THE MARKET FOR TAX HAVENS*

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Abstract

I investigate the determinants and consequences of the development of tax havens using a novel database that tracks the creation and development of offshore institutions in 48 tax havens. After describing the development of tax havens in the 20th century and several key empirical patterns, I explore their causal determinants. Building on the idea that tax havens are the suppliers in the market for offshore services, I show that demand shocks explain why countries become tax havens. I also find that competition shocks explain why tax havens update their regulations. This reaction is facilitated by the diffusion of legal technologies between tax havens. Finally, I show that becoming a tax haven generates GDP per capita gains and sectoral reallocation in countries adopting this status. In return, the tax structure of non-haven countries is affected by the rise of tax havens, resulting in an increased tax burden on labor relative to capital.

Keywords: Tax Havens, Taxation, Regulatory Competition, International Taxation, Tax Avoidance, Tax Evasion.

JEL codes: H26, H73, H87, F39, N40

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1 Introduction

Tax havens are one of the most important economic phenomenon of the recent globalization. Despite being non-existent in the 19th century, there are now almost 50 tax havens in the world, ranging from small islands in the Caribbean, Indian and Pacific Oceans, or wealthy city-states such as Singapore or Hong Kong to developed countries such as Ireland, Switzerland, and the Netherlands. Tax havens are small countries, primarily located at the periphery of large markets, that offer opacity and low level of taxation to individual and corporations. They have a strong influence on tax revenues collected from both individuals (Zucman, 2013 and Alstadsæter et al., 2018) and firms (Hines and Rice, 1994, Torslov et al., 2022, Garcia-Bernardo and Janský, 2022 or Ferrari et al., 2022). Because they facilitate tax evasion and tax avoidance, tax havens also affect tax morale (Luttmer and Singhal, 2014, Besley et al., 2023), and the optimal tax policy (Piketty et al., 2014). On top of these effects on public finance, several studies have documented their impact on various socio-economic outcomes such as inequalities of income and wealth, or the capture of rents by elites. [1]

In this paper, I investigate the determinants and consequences of tax havens. I build on two main ideas. The first one is that tax havens result from the building of an *offshore legal architecture*, *i.e.*, legal, political and economic institutions that allow these countries to provide offshore services. The concept of legal architecture is useful to illustrate that enacting a set of offshore regulations is a necessary condition to be a tax haven, beyond having low tax rates. An offshore legal architecture is composed of blocks, that I call *legal technologies*, that reflect tax havens' specialization. Legal technologies are the legal tools that allow tax havens to supply offshore services such as banking secrecy or tax-exempt trusts, in exchange for the payment of a low tax rate or a fee. [2] To become a tax haven, a country must introduce an offshore legal technology through a legal reform. Once a country is a tax haven, its legal architecture can be updated to attract more demand or to adapt to new regulations in non-haven countries. Based on this idea, I collect data about the offshore legal architectures' reforms of 48 tax havens, identifying when these countries became tax havens (*extensive margin*) and when they updated their legal architecture (*intensive margin*). My primary sources are tax haven guidebooks written by tax lawyers. I complement them with a wealth of sources ranging from academic papers to advertising brochures from offshore service providers. To my knowledge, this dataset is the first to provide a time-varying account of the existence and evolution of tax

1. Zucman (2013) and Guvenen et al. (2022) have shown that tax havens affect the measurement of macroeocomic aggregates. They also affect the measurement of inequalities (Alstadsæter et al. (2019)), of portfolio holdings (Coppola et al., 2021), of corporate control (Fonseca et al., 2023), and allow the avoidance of financial risk regulation (Alfaro et al., 2020). Additionally, they are used by elites to capture revenues (Andersen et al., 2017, Andersen et al., 2022) or to avoid regulations (see Kollewe, 2022 on sanctions against Russia), thereby generating detrimental effects on the perception of government and elites in many countries (Louis-Sidois and Mougin, 2020 and Guriev et al., 2021).

2. It is often assumed that providing secrecy does not come with tax revenue collection. However, the users of offshore entities generally pay fees: *e.g.* registering a trust in the Cayman islands costs $500 at registration and $500 in annual fees. Hence, the offshore sector (*Financial Services Licenses* in the official terminology) accounted for 33% of Cayman's tax revenues in 2020 (Government of the Cayman Islands, 2021).

havens, while the literature generally relies on a constant tax haven indicator variable (Slemrod, 2008, Dharmapala and Hines, 2009).

The second main idea is that tax havens can be studied through the lens of market forces. They are the key suppliers in the market for offshore services. On the other side of this market, the demand comes from tax evaders in non-haven countries that seek low tax rates, advantageous regulations, and secrecy. The market environment, such as demand shocks, supply shocks or competition, will therefore affect the incentives of countries to enter this market by becoming tax havens. Based on this idea, I study the impact of demand and supply shocks on tax havens' legal architecture, both at the extensive and at the intensive margin.

I first study demand shocks. I show that the demand for tax haven services has strong geographical determinants. Using leaked data from the Offshore Leaks about more than 800,000 offshore entities opened in tax havens (ICIJ, 2022a), I estimate a gravity equation and find an elasticity of the use of tax haven entities with respect to distance equal to one. I use this geographical variation to proxy the differential exposure of countries to demand shocks. Hence, I construct the demand for offshore services addressed to a country i as the average level of taxation in foreign countries weighted by (a function of) their distance to country i and their size. Intuitively, a country like Switzerland will receive more offshore demand from France than from a country further away like India and it will receive more demand from the U.S. than from an equally-distant but economically smaller country like Canada.

In a regression framework, I explain the tax haven status of a country or its probability of passing a new reform by the level of demand it receives interacted with its size. This interaction with size comes from the fact, already discussed theoretically by Hansen and Kessler (2001) or Slemrod and Wilson (2009), that only small jurisdictions have an incentive to become tax havens. Intuitively, this is the case because developing the offshore sector crowds resources out of the productive sector. When the productive sector is small, like in the Cayman Islands for instance, losses in this sector are compensated by gains in the offshore sector. On the contrary, when the productive sector is large, the gains in the offshore sector do not compensate for the losses. This is because these gains are largely independent from country size since using a tax haven generally excludes real activities.

To circumvent potential endogeneity, I predict the level of taxation in a country using changes in the level of democracy and in the ideology of the head of government. These variables affect domestic taxation policies (Kiser and Karceski, 2017) while they are arguably independent from different endogeneous factors. For instance, reverse causality concerns are addressed as long as these variables are independent from tax havens' policies. In addition, I test for the correlation of these variables with potential confounding factors such as economic shocks, globalization shocks, or liberalization shocks and find no link between them. Then, I construct the IV for demand using the level of taxation predicted by these variables. I confirm the OLS results and find that increasing demand by one standard deviation increases the probability that a very small country becomes a tax haven by 97%. This probability decreases with country size and becomes nil for

countries at the 24^{th} percentile of size. Importantly, I find that demand particularly matters for the first reform (extensive margin) rather than for other reforms (intensive margin), for which its impact is small and not significantly different from zero.

Given that demand shocks do not explain the variation in reforms in countries that are already tax havens, I investigate their sensitivity to supply-side shocks. I leverage the quasi-natural experiment of decolonization that is plausibly exogenous to the level of supply and demand for offshore services and that increased the number of tax havens competing with each other. The links between the British colonial world and the offshore world have been discussed in several historical contributions (Sagar et al., 2013, Ogle, 2017, Sævold, 2022). Using an event study design, I show a sizeable impact of becoming independent from the U.K. on the number of offshore tax reforms. Hence, independence waves can be used as exogenous events that spurred the adoption of offshore reforms in newly decolonized countries and then increased competition between tax havens.

To my knowledge, the role of competition between tax havens has not been explored empirically before. I first show that increased competition pushes tax havens to update their legal architecture, akin to firms updating their products in response to increased market competition. This effect is the result of two opposite forces. An increase in competition decreases rents in the market, which should discourage reforms. At the same time, it also increases information about the legal technologies available. Indeed, the introduction of a legal technology in a foreign countries provides insights on how to design it from a legal point of view, and also about its effectiveness, hence decreasing investment costs in this legal technology. This channel is illustrated by the fact that some tax havens copy-pasted their offshore laws from other countries (for instance this is the case of several Pacific tax havens in the 1980s as noted by Palan et al., 2009). In line with this channel, I show that tax havens reacted to the competition shock by adopting the same legal technology as their neighbors, suggesting a spatial diffusion of offshore reforms, in particular when their implementation cost is small. This result highlights the essential role of legal technologies in tax havens' dynamics. Besides, it helps understanding tax havens' dynamics when they face negative shocks to their rents, which also happens when anti-tax haven regulation is strengthened in non-haven countries.

Finally, I study the consequences of tax havens. When one dollar of tax base is evaded to a tax haven, this is neutral from an accounting point of view at the world level: the reduction in tax revenues in the non-haven country is offset by an increase in tax revenues in the tax haven and a rise in private (post-tax) income. This would, however, ignore externalities associated with government revenue. Additional tax revenues in tax havens may spur economic development, increased private income might influence investment in the tax haven or in the non-haven country, and lost tax revenues in non-haven countries could negatively impact their GDP. On top of this, non-haven countries can react by endogenously adapting their tax policies, as shown in the tax competition literature (Keen and Konrad, 2013).

I first show that becoming a tax haven positively impacts GDP per capita using an event-study framework and a generalized synthetic control method (following Liu et al.,

2022). [3] The findings reveal positive growth gains of 3.4 percentage points annually over 10 years, resulting in a 40% long-term increase compared to non-haven counterparts. Furthermore, I provide evidence that this result captures changes in the real economy by demonstrating that new tax havens transition away from the agricultural sector.

Then, I explore the impact of tax havens on non-haven countries. Building on the assumption that exposure to a tax haven is function of geographical distance, I find that tax havens, on average, do not significantly affect GDP and total tax revenues in non-haven countries. However, tax havens durably affect the tax structure of other countries. Countries exposed to tax havens shift the burden of taxation from capital to labor, with important implications for economic inequalities. Tax revenues losses from the use of tax havens by mobile agents are compensated for by an increase in the taxation of less-mobile agents, keeping total tax revenues unchanged. In sum, I argue that tax havens can be analyzed as a revenue-neutral subsidy of mobile agents financed by a tax on immobile agents.

Finally, these three results about demand, supply and consequences are rationalized in a conceptual framework inspired by the literature on legal capacity building (Besley and Persson, 2011). It studies the decision of a government to become a tax haven given its own characteristics, the external demand for tax haven operations and competition in the market for offshore services. It also supports the use of geographical variation to identify these three effects.

