolution of aggregate dividend payments and profit distributions to tax havens versus non-havens can be seen in 13. Around the reform, the gap in outflows increases, as predicted by the intent of the reform, albeit not on an incredible large scale. However, these aggregates statistics mask potentially larger micro-level responses.

Figure 14 displays the simple difference-in-differences plot for log dividend payments to tax havens versus non-havens around the reform at the end of 2011. Immediately following the reform, dividend payments to tax havens saw drastic decline by a whole log point. This decrease is significant and generally remains at this level throughout the post-period. Figure 15 adds firm-level fixed effects. The results of this specification corroborate the results of the simple difference-in-differences design. The coefficient time series exhibits a similarly strong drop of half a log point in the immediate post-reform period. The relatively attenuated response here suggests the presence of an important response on the extensive margin. Figures A1 and A2 display similar results on the transaction level.²²

evasive behaviour, identification may be threatened by perceived changes in the probability of detection. Indeed, the installation or popularization of administrative data architecture that monitors transnational economic activity for the purpose of enforcing the ISD outflows tax may simultaneously violate an exclusion restriction by affecting individuals' perceived risk of detection.

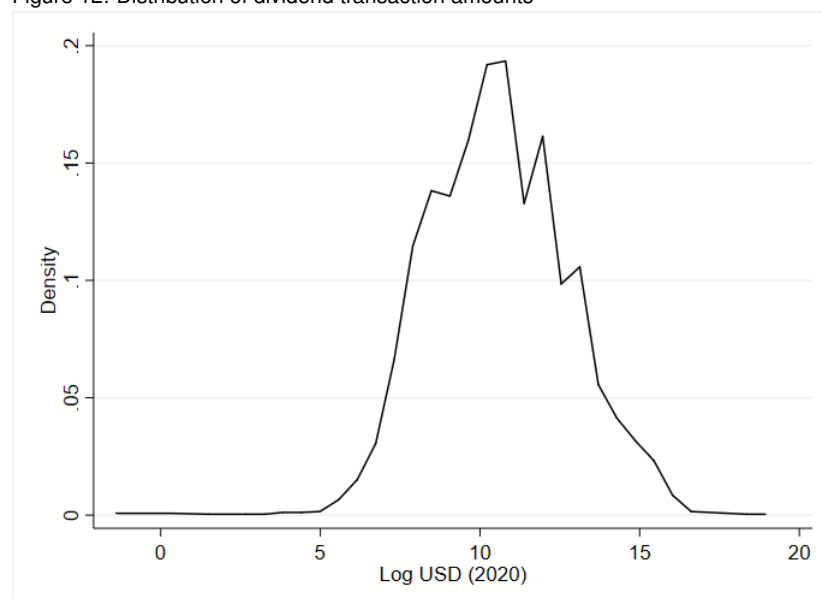
¹⁹ Future versions of this work will use an event study design around additions and removals to/from the list of government-recognized tax havens to identify this elasticity.

²⁰ Using the yearly level of course reduces computation memory load by a factor of four, but this reduction proves non-trivial in the case of rectangularizing on the taxpayer–time–purpose–country level. The case of restricting only to corporate taxpayers that register dividend payments abroad (a non-trivial restriction for the triple-difference design) results in respectively $10,000 \times 48 \times 67 \times 250 \approx 10$ billion categories.

²¹ Without restriction, full rectangularization on the firm–quarter–country–purpose level would generate nearly 100 billion categories.

²² The most important difference is that Figure A2 displays a largely attenuated response after two years post-period including firm-level fixed effects on the transaction-level reduced forms. This difference indicates that the medium-run response is not driven by individual firm changes in intensive amounts sent on the transaction level.

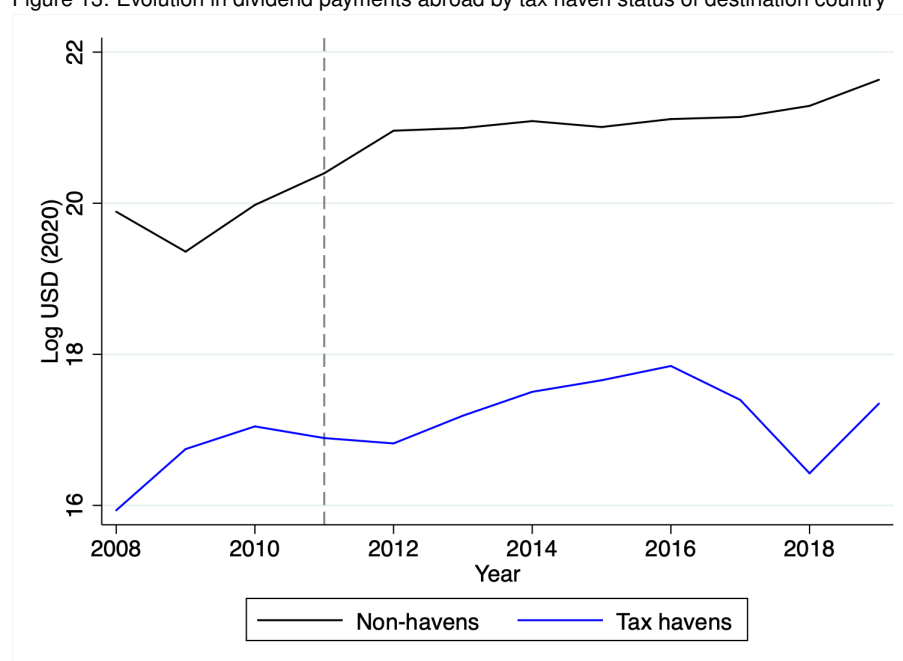
Figure 12: Distribution of dividend transaction amounts



Note: this figure displays the distribution of log US dollars sent as dividends or profit distributions to parties abroad by Ecuadorian companies between 2008 and 2019.

Source: author's calculation based on MID data.

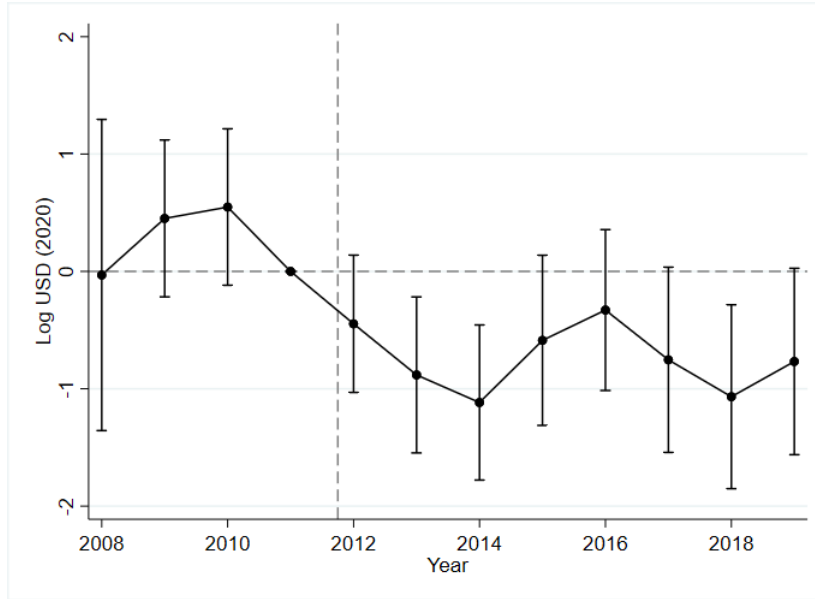
Figure 13: Evolution in dividend payments abroad by tax haven status of destination country



Note: this figure displays log aggregates of US dollars in dividend outflows to tax havens and non-haven countries over time.

Source: author's calculation based on MID data.

Figure 14: Dividend reform (log US dollars)

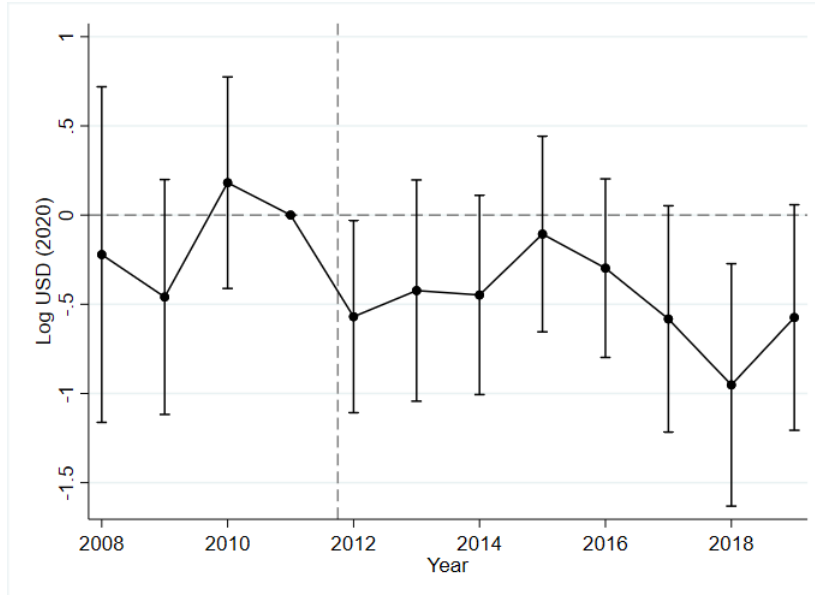


Note: this figure displays the simple annual difference-in-difference coefficients $\{\beta_k\}$ estimated from the reduced form

$$\log y_{ijt} = \beta_0 + \sum_{k=2008}^{2019} \delta_k \mathbb{1}\{Year_t = k\} + \gamma Haven_{jt} + \sum_{k=2008}^{2019} \beta_k \mathbb{1}\{Year_t = k\} Haven_{jt} + \varepsilon_{ijt}$$

with 2011 as the base period. Error bars represent 95 per cent confidence intervals based on firm-clustered standard errors. Source: author's calculation based on MID data restricted to Ecuadorian firms engaging in payments of dividends and profit distributions abroad and aggregating and rectangularizing activity to the firm–year–country level.

Figure 15: Dividend reform (log US dollars)



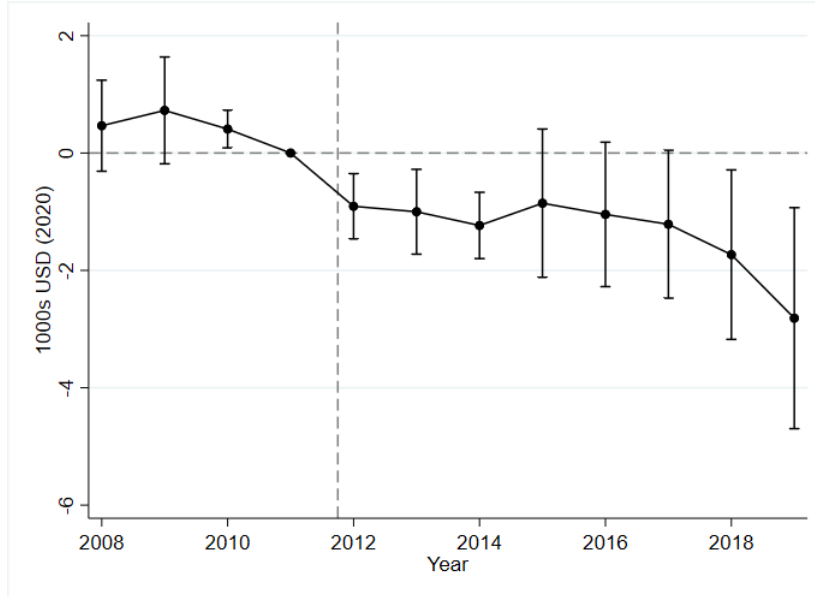
Note: this figure displays the simple annual difference-in-difference coefficients $\{\beta_k\}$ estimated from the reduced form

$$\log y_{ijt} = \alpha_i + \sum_{k=2008}^{2019} \delta_k \mathbb{1}\{Year_t = k\} + \gamma Haven_{jt} + \sum_{k=2008}^{2019} \beta_k \mathbb{1}\{Year_t = k\} Haven_{jt} + \varepsilon_{ijt}$$

with 2011 as the base period. Error bars represent 95 per cent confidence intervals based on firm-clustered standard errors. Source: author's calculation based on MID data restricted to Ecuadorian firms engaging in payments of dividends and profit distributions abroad and aggregating and rectangularizing activity to the firm–year–country level.