This paper is related to several strands of research. One of its key contribution is the construction of a novel dataset of offshore reforms in tax havens. It is the first attempt to follow the tax haven status of many countries across time. Providing temporal and spatial variation also enables the use of causal inference methods, in particular the generalized difference-in-differences (de Chaisemartin and D'Haultfœuille (2023)). This approach complements the more descriptive approaches from history or political science (see Palan et al., 2009, Ogle, 2017, 2020, Hollis and McKenna, 2019, or Farquet, 2021 for general approaches; for country-specific approaches see Guex, 2021 on Switzerland, Rawlings, 2004 on Vanuatu or van Beurden and Jonker, 2021 on Curaçao) and allows for quantitative comparative history of tax havens. Zucman (2015) provides an interesting approach by constructing a long-run series of offshore wealth held in Switzerland. Here, I follow a different approach and bring more representativity regarding the supply of offshore services: I cover different countries that become tax havens at different times and places, and using different legal technologies. This general approach makes it possible to exploit different sources of variation and to find common factors to the rise of tax havens. It also allows me to provide new descriptive evidence on the emergence of tax havens in the 20th century on a global scale. This new database will also be useful to future research by enabling more panel data analysis of tax havens. In terms of data sources used, my paper also contributes to a scarce literature that uses and analyzes

3. This approach speaks to a recent literature that uses synthetic controls to estimate the causal impact of historical events on country-level GDP (Abadie et al., 2015, Billmeier and Nannicini, 2013, Funke et al., 2022 for instance).

micro-level data from the Offshore Leaks.[4] Using this data, I am the first to document that offshore use follows a strong gravity pattern and to link Offshore Leaks data to reforms in tax havens.

Second, my paper is related to the public finance literature that studies the role of tax havens in the world economy (Palan et al., 2009, Zucman, 2014, 2015, or Hebous, 2014). The tax haven literature is generally interested in the contemporaneous effects of the use of tax havens on non-haven countries. However, the determinants of tax havens and their domestic consequences are less studied. Some theoretical papers in the tax competition literature are interested in the causes of tax havens (Kanbur and Keen, 1993, Hansen and Kessler, 2001, Slemrod and Wilson, 2009). On the empirical side, few papers study the determinants of tax havens. An exception is Dharmapala and Hines (2009) who study the correlation between governance institutions and the tax haven status using cross-sectional data. They argue that better-governed countries are more likely to be tax havens and that this is likely driven by initial higher governance in tax havens. My paper is different as it insists on the role of market forces on tax havens' reforms. Besides, I construct a novel database that allows me to study a broader range of potential causes, and propose a causal analysis. By analyzing tax havens through the lens of the market for offshore services, I propose a unifying framework to understand them. To the best of my knowledge, this analysis is the first attempt to establish a causal link between the rise in demand and new tax havens reforms.[5] In my paper, demand is identified thanks to geographic variation in tax rates. This is connected to recent papers insisting on the importance of gravity links between high-tax countries and tax havens (see for instance Ferrari et al., 2022). I also show the importance of competition between tax havens, which has been mostly overlooked in the literature. Even if taken into account in some theoretical frameworks (Slemrod and Wilson, 2009 or Johannesen, 2010 for instance), only Elsayyad and Konrad (2012) focus their argument on it. By affecting rents, competition between tax havens pushes them to adapt by reinforcing their legal architecture, which is made possible by legal technology innovations. I insist on the importance of these legal tools and show their key roles in tax havens' dynamics.[6] From a policy point of view, these mechanisms are important to understand the consequences of international tax reforms. These reforms should aim at preventing legal innovations from tax havens by increasing the costs of potential new legal technologies.

I also contribute to the literature that studies the consequences of tax havens. The impact of being a tax haven on GDP has been studied by Hines (2005) and Butkiewicz and Gordon (2013). They provide suggestive evidence of a positive impact on GDP. On the contrary, Miethe (2020) does not find a direct link between financial activity and local activity in tax havens, but he does not use shocks to tax havens' financial activity to

4. To my knowledge, the only other examples of papers that use the Offshore Leaks database systematically are Omartian (2017) and Garcia Alvarado and Mandel (2022). In addition, leaks from tax havens have been used by Alstadsæter et al. (2019), Bomare and Le Guern Herry (2022), Brounstein (2021) or Londoño-Vélez and Ávila-Mahecha (2022), Johannesen et al. (2022) to match the leaked data with administrative wealth records.

5. While Desai et al. (2006) discuss the "demand for tax haven operations", their paper is mostly interested in who demands tax havens operations rather than its consequences on tax havens.

6. This approach is also linked to the study of policy diffusion. See for instance Shipan and Volden (2008), Cao (2010), Zhukov and Stewart (2013), Elkink and Grund (2022), or DellaVigna and Kim (2022).

establish this result. Using a time-varying tax haven variable and recent methodological innovations for two-way fixed effects models, I document a causal impact of becoming a tax haven on GDP per capita. Importantly, my paper is also the first to study the long-term consequences of tax havens by looking at the moment when countries become tax havens. My results demonstrate that while tax havens do not necessarily affect GDP per capita or total tax revenues in non-haven countries, these countries make up for their tax losses by increasing the burden of taxation of labor, a less mobile factor than capital. This result suggests that tax havens have long-term consequences on other countries' tax structure, which in turn affects inequality. This adds to the finding of Alstadsæter et al. (2019) that tax havens reinforce inequalities because their use is concentrated in the top of the wealth distribution. This finding also complements the papers that study the role of globalization and tax competition on countries' tax structure (Antràs et al., 2017, Egger et al., 2019, Bachas et al., 2022, Ferey et al., 2023, Thunecke, 2023). Finally, it echoes the finding of Bilicka et al. (2023) that the municipal tax structure in Germany is affected by the presence of tax-avoiding firms.

Finally, my paper contributes to the large literature about the links between institutions, taxation and development (Schumpeter, 1954, Besley and Persson, 2011, Martin and Prasad, 2014). In this vein, it is part of the literature that underscores the pivotal role of the law in shaping economic outcomes (La Porta et al., 1998, La Porta et al., 2008, Pistor, 2019). This paper not only demonstrates the impact of tax institutions on the domestic development of tax havens but also sheds light on the cross-border influence of a country's legal institutions within the context of globalization (Aidt et al., 2021). These findings also contribute to the regulatory competition literature, drawing parallels between tax havens and other forms of regulatory competition. Notably, the concept of legal architecture, explored in the context of tax havens, holds potential for extension to diverse forms of regulatory competition. Moreover, the examination of the construction of tax havens' legal architecture through a market lens offers broader applicability. This analytical framework can be extended to the study of competition for capital in general (Genschel and Schwarz, 2011, Keen and Konrad, 2013), new forms of tax competition (Flamant et al., 2021), environmental considerations such as pollution havens (Copeland, 2008), subsidy competition (Ossa, 2015, Slattery, 2018), and the provision of legal opacity (Moreau-Kastler and Toubal, 2021).

The rest of the paper is constructed as follows. Section 2 provides more institutional details and describes the construction of the data. Section 3 presents three stylized facts about the development of tax havens. Section 4, presents a conceptual framework that studies the incentives to become a tax haven. In section 5, I study the role of demand shocks on the development of tax havens. Section 6 studies the role of competition between tax havens, and section 7 provides new results on the impact of becoming a tax haven on GDP per capita. Section 8 concludes.

2 The legal architecture of tax havens

I construct a new dataset about the construction of the offshore legal architecture of current tax havens. A country-by-country description of the construction of the dataset is provided in the Online Data Documentation. I use both qualitative and quantitative information to understand how countries become tax havens. The new dataset is the result of a careful analysis and classification of the legal environment of tax havens. The existence of specific laws is necessary to the tax haven activity of a territory as it provides stability and predictability to its users. My methodology is new and relies on a limited set of public information that is observable by the researcher. It also recognizes the fundamental role of law in wealth-creation processes (Deakin et al., 2017, Pistor, 2019).

This data collection is motivated by the lack of time-varying, detailed and measurable information about tax havens. There are at least four reasons for this. First, tax havens operate secretly and do not disclose essential information on their activities as offshore centers. Second, many tax havens are small countries with small statistical offices or territories depending on other jurisdictions. Third, the extent of comparability across different sources and over a long period is limited. Fourth, until now, researchers have mainly focused on tax haven's tax rates. These rates are often tailored to specific offshore structures and generally differ from the statutory tax rate (except when this rate in 0% for any activity). Archival information on these rates is difficult to collect and harmonize for the reasons cited above.

Institutional Context. Before describing in details the construction of the database, I make explicit the institutional context that underlies it. Following Ogle (2017)'s terminology, the *legal architecture* of a tax haven is the set of laws that provide legal instruments to supply offshore services. Low or no tax rates for specific types of incomes is a necessary condition to become a tax haven.[7] However, it is not a sufficient condition as an offshore legal architecture is necessary to provide tools to create secrecy, provide flexibility and blur the links between ultimate wealth owners and their offshore assets and revenues. It is only at this condition that an individual can benefit from the tax haven features of a country while not being caught by its origin country. For instance, Switzerland's bank secrecy law of 1934, that is central to its offshore legal architecture, was enacted partly to prevent foreign authorities from accessing details about Swiss bank activities following a tax scandal where French authorities pressured Swiss banks for information (Guex, 2000).[8] The legal architecture of tax havens is specifically designed to circumvent high-tax countries' regulations.[9] The new dataset informs on the development of such an architecture and on the rise of tax havens.

7. Note that having a low tax rate on all types of income is not necessary. Some tax havens can have large tax rates for incomes not covered by their specialization as tax havens.

8. New Caledonia, a French territory in the Pacific, offers an other interesting example of the importance of the legal architecture, beyond low tax rates. New Caledonia was a no-tax jurisdiction but France was reluctant to make it a tax haven (Rawlings, 2004). As a consequence, offshore legal technologies have never been developed there, and it has never been considered as a tax haven despite its advantageous tax regime.

9. See for instance the case of the Cook Islands described in Harrington (2016).

This reliance on the concept of legal architecture is based on the idea that law is a central determinant of economic processes and institutions. This view is based both on the work of legal scholars (see for instance the analyses of Deakin et al., 2017, and Pistor, 2013) and on a vast economic literature which studies the way in which variations in legal systems and rules affect economic and social outcomes (La Porta et al., 2008). In particular, Pistor (2019) argues that the law is what gives assets their capacity to create wealth and what protects the wealth created by assets. This is exactly what happens with tax havens: they design laws to allow offshore users to create and protect their wealth by shielding assets and revenues from the tax authorities of non-haven countries. This is precisely what constitutes their legal architecture.

Tax havens can use many legal technologies to build their legal architecture. For instance, one of the most prominent examples is International Business Companies (IBCs, hereafter). IBCs can have only one founder, shareholder, and director who can be the same person and do not need any annual meeting. They are tax-free and require limited reporting and disclosure (e.g., financial statements are not necessary, and incorporation documents do not include the identity of the company's ultimate owners). The only condition for registering an IBC is that it cannot have any domestic activity. The history of the British Virgin Islands, especially the *International Business Companies Act* of 1984, has proven the profound role of IBCs in the transformation of the island and other countries into tax havens. Within a few years, the British Virgin Islands became a leader in offshore company registration, with more than 130,000 IBCs registered in 1994, representing almost half of the market (Darius and Williams, 1997).[10] Trusts, exempt corporations, or holdings are other examples of offshore legal technologies.

The legal reforms implementing these technologies are the main building blocks of the legal architecture of a tax haven. Many different types of reforms are available to tax havens, determining their offshore specialization. Table 1 summarizes the different types of laws that I record. I classify them into five broad categories that follow their different possible uses. There are the legal technologies, such as trusts, that are used to directly circumvent personal taxation ("Personal"). Other types of technologies target firms to allow them avoiding corporate taxation ("Corporate"). However, in a world where a large share of income consists of business income or capital income, the frontier between personal and corporate taxation is thin and opens optimization and evasion opportunities (Love, 2021).[11] Some technologies widely implemented by tax havens are classified as "Dual" as they are equally used to circumvent corporate and personal

10. The importance of IBCs is recognized both by scholars (Palan et al., 2009 or Harrington, 2016 for instance) and professionals (see for instance Riegels, 2014 from the offshore law firm Harneys). In 2014, Appleby, a leading international law firm incorporated in Bermuda, wrote a blog post to celebrate the 30th anniversary of the law, recognizing that "one would be hard-pressed to find an example of a similar law that has had such profound and positive implications for the jurisdiction in which it was promulgated." (Kirk, 2014).

11. This is the problem of income shifting across the individual tax base and the corporate tax base. Gordon and Slemrod (1998) have documented its existence in the U.S. since at least 1965. Smith et al. (2019) estimate that three-quarters of U.S. S-corporation business income (a specific legal form of corporation in the U.S.) is actually wages. Income shifting across tax bases has also been documented in other empirical settings, see for instance Harju and Matikka (2016) or Alstadsæter and Jacob (2016).

taxation. It is for instance the case of IBCs that create tax-exempt companies with limited administrative requirements and high secrecy.

For offshore strategies to work efficiently, the tax avoider must maintain secrecy and hold its offshore revenues and wealth in a bank. Offshore banking therefore greases the wheels of the offshore industry. It is classified apart as it appears complementary to other types of technologies because it allows individuals and firms to hold revenues in offshore banks while maintaining secrecy on their identity thanks to the banking secrecy. Finally, the "Other" category includes regulations that do not follow the most classical categories, illustrating the diversity of options that countries have to become tax havens.

In sum, my approach relies on the reforms implemented by tax havens to build and develop their legal architecture. A potential downside of this approach is that the supply of tax haven services may not be mediated through new regulations or that my data collection might miss some significant laws. This latter case is especially relevant for countries with a long and complex offshore history. It also occurs when tracking legislation in federal countries, where offshore legislation can be enacted at sub-national levels (see for instance the case of Switzerland, described in Guex, 2021). Note that it is the case for a very limited number of countries among tax havens. In this case, one advantage of my approach, which can alleviate this bias, is that it relies on reports written by tax lawyers that advise potential users of tax havens. It allows me to include in my sample only laws that the users perceive to be the most relevant if one wants to use a tax haven. In particular, the laws not reported might not be of high importance in building the tax havens' legal structure.

A second potential limitation is that the introduction of new legal technologies through reforms does not directly capture the supply of tax haven services but only the legislation that allows it. For instance, tax havens can write laws that are not followed by an increase in the production of tax havens' services because of poor quality for instance. Importantly, at the end of this section, I show evidence that new reforms causally increase (on average) the supply of tax havens services. Besides, the purpose of this database is to record the construction of offshore institutions in tax havens through their legal architectures. In this regard, it is crucial to record any important law, even of low quality, as it marks a significant change in the willingness of a country to be a tax haven.

Construction I collect new data on major reforms undertaken by tax havens to build their legal architecture. The dataset informs on reforms that made countries tax havens (the extensive margin) and on subsequent reforms, which update their legal architecture (the intensive margin). Countries may update their legal architecture to reinforce existing legal technologies or create new opportunities for offshore users by introducing new technologies.

The dataset includes 50 jurisdictions covering different types and sizes of tax havens worldwide. These countries constitute today the bulk of offshore services providers. It closely matches the tax havens' list used in the literature. Appendix Table A.1 lists the countries included as tax havens in this paper and Appendix Figure A.1 shows them on a world map. It also compares this list to eleven other lists aggregated by Palan et

Table 1 – Types of legal technologies

Category	Legal Technology	Description	Examples
Individual 38 reforms	- Trust laws (⋆)	Allow legal disconnection between asset use and ownership	*Turks and Caicos Islands' Trust Ordinance 1990*
	- Other (⋆)	Tax abolition for instance	*Monaco's Abolition of personal income taxes 1869*
Corporate 37 reforms	- MNE	Attraction of MNEs activities and profits	*Ireland's Export Profits Tax Relief 1956*
	- Holding	Special regimes for holding companies	*Luxembourg's Loi sur le régime fiscal des sociétés de participations financières (Holding companies) 1929*
	- Offshore Insurance and Captives	Self insurance allowing revenue transfers to tax havens	*Barbados' Exempt Insurance Act 1983*
	- Flag of convenience	Limited regulations and tax rates for ships registered in an offshore maritime registry.	*Panama's Law/63 on foreign Ships Registration*
Dual 65 reforms	- IBC	Tax-neutral companies with no domestic activities and limited legal requirements	*British Virgin Islands' International Business Companies Act 1984*
	- Other exempt companies	Similar as IBC	*Jersey's 1940 Corporation Tax Law*
Banking 38 reforms	- Offshore banking (⋆)	Unregulated banks with limited taxation and legal requirements	*Anguilla's Banking Ordinance, 1991*
	- Bank secrecy (⋆)	Protects account holders from investigations	*Switzerland's Banking Act, 1934*
Other 16 reforms	- Tax treaties (⋆)	Limit bilateral taxation, allow conduit entities to benefit from treaties	*Netherlands Antilles' tax treaty with Netherlands (Belastingregeling Koninkrinjk) 1964*
	- Specific regulations (⋆)	Country-specific rules, not classified elsewhere.	*Bahamas' Hawksbill Creek Agreement 1955*

Note: This table classifies reforms by legal technology and broad category. The number displayed after the category name counts the number of reforms that have been adopted in each category at the end of the sample in 2000. The total exceeds the number of reforms recorded in the database as some reforms belong to several categories. Legal technologies highlighted with the symbol ⋆ are grouped together within a broad category to form a subcategory.

al. (2009). These lists of tax havens were established by different institutions and for different purposes between 1977 and 2008. Except for Costa Rica, which is absent from the list of this paper, it covers all tax havens mentioned in at least 4 of the 11 sources. [12] The data collection stops in 2000 as it marks the end of the expansion of tax havens and the beginning of a phase of regulation in high-tax countries (Sharman, 2019).

The construction of the dataset relies on a wealth of information provided by the *Guide Chambost des Paradis Fiscaux* (Chambost, 2000) and the *Guide Mondial des Paradis Fiscaux* (Beauchamp, 1992). [13] Both books scrutinize the legal architecture of tax havens and carefully describe their different possible uses. They provide a detailed description of laws and regulations that allow a potential tax evader to move its assets and revenues to the territory. Both guides describe the banking system meticulously along with the existence *de jure* or *de facto* of banking secrecy. The authors also provide information on the territory – geography, population, economy, living cost, history and political system.

For each country, I collect the key dates that the authors identify as important in the construction of the country's offshore legal architecture. I then compare these dates between both sources to ensure that any date obtained can be perceived as significant. This alleviates the potential bias of relying on only one source. This is also done to recover information about some regulations when the original text is not precise enough. Indeed, both sources often do not provide the same information. For instance, one source might not identify the original legal technology, might give the name but not the date of the regulation, might be imprecise about some regulations, or might not cover a regulation covered in the other source. For some countries, especially minor tax havens, descriptions are shorter, and information might be missing.

To deal with these issues, I cross-check these sources and collect more information using external sources such as the guides written by Starchild (1994) and Barber (2007) and different editions of Doggart (1975)'s guide to tax havens. I also rely on academic papers on specific countries or regions (Mendis et al., 2002 and Fossen, 2002 provide important and useful information for the Caribbean and Pacific tax havens). Palan et al. (2009) provide additional information on several tax havens. I also use information from various *Financial Secrecy Index*'s reports (Tax Justice Network, 2020). Finally, I use several documents written by offshore service providers to advise their clients or inform them of different offshore opportunities. [14] These alternative sources are used to systematically

12. More precisely, I first relied on the list of tax havens established by Dharmapala and Hines (2009). To this list, I added the Netherlands and Malaysia (in particular the Federal Territory of Labuan), which have been considered as tax havens but are not included in their list. I did not include Belgium due to conflicting information on its role as a tax haven. Watteyne (2022) argues that the history of Belgium as a tax haven stopped after WWI. I did not include U.S. States such as New Jersey or Delaware either. These states have mainly been considered as local tax havens (see for instance Dyreng et al., 2013) even though this might be changing.

13. These books are available in French only. André Beauchamp and Édouard Chambost are international tax lawyers specialized in the use of tax havens. Chambost has written eight different editions of his book from 1977 to 2005. He is specialized in the creation of tax (avoidance) schemes between jurisdictions (http://www.edouard-chambost.com/picture_library/chambost_articles_recadrer/1998-1999/1998_paradis_fiscaux_ou_sanctuaire_suisse.pdf).

14. For instance Trident Trusts provides "Fact Sheets" about many offshore jurisdictions: https://www.tridenttrust.com/knowledge/brochures-fact-sheets/. Trident Trust is one of the world's largest offshore providers, according to ICIJ. It operates in 19 tax havens present in my list of tax havens, besides having

confirm the existence of laws identified in the two main sources. Sometimes, they also reveal the existence of reforms not mentioned in the main sources. More details on the construction are available in the online documentation of the dataset.

Finally, I could not find reliable and precise information on the offshore legal architecture of two minor tax havens, San Marino and the Maldives.[15] Consequently, my dataset includes information about 48 tax havens in which I observe 143 reforms.