Figures 16–18 display results of the difference-in-difference specifications with different outcome parameterizations after restricting to only firms that ever made foreign dividend transactions and rectangularizing the MID data on the firm–year–country level. Overall, the figures substantiate the preliminary evidence that the dividend reform induced a decrease in dividends sent to tax havens—this is observed on the intensive and extensive margins of funds sent abroad. Simultaneously, Figure 17 demonstrates that the reform was unaccompanied by a large change in the number of dividend transactions on the intensive margin (i.e. among firms engaging in a non-zero number of dividend outflow transactions), while on the extensive margin the reform induced a 10 percentage point drop in the probability of engaging in a non-zero number of dividend payments to tax havens in the post-reform era.

Figure 16: Dividend reform (US dollars)



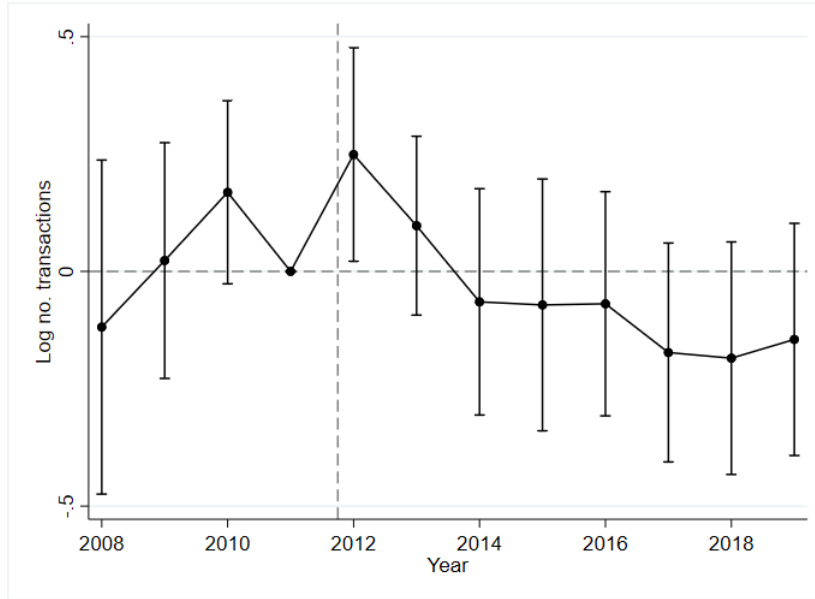
Note: this figure displays the simple annual difference-in-difference coefficients $\{\beta_k\}$ estimated from the reduced form

$$\log \left(\sum_{i'=i, j'=j, t'=t} y_{i'j't'} \right) = \beta_0 + \sum_{k=2008}^{2019} \delta_k \mathbb{1}\{Year_t = k\} + \gamma Haven_{jt} + \sum_{k=2008}^{2019} \beta_k \mathbb{1}\{Year_t = k\} Haven_{jt} + \varepsilon_{ijt}$$

with 2011 as the base period. Error bars represent 95 per cent confidence intervals based on firm-clustered standard errors.

Source: author's calculation based on MID data.

Figure 17: Dividend reform (log number transactions)



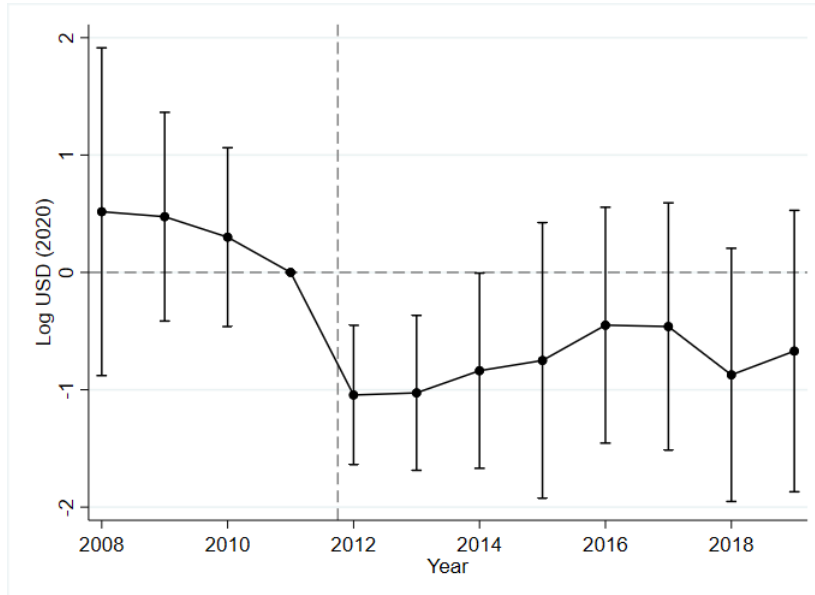
Note: this figure displays the simple annual difference-in-difference coefficients $\{\beta_k\}$ estimated from the reduced form

$$\log \left(\sum_{i'=i, j'=j, t'=t} \mathbb{1}\{y_{i'j't'} > 0\} \right) = \beta_0 + \sum_{k=2008}^{2019} \delta_k \mathbb{1}\{Year_t = k\} + \gamma Haven_{jt} + \sum_{k=2008}^{2019} \beta_k \mathbb{1}\{Year_t = k\} Haven_{jt} + \varepsilon_{ijt}$$

with 2011 as the base period. Error bars represent 95 per cent confidence intervals based on firm-clustered standard errors.

Source: author's calculation based on MID data.

Figure 18: Dividend reform probability of transacting



Note: this figure displays the simple annual difference-in-difference coefficients $\{\beta_k\}$ estimated from the reduced form

$$\mathbb{1} \left(\sum_{i'=i, j'=j, t'=t} \mathbb{1}\{y_{i'j't'}\} \right) > 0 = \beta_0 + \sum_{k=2008}^{2019} \delta_k \mathbb{1}\{Year_t = k\} + \gamma Haven_{jt} + \sum_{k=2008}^{2019} \beta_k \mathbb{1}\{Year_t = k\} Haven_{jt} + \varepsilon_{ijt}$$

with 2011 as the base period. Error bars represent 95 per cent confidence intervals based on firm-clustered standard errors.

Source: author's calculation based on MID data.

Table 3: Dividend reform (log US dollars)

	(1)	(2)	(3)
Taxhaven \times post	-0.96** (0.22)	-0.97** (0.21)	-0.40* (0.20)
Taxhaven	0.28 (0.19)	1.71** (0.53)	0.29+ (0.17)
Post	0.38** (0.093)	0.39** (0.096)	0.36** (0.078)
Constant	4.30** (0.099)	4.15** (0.11)	4.35** (0.065)
Observations	11,465	11,448	10,487
Adjusted R ²	0.008	0.056	0.603
Country FE		X	
Firm FE			X

Note: firm-clustered standard errors in parentheses. + $p < 0.10$, * $p < 0.05$, $p < 0.01$.

Source: author's compilation.

Table 4: Dividend reform (log US dollars): elasticities

	(1)	(2)	(3)	(4)	(5)	(6)
$\log \tau$	-0.33** (0.089)	-0.44** (0.088)	-0.13 (0.11)			
$\log(1 - \tau)$				15.2** (2.66)	22.5** (4.01)	5.87* (2.39)
Constant	2.94** (0.36)	2.51** (0.36)	3.83** (0.44)	4.66** (0.071)	4.72** (0.067)	4.69** (0.016)
Observations	3033	3015	2484	11465	11448	10487
Adjusted R ²	0.011	0.058	0.555	0.008	0.057	0.602
Country FE		X			X	
Firm FE			X			X

Note: firm-clustered standard errors in parentheses. + $p < 0.10$, * $p < 0.05$, $p < 0.01$.

Source: author's compilation.

Tables 3 and 4 display the estimates for these specifications. This decrease corresponds with a net-of-tax-price gap elasticity of $\varepsilon_{\Delta(1-\tau)} \in (5, 20)$.²³ While the magnitude of this response may initially appear quite large, this strong result likely reflects high tax-price sensitivity of taxpayers likely engaged in offshore tax strategy; to the extent that the purpose of offshore financial centre use is for tax-strategic purposes, taxpayers are likely highly responsive to changes in the environment that affect their ability to engage in such tax strategy.

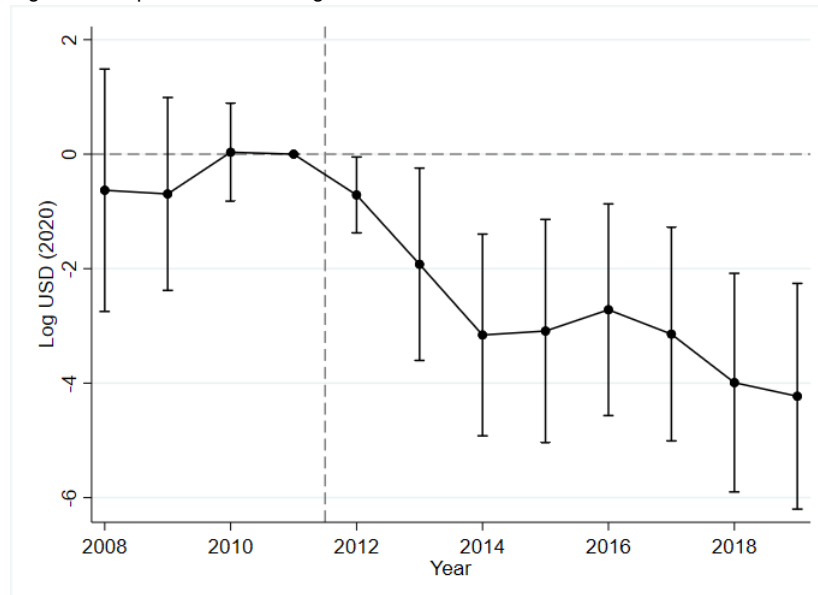
As a validation for this finding, I implement a simple triple-differences design that introduces non-dividend transactions as a third difference group. Including non-dividend and non-financial transactions as a baseline group allows the design to compare with an unaffected economic activity. I use imports and similar consumer transactions as the third baseline group in this design, estimating the regression

$$\begin{aligned}
\log y_{i,e,jt} = & \alpha_0 + \beta \text{Div}_e + \gamma \text{Haven}_{jt} + \xi \text{Div}_e \text{Haven}_{jt} + \\
& \sum_{k=2008}^{2019} \delta_k \{ \text{Year}_t = k \} + \sum_{k=2008}^{2019} \pi_k \mathbb{1} \{ \text{Year}_t = k \} \text{Div}_e + \\
& \sum_{k=2008}^{2019} \theta_{k,e} \mathbb{1} \{ \text{Year}_t = k \} \text{Haven}_{jt} + \\
& \sum_{k=2008}^{2019} \beta_{dd} \mathbb{1} \{ \text{Year}_t = k \} \text{Div}_e \text{Haven}_{jt} + \varepsilon_{i,e,jt}
\end{aligned}$$

²³ Because the tax is concentrated at values near zero, I focus on net-of-tax-price elasticities in my setting.

now for transaction purpose Div_e assuming a value of 1 for dividend and profit distribution transactions. Figure 19 displays results from this triple-differences specification. This estimation displays significantly greater results in magnitude than the difference-in-difference specifications, suggesting not only dividend transactions with non-havens, but also non-dividend transactions in havens as a result, which did not see any tax-price distortion relative to non-havens. The estimates here imply a tax-price elasticity of dividend and profit distributions to tax havens greater than four times as large—that is, $\varepsilon_{\Delta(1-\tau)} > 20$.

Figure 19: Triple-difference design



Note: this figure displays the simple annual difference-in-difference coefficients $\{\beta_k\}$ estimated from a triple reduced form with 2011 non-dividend transactions to non-havens as the baseline category. Error bars represent 95 per cent confidence intervals based on firm-clustered standard errors.

Source: author's calculation based on MID data.

Preliminary reduced-form evidence suggests a large decrease in dividend outflows and profit distributions to tax havens compared to non-haven destinations following an increase in the relative tax price of sending funds to tax havens versus non-havens. However, this large response does not directly indicate the effectiveness of this kind of unilateral action against tax havens in mitigating tax haven use and counterfactually increasing domestic reporting.

4.2 Individual response

As previously established, dividend payments and profit distributions to entities domiciled in tax havens do not represent a form of corporate profit shifting, having already been subject to corporate income tax, but rather individual tax evasion. If dividend payments do indeed represent a tax-elusive activity, individuals benefiting from dividend and other capital income sheltering in the pre-reform period should demonstrate some economic response. Among many possibilities, in a fiscal environment with negligible cost of engaging in round-tripping, any increase in transaction cost with tax havens should result in no increase in reported domestic activity, as individuals can simply move funds to non-dis-preferred countries and then to the tax shelters at zero cost. To the extent that there *is* cost associated with round-tripping or broader inability to engage in more sophisticated tax strategy, one should detect change in reported domestic activity.

Here, the crucial policy-relevant question is: to what extent do individuals and corporations engage in round-tripping behaviour to circumvent the intent of the dividend reform? For instance, based on the potentially pecuniary and non-pecuniary cost structures associated with offshore fiscal haven use

and round-tripping,²⁴ do individuals increase their domestic reporting following a reform that places scrutiny on and penalizes direct interaction with tax havens, or do they make use of foreign proxies to facilitate indirect transactions?

The ideal quasi-experiment would tie individuals to companies sending dividends to tax havens in the pre-period using a shareholder–firm crosswalk. While the Ecuadorian tax environment contains such data, it remains a key pursuit for future versions of this work.²⁵ Here, I study the response in capital income growth of individuals engaging in bank account deposits in tax havens in the pre-period (as a proxy for the ideal measure of direct exposure to the anti-tax-haven dividend reform).²⁶ In future versions of this work, I will also study the declared income responses of individuals named in the Panama Papers as well as individuals bunching on the ISD exemption kink for bank account deposits (elaborated upon in a subsequent section).

I tag individuals in the quasi-treatment group based on an indicator for having made a bank account deposit or having engaged in a transfer of a dividend or profit distribution in a tax haven prior to 2012:

$$Treat_i = \mathbb{1}\left\{\left(\sum_{j \in J^*, t < 2012} y_{ijt}\right) > 0\right\}$$

for the set of tax havens J^* and foreign bank account deposit y_{ijt} in country j and year t of individual i .

I turn to estimating the following difference-in-difference design:

$$\log Y_{it} = \beta_0 + Treat_i + \sum_{k=2008}^{2019} \delta_k \mathbb{1}\{Year_t = k\} + \sum_{k=2008}^{2019} \beta_k \mathbb{1}\{Year_t = k\} Treat_i + \varepsilon_{it}$$

for declared activity Y_{it} reported by individual i in year t . I study capital income, effective tax rate, and income tax deductions as outcome variables of interest. The main specification here compares the evolution in activity declared in the manual personal income tax forms of individuals in this ‘quasi-treated’ group with the broader population. I also estimate a regression with individual fixed effects as well as a separate specification that restricts the sample only to individuals making a foreign bank account deposit or dividend transfer or profit distribution (regardless of haven status of recipient party). Figure A4 displays the similar reduced-form estimates while including individual-level fixed effects.

The results of these reduced forms indicate a positive effect of the dividend reform on capital income claimed domestically. In the baseline specification of Figure 20(a), individual capital income increases among the quasi-treated group by approximately 0.75 log points in the post-period. The magnitude of this finding appears consistent with the other specifications, although characterized by a single-year lag in the restricted sample specification. Additionally, the post-period coefficients associated with the individual fixed effect specification are all individually insignificant and characterized by a light pre-trend (although statistically indistinguishable from zero).

²⁴ 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 to 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 modelled in Guyton et al. (2020) and strongly suggested by zero-profit bunching among UK multinational firms in Bilicka (2019).

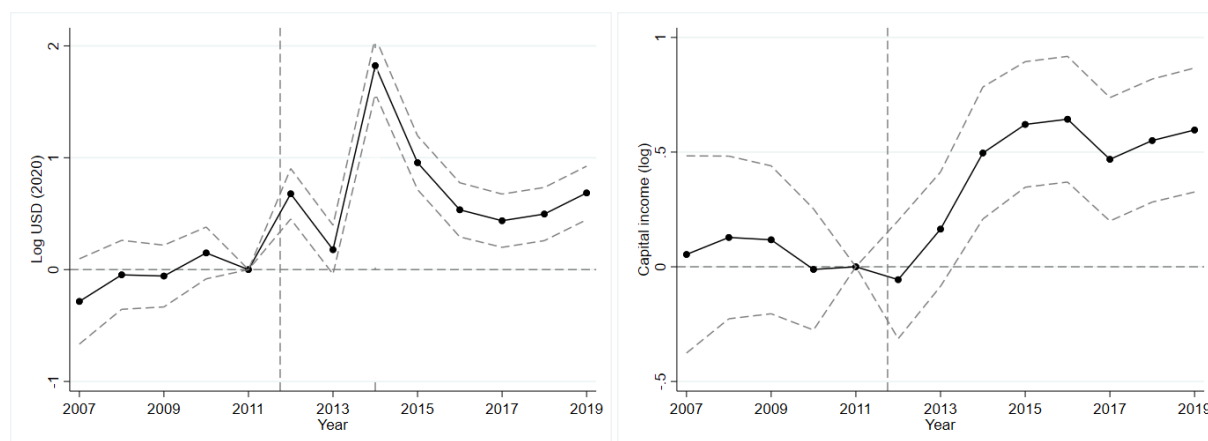
²⁵ In particular, the Ecuadorian tax environment features a data set on individual ownership of Ecuadorian companies denominated on the ownership share–transaction level called the *Anexo de accionistas, partícipes, socios, miembros de directorio y administradores*. Yet another alternative would be to make use of Orbis proprietary data from Bureau van Dijk on global shareholders of companies, at the risk of potentially selective under-coverage of Ecuadorian firms.

²⁶ The Ecuadorian tax authorities began disaggregating capital income between dividends, capital gains, and business income in 2010; this unavailability for prior years currently precludes the study of dividends received as reported on personal income tax forms. For this reason, I presently study the evolution in overall capital income as reported on personal income tax declarations.

Figure 20: Dividend reform impact on declared capital income

(a) Comparison to all taxpayers

(b) Comparison to non-haven transactors



Note: these graphs display the estimates $\{\beta_k\}_{k=2008}^{2019}$ from the above difference-in-difference specifications for evolution of reported capital income around the 24 November 2011 dividend reform. In panel (a), the 'control' sample consists of all manual personal income tax filers not having made a financial transfer to a tax haven in the pre-reform period. Panel (b) restricts the control group to individuals making foreign bank account deposits or dividend payment/profit distributions in non-haven countries in the pre-reform period. Error bars represent 95 per cent confidence intervals based on individual-clustered standard errors.

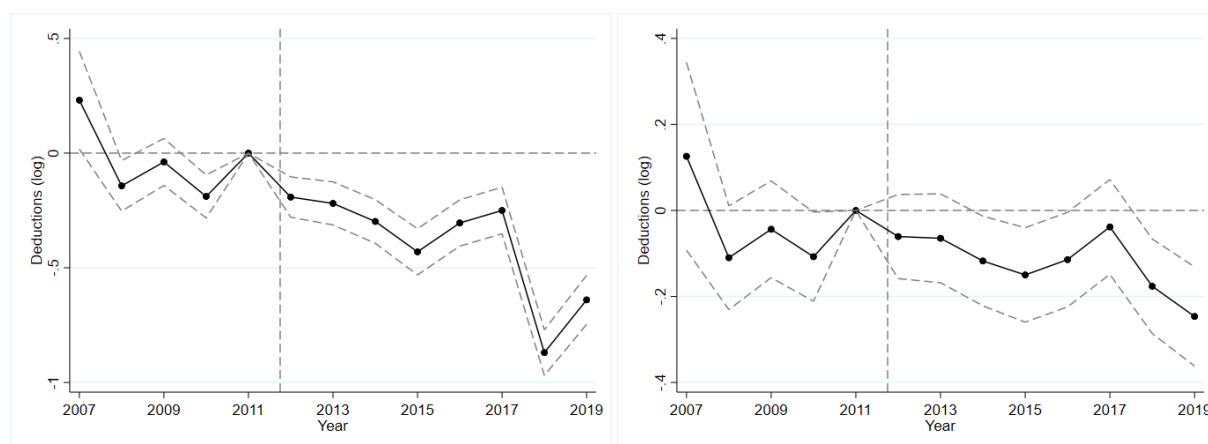
Source: author's calculation based on MID data and Ecuadorian personal income tax return filings for 2008–19.

I also use this quasi-experimental design to study income tax deductions claimed (consisting of the sum of business expense deductions and health/education expenses). The results of the difference-in-differences estimation displayed in Figure 21 display a significant decrease in deductions claimed.

Figure 21: Dividend reform impact on deductions claimed (log US dollars)

(a) Comparison to all taxpayers

(b) Comparison to non-haven transactors



Note: these graphs display the estimates $\{\beta_k\}_{k=2008}^{2019}$ from the above difference-in-difference specifications for evolution of income tax deductions claimed around the 24 November 2011 dividend reform. Income tax deductions include deductions from business expenses, health expenditures, and educational expenses. In panel (a), the 'control' sample consists of all manual personal income tax filers not having made a financial transfer to a tax haven in the pre-reform period. Panel (b) restricts the control group to individuals making foreign bank account deposits or dividend payment/profit distributions in non-haven countries in the pre-reform period. Error bars represent 95 per cent confidence intervals based on individual-clustered standard errors.

Source: author's calculation based on MID data and Ecuadorian personal income tax return filings for 2008–19.