Consistency of the data Before turning to the analysis of this new dataset, it is essential to check its consistency. I investigate whether the implementation of new reforms leads to the provision of more tax havens services. To proxy the provision of tax havens services over time, I use micro-level data from the Offshore Leaks (ICIJ, 2022b). The International Consortium of Investigative Journalists (ICIJ) has received data from different leaks in tax-advising firms between 2013 and 2021 (ICIJ, 2022a). This data includes micro-level information on more than 800,000 entities opened in several tax havens along with the date when they opened and, when available, information on their owners. I use this data to count the number of offshore entities located in a given tax haven i at date t. I detail the treatment of the data in Appendix D.

This exercise focuses on the implementation of reforms introducing *International Business Companies* because these are the type of legal technologies that are the most likely to be covered by the Offshore Leaks. I run an event-study to investigate whether a new reform in a country i at date t has any effect on the number of offshore entities located there. As illustrated by Figure A.9, I find that following the reform adoption, the number of Offshore entities recorded in the Offshore Leaks increases by 640% after 9 years. This effect appears immediately after the reform and increases over time, while the pre-reform coefficients are close to zero and not statistically different from zero. This figure shows, using two independent data sources, that reforms of tax havens' legal architecture materialize into an increase in the provision of tax haven services in these countries. This result supports the consistency of the data. Details about this exercise are provided in appendix E.

Additional data I complement information on the legal architecture of tax havens with additional data. Appendix A provides a list of all data sources used in this paper.

I first associate each territory with a status relative to its history as a sovereign state. Each country or territory can be either independent, non-independent and a colony, or non-independent and not a colony. This last status includes for instance territories such as Jersey and Guernsey, that are generally not considered as colonies even though they depend on the United Kingdom. I gather this information from the Colonial Dates Dataset (Becker, 2020), the Cepii Gravity Dataset (Head and Mayer, 2014) and

offices in the U.S., the U.K. and Canada. It has been exposed in the Pandora Papers, with more than 3.3 million records leaked.

15. As illustrated by Appendix Table A.1, the Maldives appear in only three tax havens lists and San Marino in only one. Chambost (2000) only devotes two lines to San Marino to write that he does not consider it as a tax haven while Beauchamp (1992) writes that "If San Marino has an old reputation of tax haven, the republic has taken very few actions to justify it" (p.549, own translation). The Maldives are not covered in any of the main sources.

the ICOW colonial dataset (Hensel, 2018). The data is then manually completed when information is missing for a given territory using `worldstatesmen.org`, `rulers.org`, and `wikipedia.org`.

To measure the level of taxation worldwide, I combine two types of sources. First, I use the Tax Introduction Dataset (Seelkopf et al., 2021) that provides the date of introduction of six different modern taxes (including personal income taxes and corporate income taxes) for 220 countries and territories in the world. The authors distinguish modern taxes, compared to pre-modern taxes, by their simple and broad tax bases, their administrative complexity (they require information-intensive processes), and their redistributive potential. This data source about the extensive margin of taxation is completed with information about the intensive margin. I use data from the Government Tax Revenue dataset created by Andersson and Brambor (2019a, 2019b). The dataset covers 31 countries between 1800 and 2012 (non-square) and provides information on their tax revenues as a share of GDP. I use this information as a proxy for the effective tax rate. Interestingly, the data distinguish between direct and indirect tax revenues. Despite covering fewer countries than the Tax Introduction dataset, this data covers a large share of the world economy (*e.g.* 66% of the world's GDP in 1950). Missing data, in particular during world wars, is linearly interpolated when it occurs between two dates where I observe the level of taxation. It allows me to gain coverage. Data is used from 1920 onwards. Before this date, the coverage is too restricted. Overall, both sources provide a different but complementary view on world taxation.

3 The development of tax havens

The new dataset provides new information about the rise of tax havens in the 20th century, shedding light on key supply and demand forces in the market for offshore tax haven services.

First, I detail the characteristics and long-run evolution of tax havens. Then, guided by this first exploration, I explore the characteristics of the demand for tax havens services, and show how gravity forces shape it. Finally, I study the links between colonial empires and the development of tax havens.

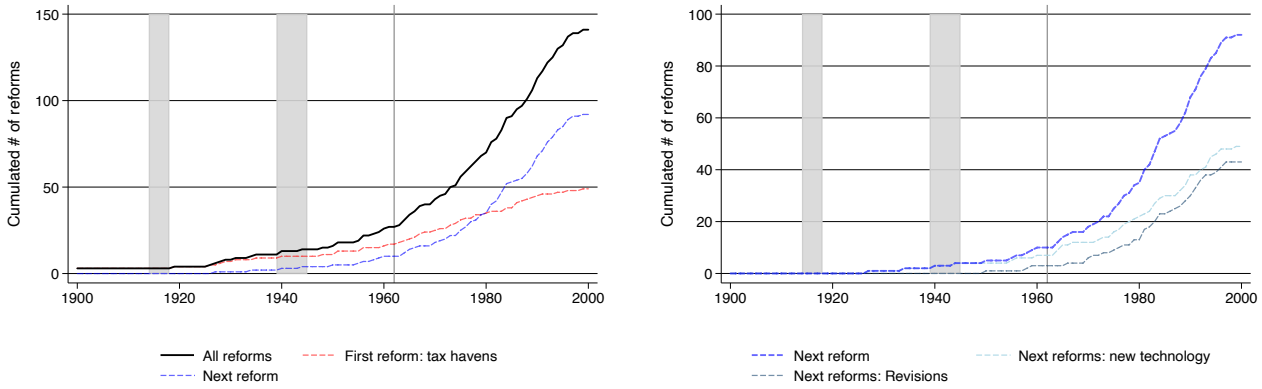
3.1 The long-run development of tax havens

I first document the striking increase in the number of tax havens in the 20th century. I describe the pattern of expansion by type of reform and broad geographic region. Finally, I show that country size and colonial history are two critical determinants of the choice of becoming a tax haven.

The rise of tax havens Figure 1 describes the development of tax havens in the 20th century, distinguishing between the extensive and intensive margins in panel (a). The interwar period witnessed the initial rise, linked to the introduction of modern direct taxation through individual and corporate income taxes in several countries. Notably,

the fifties marked the initiation of large-scale updates to the legal architectures of existing tax havens, with a pronounced acceleration in subsequent reforms from the seventies onward. The vertical line marks the beginning of British decolonization in the Caribbean, a pivotal moment that drove increased reforms. At the end of the period, the majority of reforms occurs at the intensive margin (subsequent reforms), reinforcing the legal architecture of already existing tax havens, rather than at the extensive margin.

Panel (b) decomposes subsequent reforms between those introducing a new legal technology (*new technology*) and those reinforcing a legal technology in which the country is already specialized (*revisions*). This distinction illustrates a fundamental trade-off faced by suppliers in competitive markets — the choice between specialization for vertical competition, and diversification for horizontal competition. The figure reveals a slightly higher frequency of reforms introducing new legal technologies, indicating that tax havens compete both through horizontal diversification and vertical specialization.



(a) First and subsequent reforms

(b) Decomposition by purpose

Figure 1 – The rise of tax havens in the 20th century

Note: This figure depicts the rise of tax havens in the 20th century according to two dimensions: (a) First and subsequent reforms, (b) Decomposition of subsequent reforms between those introducing a new legal technology and those reinforcing a technology in which the tax havens is already specialized. Data on tax havens' reforms comes from own data collection detailed in section 2. Legal technologies considered here are the following: Banking, Insurance, Exempt companies (IBC or not), MNE-specific, Holding regimes, Individual, Ships, and Other. Shaded areas indicate the world wars and the vertical line (1962), the beginning of the independence wave in the U.K.-dominated Caribbean area.

Legal Technologies To better understand the evolution of tax havens, it is necessary to study the type of legal technologies introduced. Figure 2 decomposes the trend based on tax havens' specialization, as categorized in Table 1.

During the interwar period, the inaugural reforms exhibit diversification across various legal technologies, hinting at limited competition among tax havens. However, from the 1950s, "Exempted companies" surfaced as the predominant type of tax haven technology, outpacing reforms in other sectors. These companies, that provide flexibility to both firms and individuals (particularly for managing business income), also reduce administrative costs for countries that become tax havens. This attractive property might explain its growing adoption by tax havens.

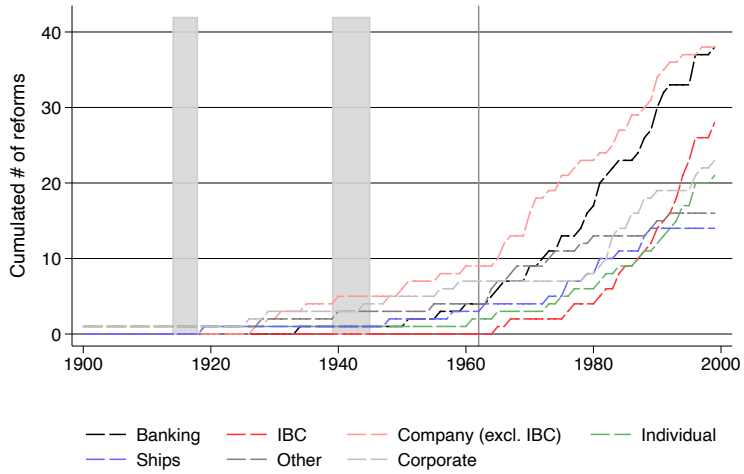


Figure 2 – Decomposition by type

Note: This figure plots the cumulated number of reforms by legal technology. Data on tax havens' reforms comes from own data collection detailed in section 2. Details on the classification used in this figure are displayed in Table 1. Shaded areas indicate the world wars and the vertical line (1962), the beginning of the independence wave in the U.K.-dominated Caribbean area.

The figure also shows a rapid rise in the number of banking reforms. These include offshore banking or bank secrecy laws, which are complement with other legal technologies. Unlike onshore banks, offshore banks provide flexibility and secrecy, which is crucial for offshore users. Consequently, offshore banking reforms are expected to develop simultaneously with other legal technologies.

Finally, International Business Corporations appear more and more attractive at the end of the century as we notice a significant increase in the number of IBC reforms. There are a few IBC reforms in the sixties but we observe a break in the trend following the reform of 1984 in the British Virgin Islands. Since then, IBC has been the legal technology that has experienced the most remarkable growth, emphasizing the key role of legal innovations in tax havens' development. It also illustrates how quickly legal innovations can diffuse. Unlike other markets, they can be readily replicated since regulations are publicly available and are not protected from replication.

The geography of tax havens Figure 3 studies the spatial dimension of the rise of tax havens. It highlights striking regional differences in their expansion, with Europe, the Americas, and later Asia hosting a significant number, while Oceania and Africa lag behind.