The simultaneous increase in capital income declared and decrease in deductions claimed possibly reflect a domestic absorption response of income previously shifted elusively to offshore financial centres. In particular, individuals ostensibly sending capital income to tax havens through their owned businesses in the pre-reform period face a diminished incentive to continue directly shifting income abroad through

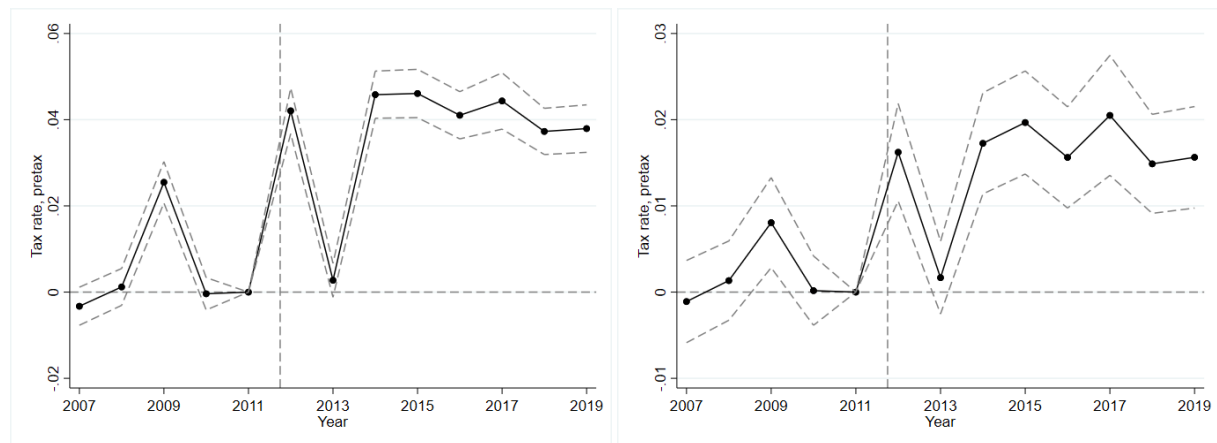
corporate profit distributions, given the increase in the outflows tax rate specifically for tax haven destinations. The important distinction here is that these individuals might circumvent the stated intent of the ISD reform (i.e. to disincentivize financial outflows to tax havens) via round-tripping activity. The evidence from manual personal income tax statements indicates that individuals likely directly affected demonstrate a significant increase in taxable activity in the post-reform period.

Because the ‘quasi-treated’ individuals likely constitute a high-earner demographic, to the extent that they increase domestic reporting, the progressivity of the income tax may induce an average increase in income taxes paid. Figure 22 displays an analogous difference-in-difference estimation that replaces the dependent variable with average income tax—defined as the quotient of income taxes paid and pre-tax income. The results of this estimation illustrate a 2–4 percentage point increase in average income tax rate of quasi-treated individuals, confirming the prediction resulting from increased capital income declarations and decreased deductions concentrated among high-earning, haven-connected taxpayers.

Figure 22: Dividend reform impact on average income tax rate

(a) Comparison to all taxpayers

(b) Comparison to non-haven transactors



Note: these graphs display the estimates $\{\beta_k\}_{k=2008}^{2019}$ from the above difference-in-difference specifications for evolution of average income tax rate around the 24 November 2011 dividend reform. I define average income tax rate as the quotient of taxes paid and pre-tax income. In panel (a), the ‘control’ sample consists of all manual personal income tax filers not having made a financial transfer to a tax haven in the pre-reform period. Panel (b) restricts the control group to individuals making foreign bank account deposits or dividend payment/profit distributions in non-haven countries in the pre-reform period. Error bars represent 95 per cent confidence intervals based on individual-clustered standard errors.

Source: author’s calculation based on MID data and Ecuadorian personal income tax return filings for 2008–19.

Table 5 estimates that the difference in capital income reported between the quasi-treatment and -control groups increases by between 0.4 and 0.9 log points in the post-reform period, and Table 6 reports a decrease in deductions claimed by approximately 0.3 log points. Of note, constructing other ‘quasi-treatment’ groups based on the interaction of pre-reform period tax haven use and respective income rank yields insignificant results, with an implied attenuated effect in combining coefficients of difference groups.²⁷ Table 7 displays the results from estimating these specifications with average tax rate as the dependent variable.

The arithmetic of the entire decrease in dividends sent by corporations to tax havens has yet to be entirely accounted for; responses may range widely from changes in corporate behaviour (e.g. transactions classified under other economic activities) to substitution to different tax evasion strategies on the part of individuals. The evidence here, however, makes it clear that unilateral action against fiscal haven use results in a non-trivial increase in reported domestic activity on the part of suspected beneficiaries of offshore tax sheltering. The responses of individuals ostensibly demonstrating financial connections to

²⁷ The tables do not display all of the treatment \times post-period interaction coefficients.

offshore financial centres in the pre-reform period *do not* reflect complete circumvention of the purpose of the tax reform via substitution to round-tripping activity. The unilateral legislative action did result in an increase in reported domestic activity and taxation of affected taxpayers.

Table 5: Dividend reform impact on reported capital income (log US dollars)

	(1)	(2)	(3)	(4)	(5)	(6)
Haven user × post	0.90** (0.088)	0.39** (0.083)	0.75** (0.091)	0.39** (0.086)	0.76** (0.089)	0.42** (0.083)
Top 1% × haven user × post			0.80* (0.37)	0.24 (0.35)		
Top 0.1% × haven user × post					0.74 (0.83)	0.11 (1.01)
Observations	786,342	598,670	482,566	397,310	482,566	397,310
Adjusted R ²	0.106	0.705	0.128	0.693	0.123	0.693
Person FE		X		X		X

Note: this table displays the average of post-reform period difference-in-difference coefficients for the reduced-form specification that compares ‘quasi-treated’ individuals with all other manual personal income tax filers. The dependent variable in this table is log capital income (defined as the sum of business income, capital gains, and dividends received). Each regression includes the full set of treatment and post-period covariate interactions. ID-clustered standard errors in parentheses. ⁺ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$.

Source: author’s calculation based on MID data and Ecuadorian personal income tax return filings for 2008–19.

Table 6: Dividend reform impact on deductions claimed (log US dollars)

	(1)	(2)	(3)	(4)	(5)	(6)
Haven user × post	−0.23** (0.031)	−0.32** (0.032)	−0.33** (0.033)	−0.31** (0.033)	−0.34** (0.032)	−0.32** (0.032)
Top 1% × haven user × post			0.62** (0.17)	0.69** (0.17)		
Top 0.1% × haven user × post					0.25 (0.32)	0.41 (0.29)
Observations	6,642,243	6,269,832	4,100,864	4,046,680	4,100,864	4,046,680
Adjusted R ²	0.002	0.327	0.001	0.312	0.001	0.311
Person FE		X		X		X

Note: this table displays the average of post-reform period difference-in-difference coefficients for the reduced-form specification that compares ‘quasi-treated’ individuals with all other manual personal income tax filers. The dependent variable in this table is the total of income tax deductions claimed (including mainly business expenses and health/educational expenses). Each regression includes the full set of treatment and post-period covariate interactions. ID-clustered standard errors in parentheses. ⁺ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$.

Source: author’s calculation based on MID data and Ecuadorian personal income tax return filings for 2008–19.

Table 7: Dividend reform impact on average tax rate (log US dollars)

	(1)	(2)	(3)	(4)	(5)	(6)
Haven user × post	0.029** (0.0016)	0.023** (0.0017)	0.028** (0.0019)	0.025** (0.0019)	0.028** (0.0018)	0.024** (0.0017)
Top 1% × haven user × post			−0.0062 (0.0048)	−0.0075 ⁺ (0.0042)		
Top 0.1% × haven user × post					−0.022** (0.0082)	−0.024** (0.0049)
Observations	6,893,731	6,501,461	4,239,939	4,190,192	4,239,939	4,190,192
Adjusted R ²	0.002	0.314	0.004	0.329	0.003	0.329
Person FE		X		X		X

Note: this table displays the average of post-reform period difference-in-difference coefficients for the reduced-form specification that compares ‘quasi-treated’ individuals with all other manual personal income tax filers. The dependent variable in this table is average income tax rate (defined as the quotient of taxes paid and pre-tax income). Each regression includes the full set of treatment and post-period covariate interactions. ID-clustered standard errors in parentheses. ⁺ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$.

Source: author’s calculation based on MID data and Ecuadorian personal income tax return filings for 2008–19.

5 Model framework and theoretical underpinnings

Given the ISD's unique design, the repeated legislative shocks to its rate, and its restructuring to target fiscal haven use for tax-strategic purposes, the Ecuadorian environment is well suited for analysing the behavioural characteristics of tax evasion. In the canonical Allingham and Sandmo (1972) model environment of tax evasion, agents demand evasion services based on the perceived risk of evasion— itself a function of the probability of detection and the penalty faced if caught (Allingham and Sandmo 1972; Yitzhaki 1974).

I augment the Allingham and Sandmo framework by incorporating a pecuniary cost of sheltering funds, analogous to that induced by the ISD foreign transaction tax. This pecuniary cost structure generalizes the framework in Guyton et al. (2020), 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, as well as an environment where individuals can engage in an income-concealing activity with more general cost that varies with funds concealed.²⁸ My framework also draws motivation from the documented fact that tax auditors tend to miss certain kinds of concealed income in their investigations—namely income generated and undeclared offshore. In this respect, an important feature of this model is that detection of one type of under-reported income does not affect the probability of detection of the other type.

This goal of this model is to illustrate the different income and substitution responses to changes in the cost of engaging in tax-strategic income concealment. In particular, the intuition-building purposes of this model frame concealment as analogous to offshoring funds and poses tax haven use as in potential competition with declaring income domestically. Given an increase in the cost of sending funds to tax havens, to what extent do individuals increase reporting domestically versus simply engage in less-costly under-reporting that trades off a greater detection risk?

5.1 Model setup

Consider a taxpayer with exogenous pre-tax income $y \in \mathbb{R}_+$. She faces the choice of under-reporting her income to tax authorities by an amount $e \leq y$, allocated between unconcealed and concealed evasion as $e = e_u + e_c$. The taxpayer pays a linear tax $\tau \in [0, 1]$ on the amount $y - e$. As in Guyton et al. (2020), I modify the Allingham and Sandmo environment by incorporating a detection probability that depends on whether a particular evasion activity is concealed, with $p_u > p_c$. Getting caught under-reporting by the tax authorities is associated with a penalty $\theta > 0$.

Thus, an individual exhibiting standard risk aversion and concavely increasing utility in post-tax income $u(Y)$ optimizes in expectation over concealed and unconcealed income:

$$\max_{e_u, e_c \geq 0} \sum_{j \in \{0,1\}} \sum_{k \in \{0,1\}} \mathbb{P}(E_u = j) \mathbb{P}(E_c = k) \cdot u\left((1 - \tau)y + \tau\left(e_u(1 - j(1 + \theta)) + e_c(1 - k(1 + \theta))\right) - c(e_c)\right) \quad (1)$$

for detection events E_u and E_c for unconcealed and concealed income, respectively, such that

$$e_u + e_c \leq y \quad (2)$$

$$(1 - \tau)y - \tau\theta(e_u + e_c) - c(e_c) \geq 0 \quad (3)$$

²⁸ 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) on the part of Ecuadorian corporations.

That is, taxpayers cannot shelter more than the cost of concealment and penalties, and their under-reported income cannot exceed their true post-tax income.²⁹ However, these constraints do not necessarily bind given the expected cost of both unconcealed and concealed income under-reporting. For now, I leave concealment costs unspecified as a function of concealed funds other than imposing that $c(0) = 0$, but the main specification will express cost as a linear function of concealed funds to better reflect the cost structures of concealment associated with the ISD: $c(e_c) = \gamma e_c + f \cdot \mathbb{1}\{e_c > F\}$ or $c(e_c) = \gamma e_c \cdot \mathbb{1}\{e_c \geq K\} + f \cdot \mathbb{1}\{e_c > F\}$ for some $F, K \geq 0$ representing fixed costs of concealment and the ISD payment threshold. Concealing unreported income offers a benefit to the probability of detection: $\mathbb{P}(E_c = 1) < \mathbb{P}(E_u = 1)$.

This model nests both the original Allingham and Sandmo model by shutting off the concealment channel (i.e. imposing $e_c \equiv 0$) and the Guyton et al. model by only allowing for concealment that takes payment (i.e. imposing $e_u \equiv 0$) and letting $c(e_c) = \kappa \cdot \mathbb{1}\{e_c > 0\}$. Denoting relative and absolute risk aversion $R(Y) = -Yu''(Y)/u'(Y)$ and $A(Y) \equiv -u''(Y)/u'(Y)$, respectively, the standard Allingham and Sandmo results hold while shutting off the concealment channel.

Lemma 1 *An interior optimum requires that $c_e(e) \leq \tau$.*

I present the proof of Lemma 1 and subsequent proofs in Appendix B. The lemma states that the pecuniary benefits from concealment must weakly exceed the cost of concealment at the margin at a non-zero optimal level of concealment.

Proposition 1 *At an interior optimum, taxpayers conceal income satisfying a first-order condition:*

$$\frac{\mathbb{E}[u'(Y_{x,1})]}{\mathbb{E}[u'(Y_{x,0})]} = \frac{(1-p_c)}{p_c} \cdot \frac{(\tau - c_{e_c})}{(\tau\theta + c_{e_c})} \quad (4)$$

and under-reported income in an unconcealed fashion according to:

$$\frac{\mathbb{E}[u'(Y_{1,x})]}{\mathbb{E}[u'(Y_{0,x})]} = \frac{(1-p_u)}{\theta p_u} \quad (5)$$

implicitly defining both optimal concealed and unconcealed under-reported income.

The left side of eq. (4) represents the ratio of expected marginal utilities under detection of concealed income versus under non-detection of concealed income. This term is stochastic due to the probabilistic detection of unconcealed income and necessarily greater than 1 due to the shape of the utility function. This quotient represents the relative difference in utility under detection and non-detection, where values closer to 1 correspond with lower levels of concealed under-reporting. This term also increases in the tax rate τ and penalty rate θ , reflecting larger potential variance in post-tax income.

The first term on the right side is an inverse odds ratio of the probability of detection of concealed under-reported income, and the second term represents the ratio of the marginal pecuniary benefit of undetected concealment to the marginal pecuniary cost under detection. These interpretations follow analogously for optimal unconcealed under-reporting according to eq. (5).

These first-order conditions lend to some intuition building. For concealed under-reporting, an increase in the penalty rate produces an increase in the left-hand side and a decrease in the marginal pecuniary

²⁹ Note that the condition in eq. (2) is not implied by satisfying the constraint in eq. (3).

benefit–cost ratio that necessitates a commensurate increase in the inverse odds ratio of concealed detection or a decrease in concealed under-reporting to offset this change. Similarly, an increase in the marginal cost of concealment decreases the right side as well as the left-hand side ratio both mechanically and through substitution, and can be offset by a decrease in the probability of detection.

6 Bunching design: bank account deposits in tax havens

In this section I estimate the price elasticity of demand for banking services domiciled in tax havens. Starting on 30 December 2009, the Ecuadorian government imposed an exemption from ISD payments up to a defined monetary threshold, only above which parties sending funds abroad would be required to pay the outflows tax (i.e. a kinked tax schedule).³⁰ As an additional exercise, I study the descriptive characteristics of the individuals making bank account deposits in tax havens and focus on bunchers as an explicit group of interest—given their elevated engagement in tax strategy and likelihood of demonstrating financial connections with tax havens (as in Mortenson and Whitten 2020).

6.1 The tax-price elasticity of demand for haven banking services

The ISD schedule has also seen considerable variation in the kink location and the rate change between under and above the obligation threshold (Figure 23). In terms of the ISD base, the threshold was initially installed at US\$1,000, where it remained until the end of April 2016. Starting in May 2016, the tax authorities began indexing the threshold to an annual price index equal to three times the monthly minimum wage.³¹

This feature of the ISD regime offers a setting in which to estimate the tax-price elasticity of demand for banking services in tax havens. In particular, the panel structure of the data provides empirical counterfactual distributions for some of the bunching reforms, thus removing the necessity to interpolate a smooth counterfactual distribution as in classical bunching estimators (e.g. Saez 2010). Moreover, in a setting where individuals face minimal frictions in setting their transaction amounts (by merit of choosing the amount they send), the setting is likely to be characterized by significant round-number bias (normally dealt with using a round-number binning procedure as in Kleven (2016)), which may be particularly severe for the initial kink located at US\$1,000. The availability of prior empirical counterfactual distributions allows me to overcome this challenge as well.

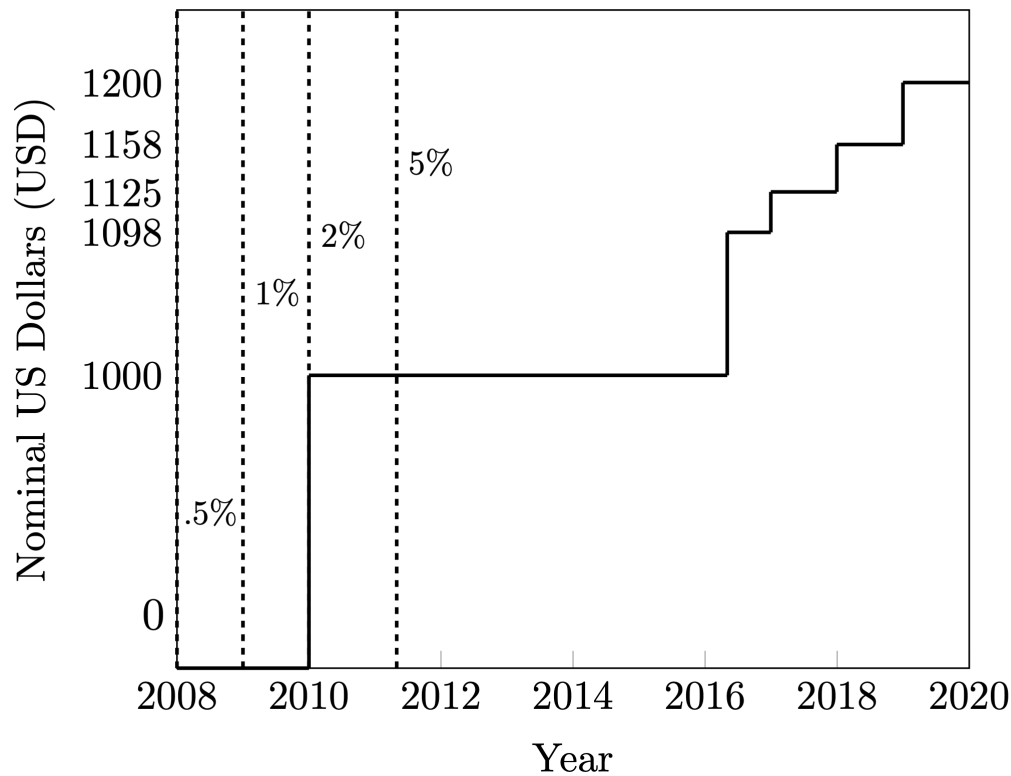
By focusing on the bunching at the threshold in the kinked outflows tax schedule among transactions involving deposits in foreign bank accounts, I turn to estimating the price reactivity of individuals making foreign bank account deposits. I start by isolating specifically bank account deposit transactions made by Ecuadorian manual personal income tax filers in tax havens.³² Here, I use the Tørsløv et al. (2020) list of tax havens, because the kinked tax obligation schedule does not have any legislative interaction with the

³⁰ The Ecuadorian tax authorities employ an anti-avoidance screening process to group together transactions strategically split to exploit the exemption threshold. For example, given a kink threshold of $K > 0$, three transactions of K US dollars each with the same parties executed within a month would be grouped together, thereby resulting in a non-zero ISD obligation from these transactions together. I also present evidence validating the tax authorities' efforts to mitigate transaction splitting.

³¹ The tax authorities apply this exemption schedule for all exits except credit and debit card transactions. Credit and debit card transactions use an alternate exemption regime based on the sum of annual activity by card, resulting in potentially high optimization frictions that may prevent bunching responses along this margin.

³² Since the kinked outflows tax obligation schedule is not specific to this group, there is some arbitrariness here. In principle, one can study other transaction purposes on the part of one of the other taxpayer groups. Indeed, future versions of this work will study corresponding bunching responses of corporations sending dividends abroad.

Figure 23: ISD exemption threshold (non-card transactions)



Note: this figure displays the evolution of the ISD rate and exemption threshold location over time.

Source: author's computation based on publicly available information on ISD legislation.

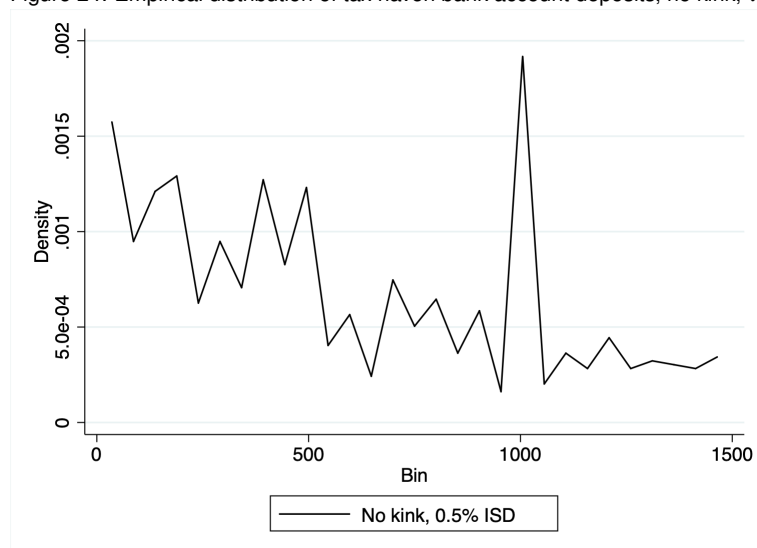
list of government-recognized tax havens; that is, this exercise seeks to estimate the tax-price response of demand for foreign banking services in the countries more typically considered tax havens.

Figure 24 displays the empirical distribution of bank account deposits in tax havens on the part of individual manual income tax filers. The distribution exhibits significant bunching at precisely US\$1,000 in spite of the ISD obligation schedule featuring no exemption threshold. This finding suggests the presence of round-number preference as an important source of bias, thus further motivating the use of a counterfactual distribution for elasticity estimation.