Until the fifties, almost all tax havens were located in Europe or the Americas, particularly in the Caribbean area. This is in line with the fact that taxation was first introduced in these regions. Indeed, a striking fact about state-building in the 20th century is the rapid spread of modern taxation (Seelkopf et al., 2021). A consequence of this global rise in taxation is that some individuals and firms are now willing to avoid it. It creates a demand for tax avoidance and tax evasion services. On the personal taxation side, this is reinforced by the fact that personal income taxes were characterized by their high

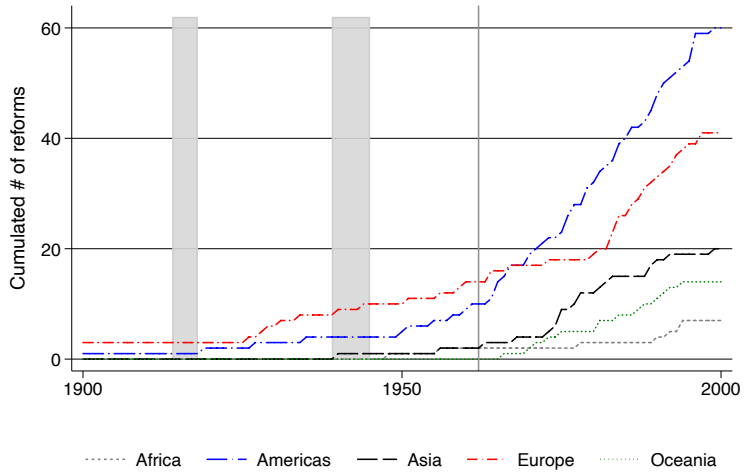


Figure 3 – The rise of tax havens in the 20th century: Decomposition by region

Note: This figure plots the cumulated number of tax haven reforms by broad world region. Data on tax havens' reforms comes from own data collection detailed in section 2. Shaded areas indicate the world wars and the vertical line (1962), the beginning of the independence wave in the U.K.-dominated Caribbean area.

degree of progressiveness, with the top marginal tax rate often larger than 60% in the twenties. [16]

Figure A.2 correlates the rise in modern direct taxation (personal and corporate income taxes) with the building of tax havens' architecture in Europe and America. It underscores a demand-driven mechanism where increased tax introductions are positively correlated with tax haven reforms at a regional level. Conversely, reforms in both regions at the end of the 20th century lack a straightforward explanation based on rising taxation, suggesting alternative explanations like competition between tax havens and decolonization. Figure A.3 in the Appendix extends this analysis to Asia, Africa, and Oceania. It reveals a similar trend in Asia, *i.e.*, a lag between tax introductions and the surge in tax haven reforms. However, Oceania and Africa exhibit a distinct evolution, with a steep rise not directly correlated with increased direct taxation reforms.

For a large part of the 20th century, Europe hosted the largest number of tax havens. From the sixties, following decolonization and the global liberalization of financial flows associated with the end of the Bretton-Woods system, we observe a break in the trend of American tax havens, which number increased significantly. This period also marked the emergence of tax havens in other regions, namely Asia, Oceania, and to a lesser extent, Africa. This delineates two broad periods in the global history of tax havens during the 20th century. In the first, from WWI to the seventies, Europe dominated, with Switzerland being a key player. [17] From the seventies, a shift occurred as more tax havens appeared in the developing world, particularly in the Caribbean, which became a hub for tax havens. The offshore world mirrored the shift in the global economic center from Europe to the U.S.

16. A recent literature shows that individuals located at the top of the distribution are more likely to evade taxes (Alstadsæter et al., 2019, Leenders et al., 2020).

17. The history of Switzerland, particularly its dominant role during the interwar, has led to several studies by historians. See for instance Farquet (2016, 2018) or Guex (2000, 2021).

The characteristics of tax havens To complete the tax havens' description, I explore two important supply-side characteristics underscored by the literature. The most significant is the small size of tax havens (Dharmapala and Hines, 2009). This characteristic is also grounded in theoretical models (Kanbur and Keen, 1993, Hansen and Kessler, 2001, Slemrod and Wilson, 2009, Bucovetsky, 2014). A second important characteristic of tax havens is their colonial history. Different studies have highlighted the tight connection between the colonial world, especially the British one, and the making of tax havens (Palan et al., 2009, Ogle, 2017, 2020 for instance).

Figure A.4 in the Appendix plots the share of tax havens by size and colonial history over the years. Until the decolonization period, small countries (in the first quartile of country size) exhibited a similar trend, irrespective of their colonial history. A notable shift occurs in the sixties, with more than 80% of small U.K.-related countries being tax havens compared to 40% of non-U.K-related. countries. The trend is similar among big countries. This dynamic dimension adds to the literature, indicating that the decolonization shock significantly influenced the development of tax havens, particularly in newly independent and small countries. Further examination of the decolonization shock is provided in section 3.3.

The size of the market for tax havens What is the impact of the increase in the number of tax havens on the size of the global market for offshore services? We already know from the previous section that this increase is linked to an increase in the provision of offshore services in the countries that introduce new reforms. This increase in the provision of services can be at the expense of the tax havens already supplying the market or can expand the size of the market. I explore this question in appendix F.

I use data from Zucman (2013) that collects fiduciary deposits in Switzerland by country of origin between 1976 and 2014 from the Swiss National Bank. The Swiss market is one of the largest ones for individuals' tax evasion: it represented 34% of all offshore financial wealth in 2008 and was probably even larger before this date (Zucman (2013), Alstadsæter et al., 2018). To access the Swiss market for tax evasion purposes, one has to intermediate its deposit through a tax haven. Data on the origin country of Swiss deposits therefore allow to proxy the market share of each tax haven in the Swiss Offshore market.

Figure A.10 in appendix F delineates the market size of tax havens, distinguishing between those becoming havens before and after 1960. The global size of the tax haven market in Switzerland has surged over the period, especially since the early nineties. While the share of older tax havens has oscillated around 30%, the market share of new tax havens has consistently risen, matching old tax havens after 2010. This increase in new tax havens' share is not associated with a decline of the share of old tax havens, suggesting limited substitution. The entry of new tax havens has contributed to the increase in the market size of tax havens.

3.2 The gravity of tax haven use

The previous remarks correlate the rise of taxation with the rise of tax havens reforms across time and space. The implicit assumption to explain this pattern is that there is a regional component of demand: the introduction of taxes in a country increases the demand for tax havens' services in nearby countries. It boils down to the assumption that the costs of tax evasion increase with distance. Bilateral evasion costs are diverse. For instance, they include the extent of compatibility between the regulations in the high-tax country and those in the offshore country. They also include communication and travel costs. Locating its assets in a tax haven means traveling there occasionally (even in the 21st century, see Harrington, 2016), communicating with intermediaries located in the tax haven, etc. These costs are most likely distance-dependent.

Empirical support for this assumption is found in the literature, that highlights the gravity structure of the use of tax havens. Studying the behavior of multinational firms, Ferrari et al. (2022) shows that a gravity-like relationship exists for profit shifting between production places and tax havens. This link is also found in the bilateral profit shifting data of Torslov et al. (2022). Studying individuals' tax evasion in the Netherlands, Leenders et al. (2020) find that individuals close to a border tend to locate their hidden wealth in the country with which they share the border, again suggesting geography-dependent costs.

To complement this evidence, I employ the micro-level data from the Offshore Leaks, focusing on the bilateral information in the dataset. Using the ownership links provided by the International Consortium of Investigative Journalists (ICIJ), I create a variable that measures the number of links between each $(non-haven; haven)$ country pair. These links represent ownership connections between offshore entities in a tax haven j and an entities in a non-haven country i. I detail the treatment of the data and the main assumptions made to count links between two countries in Appendix D. I estimate the following gravity equation to explain the number of links between two pairs:

$$\#Links_{ijk} = exp\left(\beta_1 ln(Dist_{ij}) + \beta_2 Ever\ Colony_{ij} + \beta_3 Legal\ origins_{ij} + \nu_{ik} + \nu_{jk}\right)\epsilon_{ijk} \quad (1)$$

where $\#Links_{ijk}$ is the number of links between non-haven country i and tax haven j released in the leak source k (see the list of sources in appendix D).[18] $Dist_{ij}$ is the geographic distance between i and j, $Ever\ Colony_{ij}$ is an indicator variable that is equal to 1 when both countries have ever been in a colonial relationship and $Legal\ origins_{ij}$ is an indicator variable that is equal to 1 if both countries share legal origins. ν_{ik} and ν_{jk} are country $\times$ source fixed effects that account for any country-level characteristic and any country $\times$ source-level characteristics such as preferences from the offshore providers exposed in a given leak for some tax havens or some origin countries. ϵ_{ijk} is the error term. Given the count nature of the data, the equation is estimated using a Poisson pseudo-maximum likelihood (PPML) estimator. To focus on links indicative

18. The information about the source of the leak is kept in order to absorb any source-specific bias in coverage through fixed effects. Similar results are obtained when this dimension of heterogeneity is not used.

of ultimate ownership, the estimation is conducted on a restricted sample where origin countries are non-haven countries, and destination countries are tax havens. Results are quantitatively similar when estimated with OLS or from the non-restricted sample.

Results are displayed in Table 2. I find that the distance plays an important role as increasing it by 1% decreases the number of links between two countries by approximately 1%. This result supports the hypothesis that bilateral evasion costs increase with distance. It is also important to note that these costs also depend negatively on the legal similarities between the origin country and the tax haven: sharing a common legal origin increases the number of tax evasion links. It can be explained by the fact that two legal systems having the same origin might be more complementary when one wants to evade or avoid taxation.

Table 2 – Gravity in Offshore leaks data

	(1) Nb. links	(2) Nb. links
ln(Dist.)	-0.987***	-1.072***
	(0.104)	(0.113)
Colonial link		-0.146
		(0.241)
Common legal origin		1.435***
		(0.227)
Observations	2,291	2,291
Origin-source and Destination-source FE	Yes	Yes

Note: The equations are estimated using a Poisson Pseudo-Maximum Likelihood (PPML) estimator. Robust standard errors clustered at the country-pair level in parentheses. *** p<0.01, ** p<0.05, * p<0.1

In summary, the evidence indicates that distance is a crucial factor influencing the demand received by tax havens. This observation aligns with the economic geography literature's concept of market access (Redding and Venables, 2004), where countries close to large markets are better positioned to serve demand, akin to tax havens benefiting from proximity to countries implementing higher tax rates. Consequently, countries in close proximity to large markets with large tax rates are more likely to emerge as tax havens, irrespective of their own size.