Figure 25 illustrates a substantial bunching to the imposition of a kinked exemption threshold. I identify net-of-tax-price elasticities of demand for offshore banking services in tax havens from the exemption schedule and changes in the location of the kink and in the ISD tax rate. The classical bunching estimator computes an elasticity based on the proportion of individuals bunching at a kink (as compared to an imputed counterfactual distribution) normalized by the proportion change in net-of-tax-price between above and below the kink:

$$\varepsilon = \frac{B/(K \cdot f(K))}{\ln\left(\frac{1-\tau_{K-}}{1-\tau_{K+}}\right)}$$

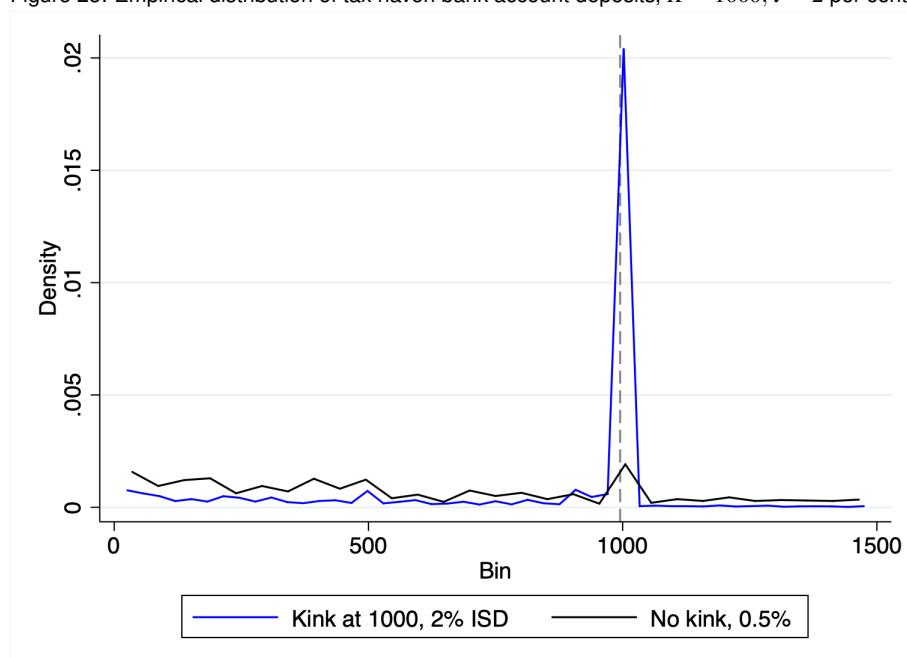
Figure 24: Empirical distribution of tax haven bank account deposits, no kink, $\tau = 0.5$ per cent



Note: transactions are aggregated from January 2008 to December 2008.

Source: author's calculation based on monthly aggregates of individual bank account deposits in tax havens.

Figure 25: Empirical distribution of tax haven bank account deposits, $K = 1000$, $\tau = 2$ per cent



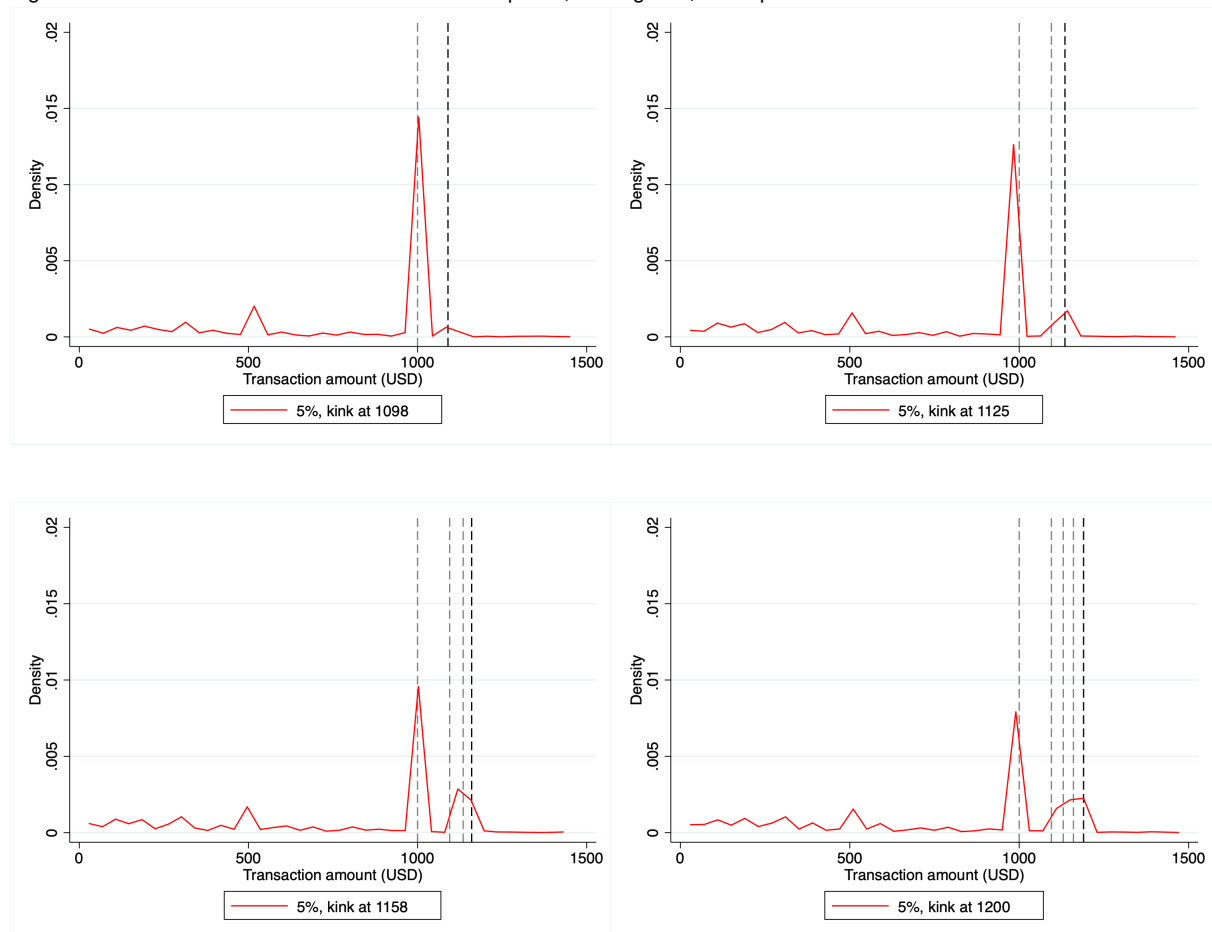
Note: this graph displays the empirical counterfactual distribution as observed during the no-kink, $\tau = 0.5$ per cent regime. The dashed grey line illustrates the location of the post-reform kink at US\$1,000.

Source: author's calculation based on monthly aggregates of individual bank account deposits in tax havens.

To estimate the classical bunching elasticity in this setting, I estimate a degree 11 polynomial counterfactual and compare the empirical bunching to this smooth interpolation. I also implement three other estimation strategies. To account for round-number bias, my second specification includes round-number bins that ex-ante may exhibit idiosyncratically high activity (Kleven 2016). The challenge of this strategy is that it accounts for round-number bias in an overly coarse manner, possibly overcompensating. As such, my preferred estimates use the pre-kink distributions of tax haven bank account deposits as true counterfactual distributions. The key benefit of this method is that, in the absence of a kink, any bunching at US\$1,000 can be attributed entirely to round-number preference, which can be accounted for tractably in a bunching setting.

Figure 26 displays the distributions of tax haven bank account deposits on the part of manual personal income tax filers under the subsequent ISD exemption schedules that are indexed to the annual inflation rate. The kink in each of these plots corresponds with three times the monthly minimum wage. This figure illustrates that while individuals do respond to the imposition of a new kink, via moving to each new exemption threshold location, a substantial mass of individuals inertially bunch at previous kink points. The optimization frictions seen here suggest that the elasticity estimates from bunching designs off of subsequent reforms will be somewhat attenuated.

Figure 26: Distribution of tax haven bank account deposits, moving kink, $\tau = 5$ per cent



Note: each panel displays the empirical distribution of tax haven bank account deposits under a certain kink regime, progressing chronologically. Dashed grey vertical lines display the previous kink locations, and the dashed black line displays the relevant kink threshold for each respective outflows regime.

Source: author's calculations based on bunching at ISD kink thresholds for manual personal income tax filer bank account deposits in one of the 55 Tørsløv et al. (2020) tax haven countries.

This exercise is characterized by several limitations. First, the counterfactual distributions prior to December 2009, while absent of a kink, are not true counterfactual distributions for the purpose of the

bunching exercise, in so far that, with a non-zero tax globally in the pre-reform period, there are individuals that move to bunch at the kink that were previously located below the threshold. For this reason, the distortions are less important for the 0.5 per cent counterfactual distribution, so that my preferred methodology uses the bank account deposit distribution under this regime (as opposed to under the $\tau = 1$ per cent regime). Thus, Table 8 displays preferred estimates the net-of-tax-price elasticity of demand for offshore banking services corresponding to between 0.8 and 1.1. Table A1 presents analogous results estimated for non-haven bank account deposits.

Table 8: Implied net-of-tax-price elasticities, bank account deposits in tax havens

	$K = 1,000, \tau = 2\%$	$K = 1,000$	$K = 1,098$	$K = 1,125$	$K = 1,158$	$K = 1,200$
Classical	6.757*** (0.096)	2.779*** (0.033)	0.022*** (0.002)	0.065*** (0.004)	0.087*** (0.004)	0.099*** (0.004)
Round number	0.405*** (0.001)	0.148*** (0.000)	0.024*** (0.002)	0.099*** (0.006)	0.133*** (0.007)	0.080*** (0.004)
Emp. distr. ($\tau = 0.5\%$)	1.121*** (0.140)	0.467*** (0.058)	0.172** (0.080)	0.262*** (0.071)	0.581** (0.274)	0.503** (0.229)
Emp. distr. ($\tau = 1\%$)	0.775*** (0.038)	0.323*** (0.016)	0.091*** (0.015)	0.372*** (0.075)	0.537*** (0.095)	0.250*** (0.035)

Note: each column represents the elasticity for a specific reform period (kink location K and ISD rate). Only the first column estimates elasticities using the kink under the $1 - \tau_{ISD} = 0.98$ regime; columns 2–5 all use the $1 - \tau_{ISD} = 0.95$ regime but with varying kink locations. Each row represents a different methodological specification. The classical bunching estimator is specified as in Saez (2010) and Chetty et al. (2011). The second row accounts for round-number bias using a dummy for round-number bins as in Kleven (2016). Rows 3 and 4 use the empirical distributions of tax haven bank deposits under their respective regimes as impure counterfactuals. Standard errors are estimated via bootstrap at the transaction level 100 times.

Source: author's calculations based on bunching at ISD kink thresholds for manual personal income tax filer bank account deposits in one of the 55 Tørsløv et al. (2020) tax haven countries.

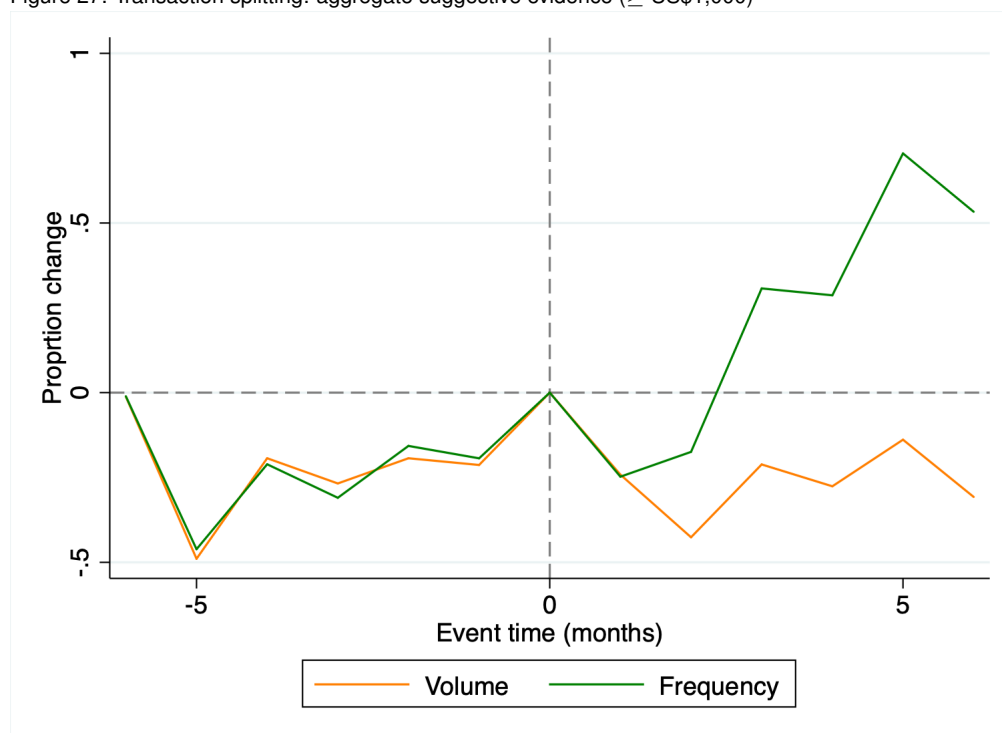
Additionally, given the low kink level, one may also voice concerns over the external validity of the bunching estimates in inferring the tax-price response of elusive behaviour through bank account deposits in offshore tax havens. That is, the bunching activity around the kink is of a fundamentally different nature in purpose than multinational tax strategy.

Importantly, the net-of-tax-price elasticity estimates face some threat to internal validity if, in spite of the efforts of the Ecuadorian tax authorities, individual transactors are actually splitting their transactions high above the threshold and locating the subsequently split transactions below the exemption threshold. The tax authorities state that repeated transactions by identical parties within a short time frame (typically one month) are grouped together, but the presence of such transaction splitting can be empirically investigated. Furthermore, even if the Ecuadorian tax authorities implement an anti-transaction-splitting screening process, individuals may misoptimize similarly to as observed in their inertial bunching behaviour along with the moving kink location. For the time being, I evaluate whether individuals are splitting their transactions using aggregate transaction data, but future versions of this work will study micro-level responses.

There exists some difficulty in falsifying the presence of transaction splitting using aggregate data. This is because above the kink one should observe a simultaneous decrease in transaction volume and no increase in transaction frequency, where below the kink both kinds of activity should exhibit movement in opposite directions.³³ Studying the evolution in activity around the kink thus corresponds with an ambiguous quantitative prediction. Figure 27 isolates transactions depositing greater than or equal to US\$1,000 and illustrates a modest decrease in total transaction volume along with an initial decrease in transaction frequency followed by a subsequent increase. In light of the ambiguity posed by the different scenarios here, it will prove important to pursue a more micro-level investigation of whether individuals are splitting transactions.

³³ That is, previously non-transacting individuals may be induced into transacting at lower levels in response to the imposition of a low exemption zone. Additionally, transactions previously below US\$1,000 may move upward towards the kink.

Figure 27: Transaction splitting: aggregate suggestive evidence (\geq US\$1,000)



Note: both volume and frequency are normalized with respect to December 2009 activity less one.

Source: author's calculations based on monthly aggregates of individual bank account deposits in tax havens of amount \geq US\$1,000.

7 Conclusion

The data and legislative environment of Ecuador provide a unique opportunity to learn about international tax strategy. The results here depict a picture of the distribution and magnitude of tax haven use in a middle-income, developing country setting. The environment also facilitates investigating the effectiveness of potential unilateral policies aimed at mitigating offshore tax haven use. I find that tax haven use is simultaneously relatively low in general among Ecuadorian income tax filers while highly skewed in use towards the highest earners. I find that the highest-earning taxpayers that engage in tax haven bank account deposits move over US\$100,000 per person annually to tax havens. Descriptive evidence also depicts how individuals and corporations engage in different use of tax havens and non-haven countries, where tax havens host demonstrably more potentially tax-elusive activity, such as provision of intangible goods and services and financial outflows.

Beyond depicting the joint distribution of economic activity and tax haven usage, I study the effectiveness of a unique policy aimed at unilaterally mitigating the amount of offshore tax strategy using fiscal havens by increasing the tax price of sending dividends to government-recognized tax havens. The results of this policy experiment have significant implications with respect to mitigating international tax evasion. Previous arguments have presented the case that, considering increasingly sophisticated international tax strategy and limited resources of national tax authorities, effective unilateral mitigation of offshore tax evasion may be impossible. Namely, that in response to unilateral action of a country against fiscal haven activity, individuals may engage in round-tripping activity that effectively circumvents legislation aimed at mitigating overall tax haven use.

However, the results here suggest that individuals increase domestic reporting following increases in the cost of directly transacting with tax havens. In particular, I demonstrate large decreases in corporate dividends and profit distribution outflows following a tax reform that disincentivizes sending dividends

to tax havens. Crucially, I also find that individual income tax filers ostensibly connected to those businesses sending capital income to tax havens in the pre-reform period both increased domestic capital income reporting and decreased their income tax deductions claimed. Through the progressivity of the income tax schedule, I also demonstrate that these individuals faced an effectively higher average income tax rate. The results here imply that countries can engage in unilateral action to effectively decrease tax-strategic use of fiscal havens. Estimates from a subsequent bunching design also demonstrate large tax-price responses of individuals in making bank account deposits in tax havens.

Future directions of this work should seek to substantiate the connection between individuals and corporate ownership so as to facilitate more comprehensive study of income-shifting tax strategy and the responses of likely tax haven users to incentives to use tax havens. In particular, similar work may leverage offshore leaks data, shareholder–company crosswalks, and global shareholder data to identify individuals likely engaged in offshore tax haven use. Moreover, careful comparison of individual outflows with income statements may allow researchers to take stronger stances on whether certain activity likely constitutes tax avoidance, tax evasion, or non-tax-strategic activity. Additional avenues will also study the descriptive characteristics of likely tax-sensitive individuals.

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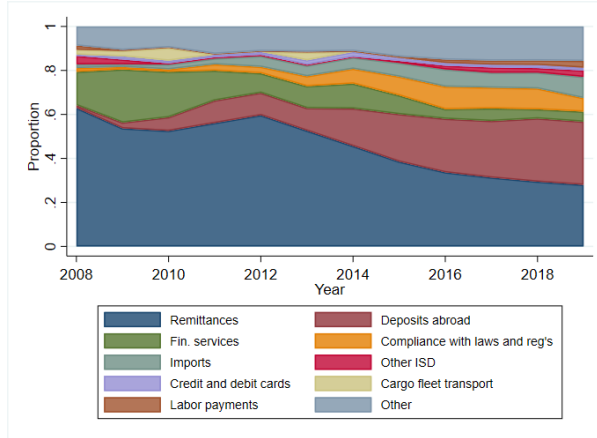
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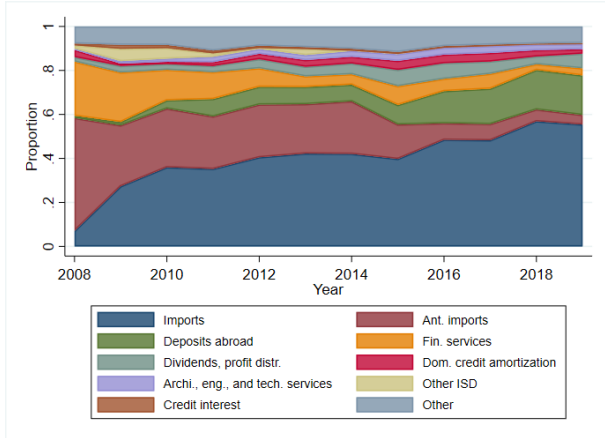
Appendix A: additional graphs and tables

Figure A1: Top outflows over time

(a) Corporations



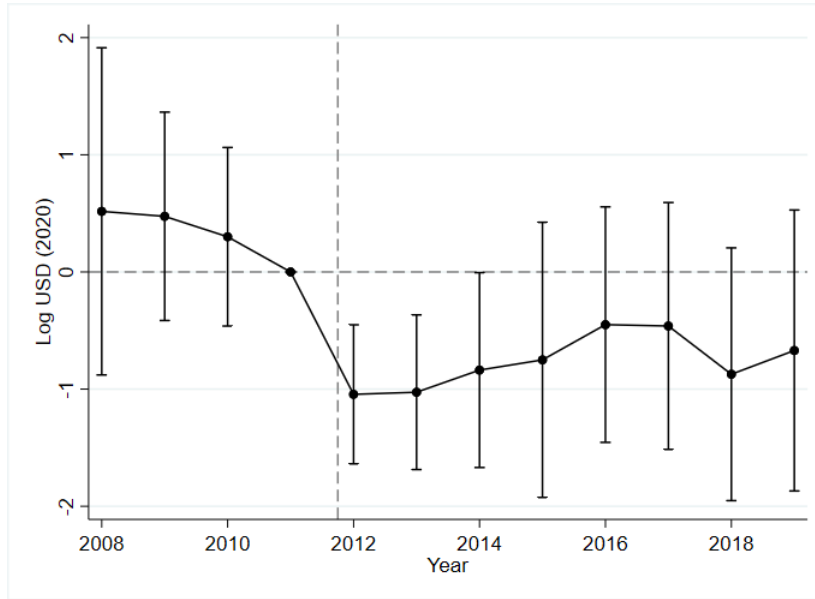
(b) Personal income tax filers



Note: this figure displays the evolution over time of the relative shares by volume of the top nine purpose bins for corporations and individual income tax filers separately. The top nine purpose bins are identified by summing and ranking all activity by purpose bin for 2008–20. The bin ‘Other ISD’ refers to bin 56 in Table C1 (constructed as an alternative to the other purpose bins in Table C1), and the bin ‘Other’ aggregates the activity in the purpose bins outside of the top nine by volume.

Source: author’s calculation based on MID data.