3.3 Colonial empires and Tax Havens

In this subsection, I explore in more details the links between colonial empires and tax havens, a topic extensively discussed in the tax havens' history literature. The new data at hand can help exploring these questions. Various studies have underscored the close connection between the colonial world, particularly the British empire, and the genesis of tax havens (Palan et al., 2009, Ogle, 2017, 2020, for instance). Newly independent countries have found a convenient specialization in the tax haven industry that necessitated a resource available to all countries: their sovereignty. Ogle (2017) argues that the connection between the colonial world and the offshore world is linked to the constitution of an informal empire, with limited actual sovereignty, by the United King-

dom. This difference generates loopholes that the former colons use for offshore purposes. She also argues that the shock was partly a demand shock, with colonizers' assets partly reallocated in tax havens after the decolonization. On the contrary, Farquet (2021) argues that even though some colonial assets have been relocated to tax havens, the bulk of offshore assets is constituted by rich countries' assets.

Some scholars have also argued that the United Kingdom has encouraged, at least indirectly, these countries to become tax havens in order to reduce their development aid (Sagar et al., 2013, Ogle, 2017). However, the recent contribution of Sævold (2022), drawing on extensive access to archives, concludes that there were no strategic effort from the UK administration to create a network of tax havens that will be beneficial to the metropolitan power. Other colonial powers such as France, have been more reluctant to encourage this development choice (Rawlings, 2004).

To further explore the links between colonial empires and tax havens, I study the evolution of the offshore policies of countries following their independence from the UK. I estimate the a dynamic difference-in-difference where the treated group is composed of countries experiencing decolonization and the control group is composed of countries that become independent from another colonizer.

$$Cumul\ Tax\ Haven\ Reforms_{it} = \sum_{k=-7}^{15} \beta_k Independent\ from\ UK_{it}^{k} + \mu_i + \mu_t + \epsilon_{it} \qquad (2)$$

where $Cumul\ Tax\ Haven\ Reforms_{it}$ counts the number of tax haven reforms made by country i at date t. $Independent\ from\ UK_{it}^{k}$ is a dummy variable equal to one for treated countries k years before or after it becomes independent from the UK. μ_i and μ_t are country and time fixed effects, and ϵ_{it} is the error term. The equation is estimated using the two-way fixed effect estimator of de Chaisemartin and D'Haultfœuille (2023) to account for potential heterogeneous effects in a generalized difference-in-difference setting with different treatment dates. [19]

A crucial identification hypothesis is the exogeneity of the decolonization process with regard to tax haven policies. A positive demand shock for tax haven services could simultaneously increase the probability of becoming a tax haven and the probability of becoming independent. In all likelihood, the timing of decolonization appears exogenous to the probability that the decolonized country becomes a tax haven. First, the timing of independence is uncertain, mostly dependent on local and regional conditions, independence wars, pro-independence protests, or negotiations with the colonizer. For instance, Sævold (2022) emphasizes that both offshore policies and decolonization policies were "*ad hoc*" and not "strategically planned." [20] Second, a country does not need to become independent for it to become a tax haven or implement offshore policies.

19. I estimate here a linear generalized difference-in-difference because it allows more flexibility in the estimation of models with different treatment timings. Alternatively, Wooldridge (2023) proposes a non-linear estimator that includes many interactions effects and makes the model hard to converge in certain cases.

20. Sævold (2022) writes: "The extent to which tax havens eventually spread through the Empire was not foreseen from the outset" (p.243) or "These factors further emphasize that tax haven formation in a British context was closely entangled with processes of independence, characterized by the *ad hoc* decisions that led to more independence, and were not strategically planned by the UK administration – quite the contrary." (p.252).

Some territories became tax havens before independence (*e.g.*, Saint-Vincent-and-the-Grenadines), and some tax havens have never gained independence (*e.g.*, the Cayman Islands). Then, if the timing of independence were endogenous to the probability of a country becoming a tax haven, non-parallel pre-trends would be expected. As we will see, this is not the case.

Results are displayed in Figure 4. I find that the number of offshore reforms made by U.K. former colonies increases by about 0.15 units 10 years after becoming independent compared to territories that gain independence from a different colonizer. This effect is substantial given that the average number of reforms made by countries in the sample is 0.17 (for a maximum of six). The absence of significant pre-trends for U.K. colonies and the exogeneity of decolonization suggest that this is a causal effect.

To sum up, the shock of decolonization has been a sizable exogenous shock for U.K. colonies' offshore history. This fact helps explain the significant increase in the number of tax havens and reforms from the 1960s in the different descriptive figures above. I will use this shock in section 6 to analyze the effects of increasing competitive pressure on tax havens' choices.

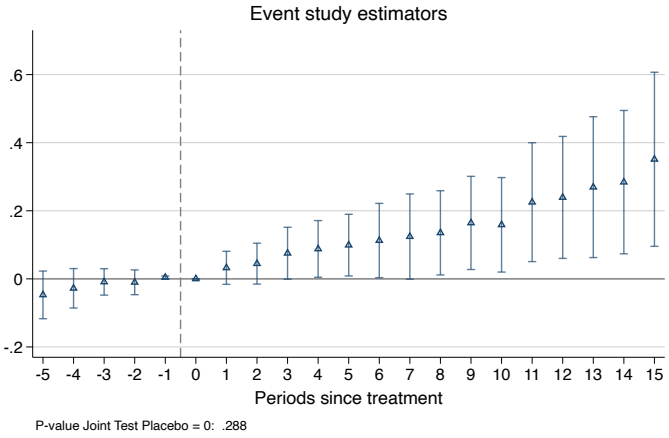


Figure 4 – Tax havens and colonial empires: Event study

Note: This figure plots coefficients from an event-study regression following equation 2. I use the estimator proposed by de Chaisemartin and D'Haultfœuille (2023). The treated group is composed of UK colonies becoming independent. The figure studies how the number of offshore reforms changes with a country's independence. The control group corresponds to territories have a different colonizer. The average number of reforms in the sample is equal to 0.17. 95% confidence intervals with standard errors clustered at the country level.

4 Conceptual Framework

To guide the empirical exploration, this section presents a conceptual framework that describes the fundamental forces influencing the choice of a government to make its country a tax haven and to update its legal architecture. The decision of becoming a tax haven is the result of the building of legal and fiscal institutions, in the spirit of the legal capacity building framework of Besley and Persson (2011). In addition, this framework describes the potential interactions that tax havens may have together through

competition in the market for tax haven services. Appendix H, proposes a more formal framework.

Utilitarian governments want to maximize the sum of private revenues and tax revenues. Tax revenues are constrained by the fiscal capacity of the country and by the fact that individuals evade taxation by using tax havens. Governments can choose between becoming tax havens or staying non-havens. Non-haven countries have one sector (the *productive* sector) characterized by its productivity. If a country decides to become a tax haven, an offshore sector is introduced. This sector is characterized by its quality, p_i, which can be increased by (costly) reforms of the offshore architecture. To become a tax haven, the country has to invest in the development of a legal technology, which is costly. The real sector is taxed at rate t_i and the offshore sector is taxed at rate t_i^o. Setting up an offshore sector allows to tax the foreign demand for offshore services, and therefore potentially increase tax revenues. Individuals in non-haven countries can evade taxation by using tax havens. Otherwise they pay their taxes domestically.

Hypothesis 1. The gains of becoming a tax haven depend on the level of demand that is received by the tax haven from each non-haven country in the world. These gains depend negatively on bilateral evasion costs, τ_{ij}, on the tax rate of the tax haven, and on an individual tax morality parameter distributed Gumbel. They depend positively on the quality of the tax haven regulation, and on the tax rate of the non-haven country.

Some formality is necessary to illustrate this hypothesis and its consequences. Noting V_{ni} the deterministic part of the utility received for using tax haven i from country n, V_n the deterministic part of the utility of living in country n and not avoiding taxes, $\{TH\}$ the set of tax havens and exploiting the Gumbel distribution of the tax morality parameter, the probability that an individual in n pays its taxes in country i is

$$\mathbb{P}_{ni} = \frac{\exp\left(V_{ni}\left(t_i^o, p_i, \tau_{ni}\right)\right)}{\sum_{k\in\{TH\}} \exp\left(V_{nk}\left(t_k^o, p_k, \tau_{nk}\right)\right) + \exp\left(V_n\left(t_n\right)\right)} \tag{3}$$

Note that it represents the probability that taxes are not evaded in the case where $n \neq i$. Multiplied by individuals' revenues, equation (3) also defines the demand for offshore services going from country n to tax haven i.

Remark 1. Demand shocks depend on non-haven countries' tax rates: $\frac{\partial \mathbb{P}_{ni}}{\partial t_n} > 0$

Tax rates are one important determinant of the demand for offshore services that is going out of a country. Exogenous changes in tax rates therefore increase the demand for offshore services going from n to i.

Remark 2. Shocks are distance-dependent: $\frac{\partial \mathbb{P}_{ni}}{\partial \tau_{ni}} < 0$

The demand received by a tax haven depends on its characteristics, including the quality of its offshore legal architecture, its tax rate on the offshore sector, and its geography. Based on the results of section 3, the distance between the non-haven origin country and the tax haven is a determinant of the marginal gains from becoming a tax haven when demand increases. A tax haven further away from the shock's origin experiences a proportionally lower positive demand shock, making demand shocks country-specific.

Remark 3. Competition matters.

Competition is pivotal and it directly affects the denominator in Equation 3. An increase in the number of tax havens leads to a diminished demand for tax haven i, all other things being equal. However, the intensity of competition from other tax havens k, depends on their bilateral costs with country n, τ_{nk}. Consequently, two tax havens that share a similar geographic location compete more together than two tax havens that are more distant from each other. Drawing a parallel with the economic geography literature (Redding and Venables, 2004), $\mathbb{P}_{ni}$ can be seen as a measure for the bilateral market access of non-havens to tax havens.

Hypothesis 2. In tax havens, the tax rate on the domestic sector is a function of the tax rate on the offshore sector.

This constraint creates a trade-off: decreasing its tax rate to attract more offshore revenues is done at the expense of the tax revenues on the domestic economy. This is a similar mechanism as in Slemrod and Wilson (2009). From an empirical point of view, tax rates on the domestic economy in tax havens tend to be lower than those of comparable countries, suggesting that this assumption is empirically grounded. [21] More broadly, this assumption boils down to assuming that the offshore sector absorbs resources from the domestic sector.

Testable Implication 1. The probability of becoming a tax haven depends on the interaction of the size of the demand shock and the size of the country (Section 5).

The role of country size is driven by the fact that the gains from becoming a tax haven are constant with country size while the costs of becoming a tax haven increase with country size. Because tax havens' offshore sector does not attract real activity but only paper money, the gains of becoming a tax haven do not depend on country size. It is illustrated by the fact that the only physical need to use a tax haven is often a postbox. This is precisely this disconnection between size and revenues that allows very small countries such as the British Virgin Island to provide a lot of tax haven services. On the contrary, the cost of becoming a tax haven increases with size. Following Hypothesis 2, the larger is a country, the larger is the proportion of foregone revenues on the domestic sector with respect to the additional revenue on the offshore sector (that does not depend on size). As a consequence, only small countries, below a given size threshold, will gain from becoming tax havens.