Figure A2: Dividend reform (log US dollars), transaction level



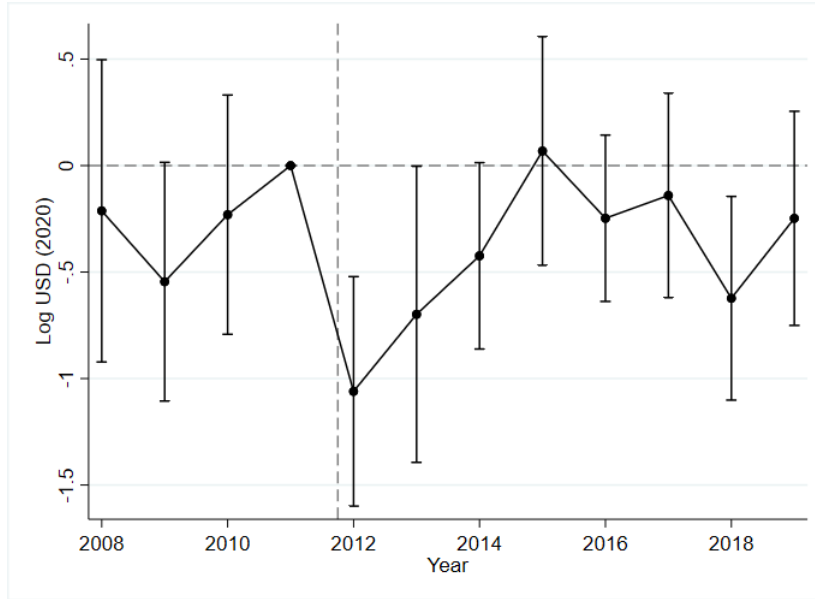
Note: this figure displays the simple annual difference-in-difference coefficients $\{\beta_k\}$ estimated from the reduced form

$$\log y_{ijt} = \beta_0 + \sum_{k=2008}^{2019} \delta_k \mathbb{1}\{Year_t = k\} + \gamma Haven_{jt} + \sum_{k=2008}^{2019} \beta_k \mathbb{1}\{Year_t = k\} Haven_{jt} + \varepsilon_{ijt}$$

with 2011 as the base period. Error bars represent 95 per cent confidence intervals based on firm-clustered standard errors.

Source: author’s calculation based on MID data.

Figure A3: Dividend reform (log US dollars), transaction level, firm fixed effects



Note: this figure displays the annual difference-in-difference coefficients $\{\beta_k\}$ estimated from the reduced form with fixed effects

$$\log y_{ijt} = \alpha_i + \gamma Haven_{jt} + \sum_{k=2008}^{2019} \delta_k \mathbb{1}\{Year_t = k\} + \sum_{k=2008}^{2019} \beta_k \mathbb{1}\{Year_t = k\} Haven_{jt} + \varepsilon_{ijt}$$

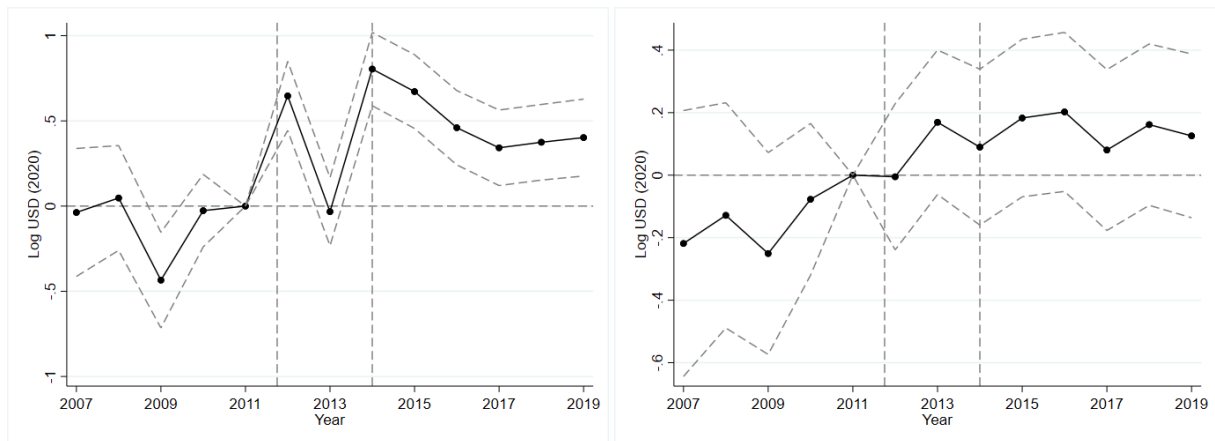
with 2011 as the base period. Error bars represent 95 per cent confidence intervals based on firm-clustered standard errors.

Source: author's calculation based on MID data.

Figure A4: Dividend reform impact on declared capital income, individual fixed effects

(a) Comparison to all taxpayers

(b) Comparison to non-haven transactors



Note: these graphs display the estimates $\{\beta_k\}_{k=2008}^{2019}$ from the above difference-in-difference specifications with individual-level fixed effects for evolution of reported capital income around the 24 November 2011 dividend reform, using individuals engaging in tax haven bank account deposits in the pre-period as a quasi-treatment group. In panel (a), the 'control' sample consists of all manual personal income tax filers not having made a financial transfer to a tax haven in the pre-reform period. Panel (b) restricts the control group to individuals making foreign bank account deposits or dividend payment/profit distributions in non-haven countries in the pre-reform period. Error bars represent 95 per cent confidence intervals based on individual-clustered standard errors.

Source: author's calculation based on MID data and Ecuadorian personal income tax return filings for 2008–19.

Table A1: Implied net-of-tax-price elasticities, bank account deposits in non-havens

	$K = 1,000, \tau = 2\%$	$K = 1,000$	$K = 1,098$	$K = 1,125$	$K = 1,158$	$K = 1,200$
Classical	1.844*** (0.022)	0.986*** (0.013)	0.043*** (0.005)	0.107*** (0.006)	0.088*** (0.005)	0.103*** (0.005)
Round number	0.262*** (0.002)	0.114*** (0.001)	0.037*** (0.004)	0.163*** (0.010)	0.132*** (0.008)	0.076*** (0.004)
Emp. distr ($\tau = 0.5\%$)	0.543*** (0.022)	0.299*** (0.012)	0.147*** (0.021)	0.883*** (0.144)	0.586*** (0.077)	0.195*** (0.018)
Emp. distr ($\tau = 1\%$)	0.988*** (0.031)	0.545*** (0.017)	0.223*** (0.028)	1.086*** (0.125)	0.624*** (0.064)	0.354*** (0.027)

Note: each column represents the elasticity for a specific reform period (kink location K and ISD rate). Only the first column estimates elasticities using the kink under the $1 - \tau_{ISD} = 0.98$ regime; columns 2–5 all use the $1 - \tau_{ISD} = 0.95$ regime but with varying kink locations. Each row represents a different methodological specification. The classical bunching estimator is specified as in Saez (2010) and Chetty et al. (2011). The second row accounts for round-number bias using a dummy for round-number bins as in Kleven (2016). Rows 3 and 4 use the empirical distributions of tax haven bank deposits under their respective regimes as impure counterfactuals. Standard errors are estimated via bootstrap at the transaction level 100 times.

Source: author's calculations based on bunching at ISD kink thresholds for manual personal income tax filer bank account deposits in non-haven countries (per Tørsløv et al. 2020).

Appendix B: proofs

In this section I develop proofs to the lemmas and propositions presented in the stylized model environment of Section 5, informing the theoretical foundations of taxpayers' responses to the tax haven financial outflows tax.

B1 Proof of Proposition 1

Proposition 1 follows simply as a result of the constrained optimization problem presented in Section 4. The taxpayer's utility can be expressed as

$$\begin{aligned} U(e_u, e_c) = & (1 - p_u)(1 - p_c) \cdot u \left((1 - \tau)y + \tau(e_u + e_c) - c(e_c) \right) + \\ & p_u(1 - p_c) \cdot u \left((1 - \tau)y + \tau e_c - \tau \theta e_u - c(e_c) \right) + \\ & (1 - p_u)p_c \cdot u \left((1 - \tau)y + \tau e_u - \tau \theta e_c - c(e_c) \right) + \\ & p_u p_c \cdot u \left((1 - \tau)y - \tau \theta(e_u + e_c) - c(e_c) \right) \end{aligned}$$

Differentiating this object with respect to concealed income yields the necessary condition for an interior solution:

$$\begin{aligned} \frac{\partial U}{\partial e_c} = & (1 - p_u)(1 - p_c) \cdot u'(Y_{0,0}) \cdot \left(\tau - \frac{\partial c}{\partial e_c} \right) + p_u(1 - p_c) \cdot u'(Y_{1,0}) \cdot \left(\tau - \frac{\partial c}{\partial e_c} \right) - \\ & (1 - p_u)p_c \cdot u'(Y_{0,1}) \cdot \left(\tau \theta + \frac{\partial c}{\partial e_c} \right) - p_u p_c \cdot u'(Y_{1,1}) \cdot \left(\tau \theta + \frac{\partial c}{\partial e_c} \right) \end{aligned}$$

with $Y_{E_u, E_c} := (1 - \tau)y + \tau(e_u(1 - E_u(1 + \theta)) + e_c(1 - E_c(1 + \theta))) - c(e_c)$, where $Y_{1,1} < Y_{1,0}, Y_{0,1}$ and $Y_{1,0}, Y_{0,1} < Y_{0,0}$. The second-order condition is satisfied by the concavity of the utility function.

At an interior optimum, this condition is set equal to zero:

$$\begin{aligned} (1 - p_c)(\tau - c_{e_c}) \left((1 - p_u) \cdot u'(Y_{0,0}) + p_u \cdot u'(Y_{1,0}) \right) &= p_c(\tau \theta + c_{e_c}) \left((1 - p_u) \cdot u'(Y_{0,1}) + p_u \cdot u'(Y_{1,1}) \right) \\ (1 - p_c)(\tau - c_{e_c}) \mathbb{E} \left[u'(Y_{x,0}) \right] &= p_c(\tau \theta + c_{e_c}) \mathbb{E} \left[u'(Y_{x,1}) \right], \end{aligned}$$

$$\frac{\mathbb{E} \left[u'(Y_{x,1}) \right]}{\mathbb{E} \left[u'(Y_{x,0}) \right]} = \frac{(1 - p_c)}{p_c} \frac{(\tau - c_{e_c})}{(\tau \theta + c_{e_c})}$$

The proof follows similarly (albeit more simply) for optimal unconcealed under-reported income:

$$\begin{aligned} \frac{\partial U}{\partial e_u} = & (1 - p_u)(1 - p_c) \cdot u'(Y_{0,0}) \cdot \tau - p_u(1 - p_c) \cdot u'(Y_{1,0}) \cdot \tau \theta \\ & + (1 - p_u)p_c \cdot u'(Y_{0,1}) \cdot \tau - p_u p_c \cdot u'(Y_{1,1}) \cdot \tau \theta \end{aligned}$$

so that

$$\frac{\mathbb{E}[u'(Y_{1,x})]}{\mathbb{E}[u'(Y_{0,x})]} = \frac{(1-p_u)}{\theta p_u}$$

B1.1 Proof of Lemma 1

Suppose by contradiction that $\tau < c_{e_c}$. At an interior optimum, the taxpayer satisfies the first-order necessary condition with respect to concealed funds:

$$\underbrace{(1-p_c)}_{>0} \underbrace{(\tau - c_{e_c})}_{<0} \underbrace{\mathbb{E}[u'(Y_{x,0})]}_{>0} = \underbrace{p_c}_{>0} \underbrace{(\tau\theta + c_{e_c})}_{>0} \underbrace{\mathbb{E}[u'(Y_{x,1})]}_{>0}$$

such that the equation cannot be satisfied. Therefore an interior optimum requires that $\frac{\partial c(e_c^*)}{\partial e_c} \leq \tau$.

Appendix C: data administration

Table A1: 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	Intra-group trade
32	Dividends/profit distributions	66	Temporary operations
33	Credit interest	67	Consular collections
34	Return on fin. investment		

Source: author's construction.