In this context, a positive demand shock such as the increase in taxation in a country (Remark 1) increases the demand for tax havens services, especially in its neighbouring countries (Remark 2). However, this shock will have an heterogeneous impact on countries' choices according to their size: for countries that are too big, the marginal increase

21. Table A.11 in Appendix G compares the corporate and individual tax rates on the domestic economy in tax havens and in non havens. It shows that tax rates in tax havens tend to be smaller than those in non havens by 5 percentage points for personal taxation and 7 points for corporate taxation. Controlling for different country characteristics in Figures A.11 and A.12, I also find that tax havens have lower tax rates than similar countries. One can also imagine that a disconnection between both tax rates will push taxpayers to try to appear as foreigners in order to benefit from the lower tax rates. This is for instance what happens with round-tripping when firms invest in their domestic countries through foreign entities to benefit from advantageous conditions (Hanlon et al., 2015).

in benefits from becoming a tax haven do not outweigh its cost. These countries will not be sensitive to the shock, contrary to smaller countries.

Hypothesis 3. The cost of introducing a legal technology decreases when other countries have introduced this legal technology.

When a new country adopts a legal technology, it provides positive spillovers to other countries: it increases their knowledge of legal technologies. It also provides them information about how successful a given legal framework can be. This effect is spurred by the fact that laws, contrary to technologies cannot be protected by patents: they are freely observed and free to copy. Anecdotally, the International Business Company law of the British Virgin Islands enacted in 1984 has been copied almost word for word by other offshore jurisdictions such as Anguilla or the Bahamas. It suggests that the diffusion of new legal technologies can reduce the costs of updating the legal architecture and increase the probability of reform.

Testable Implication 2. The effect of an increase in the number of tax havens on reforms of the offshore legal architecture is undetermined (Section 6).

An increase in the number of tax havens increases competition (Remark 3) and then decreases the rents of the offshore sector. It also decrease the cost of implementation of a specific reform (Hypothesis 3). Therefore, the net effect of additional competition is undetermined and depends on the relative size of the two effects.

Hypothesis 4. Non-haven countries must reach a given level of public expenditures. This is done through different tax bases, some of which are mobile (*i.e.* affected by tax evasion and avoidance), some of which are immobile (*i.e.* not affected by tax evasion and avoidance).

This hypothesis is necessary to discuss the impact of tax havens on the other countries. It is in line with the design of tax systems in many countries.

Testable Implication 3. When a mobile tax base is affected by an increase in tax evasion, the decrease of tax revenues on the mobile tax base is compensated by an increase of tax revenues on the immobile tax base (Section 7).

This implication is the result of Hypothesis 3 that states that countries are going to compensate losses on one tax base by increasing taxation on other bases. This implication about the substituability of tax bases is supported by different results in the literature in the context of corporate taxation. Bilicka et al. (2023) show that countries with high losses from tax avoidance have on average larger indirect tax rates. In addition, Thunecke (2023) shows that corporate taxes and consumption taxes are substitutes and that consumption taxes fully compensate the decrease in corporate tax rates due to tax competition.

5 Demand shocks in tax havens

The remainder of the paper aims at testing the Testable Implications 1 to 3. In Testable Implication 1, I show that the interaction between the demand for offshore services received by a country and its size is a driver of the development of tax havens. To test it,

I use the temporal and spatial variation of the demand shocks triggered by the changes in taxation in the 20th century. Political shocks are used to obtain exogenous variation.

Demand shocks The conceptual framework indicates that demand has a geographical component. The geographical variation in demand comes from i) the assumption of bilateral evasion costs and ii) the assumption that bilateral costs increase with distance. The assumption that bilateral costs increase with distance, empirically supported by our results of Section 3, is critical in the identification as it creates country-level variation in the demand faced by a country. A country further away from the shock experiences a lower increase in demand than a closer country.

I construct demand shocks received by country i as a weighted average of other countries' tax level. The weight represents the exposure of country i to the offshore demand sent by the other countries. This specification has the advantage of being easy to interpret and can deliver elasticities of reforms to foreign demand. The weights will be a function of size, proxied by countries j's population, and distance. In the baseline regression I use the following function, and I propose robustness analysis with different weights: $W_{ijt} = \frac{\mathbb{1}_{dist_{ij}<2500} Pop_{jt}}{\sum_j \mathbb{1}_{dist_{ij}<2500} Pop_{jt}}$. This weight is simple as it assigns a weight proportional to country size to each country j less distant to i than 2500km, and it assigns a weight of 0 to countries located further away. This specification puts a high weight on regional shocks. From these weights, I compute demand as:

$$D_{it} = \left(\sum_j W_{ijt} \right)^{-1} \times \sum_j \left(W_{ijt} \times \frac{Direct\ Tax\ Revenues_{jt}}{GDP_{jt}} \right) \tag{4}$$

The level of taxation in country i is proxied by the average direct tax revenues in GDP. Data comes from the Government Revenues Dataset (Andersson and Brambor, 2019a, 2019b).

Identification To study the effect of demand on the tax havens' legal architecture, I estimate the following equation:

$$\mathbb{1}_{Reform_{it}} = \alpha_1 D_{it} + \alpha_2 D_{it} \times ln(Area_i) + \chi Z_{it} + \mu_i + \mu_t + u_{it} \tag{5}$$

with $\mathbb{1}_{Reform_{it}}$ an indicator variable equal to 1 if country i makes a reform at date t, D_{it}, the demand received by country i at date t. $ln(Area)$ is the logarithm of the size of the country. Z_{it} is a vector of control variables, and χ is the associated vector of coefficients. Control variables include an indicator variable for being independent at date t and the number of years since independence. Country fixed effects and time fixed effects are introduced through μ_i and μ_t. u_{it} are the residuals. The equation is estimated using a linear probability model.[22] Countries that never become tax havens are included in the

22. According to Timoneda (2021), a linear probability model with fixed effects is well-suited for estimating models with rare events, which is the case in our data. It also facilitates the use and interpretation of instrumental variables and interaction models.

estimation sample. However, countries that never receive any demand (*i.e.* countries i for which $\forall t, D_{it} = 0$) are kept out of the sample.

The demand corresponds to a i-specific average of the tax rate in foreign countries weighted by the size of these countries and the distance of these countries to country i. It is therefore a shift-share design (Borusyak et al., 2022).

The identification of the impact of demand shocks on tax haven formation raises empirical concerns. In particular, some shocks can affect both the tax-revenues-to-GDP ratio observed in foreign non-haven countries and the probability of doing a reform. The existence of tax competition can push non-haven countries to decrease their tax rates to compete for capital when tax havens appear, creating reverse causality. Unobserved confounders, such as liberalization policies can also affect both tax rates and the probability that countries become tax havens due to increased capital mobility (see for instance Hollis and McKenna, 2019).

To deal with this issue, I propose an instrumental variable strategy where I construct a variable that affects the probability of doing a reform only through its effect on the demand for tax havens services. To do so, I predict exogenous changes in tax revenues and then use this variable, $\widehat{\frac{Direct\ Tax\ Revenues_{jt}}{GDP_{jt}}}^{IV}$, to build an exogenous demand variable, D_{it}^{IV}.

Exogenous changes in taxation are inspired by the results from the comparative taxation literature. In particular, Kiser and Karceski (2017) highlight three important determinants of tax revenues from a comparative perspective: war, democracy, and development. Cameron (1978) also points the role of governments' ideology in explaining taxation trends.

The occurrence or the threat of war has been extensively discussed as a determinant of tax revenues (Tilly, 1990). However, the occurrence of war might be correlated both with tax levels and tax flight and therefore does not constitute a good candidate for the IV. Development, measured by GDP per capita, might also be subject to endogeneity as it is likely to be correlated to regional economic shocks, and then affects both the dependent and the independent variables. On the contrary, democratization appears much more independent from these shocks. For instance Acemoglu et al. (2008, 2009) and Barron et al. (2014) argue that democratization is not caused, in a panel setting, by changes in income. Therefore, the level of democracy is probably not correlated to regional-level shocks that might affect the probability that some countries enact tax havens reforms. In addition, there is a long-standing literature that describes how different government ideologies affect economic outcomes, in particular taxation levels (Cameron, 1978, Tavares, 2004, Pettersson-Lidbom, 2008). For instance tax revenues tend to be larger for left-wing government than right-wing ones. The variation in tax levels due to changes in government ideology are likely to be exogenous from the tax havens' reforms in nearby countries. Therefore, this variable appears suitable for our IV strategy.

In an initial stage of the IV strategy, $\widehat{\frac{Direct\ Tax\ Revenues_{jt}}{GDP_{jt}}}^{IV}$ will be predicted using the level of democracy, the ideology of the head of government (left, center or right), country fixed effects and time fixed effects. To increase the reliability of my estimates, the

democracy index and ideology indexes are interacted with continent dummies in order to obtain continent-specific effects of each variables on the ratio of direct tax revenues over GDP:

$$\frac{Direct\ Tax\ Revenues_{jt}}{GDP_{jt}} = \theta_1 Democracy_{jt} + \theta_2 \mathbb{1}_{Left_{jt}} + \theta_3 \mathbb{1}_{Right_{jt}} + \delta_j + \delta_t + e_{jt} \quad (6)$$

where $\frac{Direct\ Tax\ Revenues_{jt}}{GDP_{jt}}$ is the share of direct taxation in GDP in country j at date t, $Democracy_{jt}$ is a variable that captures the extent of democracy in country j using VDEM's electoral democracy index (Coppedge et al., 2021). $\mathbb{1}_{Left_{jt}}$ and $\mathbb{1}_{Right_{jt}}$ are indicator variables that indicates whether the head of government belong to the left or the right (the excluded category are "center" head of governments). Data comes from Brambor et al. (2017) which provide information on the ideology of the head of government of 33 countries from 1870 to 2012. δ_j are country fixed effects, δ_t are year fixed effects and e_{jt} is the error term. The regression is estimated over the period 1920-2000.

Using the predicted value, $\widehat{\frac{Direct\ Tax\ Revenues_{jt}}{GDP_{jt}}}$, I construct the instrument, D_{it}^{IV}, as the weighted average of direct taxation around a given country i following equation 4. As an instrumental variable, D_{it}^{IV} should fulfil two conditions: i) D_{it}^{IV} must be correlated with D_{it}, ii) it should only affect the probability of becoming a tax haven through its effect on D_{it} (exclusion restriction). The first condition will be checked by looking at the first-stage F-statistics. Anticipating the results, the F-statistics are large and above the thresholds of relative bias computed by Stock and Yogo (2005). The exclusion restriction will be fulfilled as long as no endogenous variation is introduced in our initial stage. Following Borusyak et al. (2022), I study the correlation between my instrument and shock-level characteristics to assess the validity of the IV in table A.2. The table shows that the instrument is not correlated with GDP per capita growth, trade, or with any measure of (economic, commercial or financial) liberalization following the KOF globalization index (Gygli et al., 2019) or the financial openness index of Quinn and Toyoda (2008). In addition, the within R-square of the regression, is almost systematically below 0.001. These results confirm that the instrument is not correlated with shock-level observable characteristics that might bring endogeneity.

Results The results from the estimation of equation 5 are displayed in Table 3. The table gives the results for all reforms in column (1), only for the reform that makes a country a tax haven (the country leaves the estimation sample once it becomes a tax haven) in column (2), and for other reforms conditional on being a tax haven in column (3). The number of observations in columns (2) and (3) sums up to the number of observations in column (1). Results are presented for OLS and IV estimations.

In column (1), an increase in the weighted average of the tax-GDP ratio by 1 percentage point increases the probability of becoming a tax haven by 0.41 percentage points for the smallest countries in the sample. To scale this effect, it must be compared with a typical variation in the residualized dependent variable and with the average probability of

enacting a reform in the sample. [23] When demand increases by one standard deviation, the probability of doing a reform in a small country increases by 66% as revealed by the standardized effect. Note that the initial probability of doing a reform is very small in the sample. Hence, even though a typical change in demand significantly influences the probability of reform, the absolute impact remains small. This suggests that substantial demand increases are required to impact the decision to enact a reform.

The negative coefficient on the interaction between demand and size shows that the effect of demand decreases with the size of the country. It becomes nil for countries with an area of 22,574 km^2, corresponding to the 36th percentile of size, approximately equivalent to the size of Belize or Israel.

The IV results go in the same direction as OLS. The standardized effect for small countries is larger, around one. This effects become nil for countries at the 24th percentile of size, approximately equivalent to the size of Comoros.

Columns (2) and (3) facilitate a more precise analysis by splitting the sample. Results in column (2) reveal that the effect of demand is driven by the extensive margin of tax havens: when demand increases, it pushes countries that are not tax havens to become tax havens. This effect is found for OLS and IV estimations. On the contrary, the effect of demand conditional on being a tax haven is not significantly different from zero, and small as revealed by the standardized coefficient. The result in column (2) confirms that the effect of demand decreases with distance and disappears around the 30th size percentile for the OLS estimation and around the 45th size percentile for the IV estimation. For a visual representation of these results, refer to Figure A.5 in the Appendix.

In sum, the results presented in this table support Testable Implication 1, demonstrating that demand exerts a significant influence only on the smallest countries in the sample.

Robustness To assess the robustness of these results, I propose different exercises. In Table A.3, I use a threshold of 5000km to compute the demand received by a country. Then, I correct the IV estimates for spatial correlation using the estimator of Colella et al. (2019) and specifying spatial clusters such as the correlation between error terms of two observations decreases linearly with distance and is zero when their distance is larger than 1000km and when they are separated by more than 10 years (Table A.4). In Table A.5, instead of relying on the weighted average of the tax-GDP ratio in foreign countries, I rely on information about tax introductions using data from Seelkopf et al. (2021). Finally, I randomly permute the demand shocks received by tax havens. Countries are randomly assigned 1000 times the demand shock received the same year by another country (Table A.6). In all cases, the main results of this section are confirmed.

23. The residualized dependent variable corresponds to the dependent variable cleared from the variation coming from the fixed effects. It follows the methodology proposed by Mummolo and Peterson (2018).

Table 3 – The impact of demand on the probability of reform

	(1) Reform	(2) First Reform	(3) Other Reforms
OLS			
Demand (within 2500km)	0.413**	0.313**	1.404
	(0.201)	(0.128)	(1.058)
Demand (within 2500km) × ln(Area)	-0.0412**	-0.0335***	-0.0668
	(0.0163)	(0.0110)	(0.110)
Standardized effect	0.661	1.535	0.443
Effect = 0 at size:	22574	11425	–
Effect = 0 at size percentile:	36	30	–
IV			
Demand (within 2500km)	0.610*	0.879***	-2.135
	(0.365)	(0.278)	(2.267)
Demand (within 2500km) × ln(Area)	-0.0813***	-0.0811***	-0.132
	(0.0257)	(0.0199)	(0.180)
Standardized effect	0.977	4.315	-0.674
Effect = 0 at size:	1820	50905	–
Effect = 0 at size percentile:	24	45	–
K-P F-stat	128.7	56.67	11.42
Observations	9,589	8,184	1,405
Time FE	Yes	Yes	Yes
Country FE	Yes	Yes	Yes
Controls	Yes	Yes	Yes

Note: This table estimates equation 5. Data on the share of taxes in GDP comes from Andersson and Brambor (2019b). Data on tax havens' reforms comes from own data collection detailed in section 2. Column (1) includes all reforms as dependent variables. In column (2) tax havens leave the sample after the first reform. Column (3) only considers new reforms from countries that are already tax havens. Additional controls correspond to an indicator variable for being independent and the number of years since independence. The standardized effects are computed by multiplying the coefficient on demand (α_1) by the standard deviation of the residualized independent variable and dividing it by the average of the dependent variable in the sample. It can be interpreted as the percentage change, in small countries, in the probability of the event represented by the dependent variable when demand increases by one standard deviation. "K-P F-stat" stands for the Kleibergen-Paap Wald rk F statistic. Robust standard errors clustered at the country level in parentheses. *** p<0.01, ** p<0.05, * p<0.1

6 Competition shocks

The previous section studies how tax havens are affected when the demand for tax haven services changes exogenously. It has been established that an increase in the potential demand received by a country increases its probability of becoming a tax haven. This effect decreases with country size. The results also suggest that demand does not explain well why tax havens update their legal architecture. Testable Implication 2 of section 4 shows that competition between tax havens can also drive their offshore policies.

In this section, I explore whether competition shocks can help to understand other causal determinants of tax havens. This exercise participates in understanding how tax havens adapt when they face negative shocks on their rents. This is, for instance, what is expected when governments introduce anti-avoidance policies.

Identification I exploit a large quasi-natural experiment, the decolonization of British colonies in the Caribbean and the Pacific. Decolonization can be seen as a large supply shock in the market for tax haven services. Figure 4 has demonstrated that this shock increased the probability of former U.K colonies to make an offshore reform. Following the wave of decolonization, many newly decolonized countries became tax havens or updated their legal architecture. This shock can mainly be described as a supply shock that pushed many newly independent countries to seek additional revenues. It exogenously increased competition between tax havens by increasing the number of competitors in the market.

To identify the effect of competition on tax havens' policies. I assume that, as for demand, there is a geographic component of competition. Two tax havens that are geographically close will compete more than two remote tax havens. This assumption is directly linked to the theoretical framework where tax havens that are geographically close attract demand from the same places (see Remark 3). In addition, Table A.7 in Appendix B finds, using the Offshore Leaks data, that one additional tax haven reform in an area of 1000km reduces the number of entities registered in a given tax haven by 5.8%. This illustrate the negative effect of competition on the number of offshore users in a given tax haven.

To generate a differential exposure to competition, I keep using geographical variations by looking at the impact of new offshore reforms in a circle of 1000km.[24] The impact of competition is then identified by the fact that different countries are hit differently by the competition shock according to their geography. The shock hits harder the countries closer to tax havens that implement reforms. To study the role of competition on tax havens' policies, I estimate the following equation:

$$\mathbb{1}_{Reform_{it}} = \beta_1 ln(D_{it}) + \beta_2 \left(\sum_{j \neq i} \mathbb{1}_{Reforms_{jt}} \times \mathbb{1}_{Dist_{ij} < 1000km} \right) + CZ_{it} + \gamma_i + \gamma_t + \upsilon_{it} \qquad (7)$$

24. This lower threshold than in the previous section is justified by the fact that it offers more variation given that many tax havens are clustered in similar geographic areas.

where $\mathbb{1}_{Reform_{it}}$ is an indicator variable equal to 1 when a reform is enacted in country i at date t. $\left(\sum_{j \neq i} \mathbb{1}_{Reforms_{jt}} \times \mathbb{1}_{Dist_{ij}<1000km}\right)$ is a variable that counts the number of reforms enacted in foreign havens j distant by less than 1000 kilometers. Z_{it} is a vector of control variables, γ_i are country fixed effects and γ_t are time fixed effects. υ_{it} are the residuals. The equation is estimated using a linear probability model.

The effect of competition on the legal architecture of tax havens is estimated through β_2. Equation 7 is subject to endogeneity issues through reverse causality. Indeed, reforms taken in country i depend on other tax havens policies, which in turn depends on i policies. Therefore, I use the natural experiment of decolonization to obtain exogenous variation in reforms. I concentrate on post-war American and Pacific areas since these are the areas affected by the decolonization shock. I instrument the number of reforms in the 1000km around a given country by the number of newly independent British colonies in the 1000km around this country. Because of the country and time fixed effects, this instrument only captures the variation coming from newly independent countries. The variation exploited in these regressions comes from a different exposure of different tax havens to the shock due to differences in geography and differences in the timing of decolonization.

The exclusion restriction imposes that the independence of countries in an area of 1000km around country i affects its offshore policies only because it pushes newly independent countries to enact tax haven reforms. The geography and timing of decolonization have the advantage of being independent of the level of demand for tax haven services. However, one might argue that decolonization could have impacted tax havens development through a demand channel. If decolonization increased economic uncertainty, this might create capital flight to close countries. This is however unlikely as the bulk of offshore assets was coming from developed countries (Farquet, 2021). As just described, the exploration of the Offshore Leaks data (table A.7 in Appendix B) shows a decrease in offshore entities registration when neighboring countries implement new reforms. This is not compatible with a positive demand shock, in which case we would have observed an increase in the number of registered entities. Therefore it excludes a violation of the exclusion restriction through this channel.

This instrument can be subject to the omitted variable bias pointed out by Borusyak and Hull (2020) that arises through non-random exposure to random shocks. Indeed, the exposure to the random shock might not be random, since it depends on the number of neighbors that are British colonies. I follow Borusyak and Hull (2020)'s suggestions and recenter my instrumental variable by the number of British non-independent territories in a circle of 1000km around country i at date t. Assuming a constant probability of becoming independent each year, this last variable is proportional to the expected shock.

Results Results are displayed in Table 4. The three first columns display OLS regressions, columns (3) to (6) display IV regressions with the number of independent countries in 1000km around as an instrument, columns (7) to (9) restrict the sample of the IV regressions to countries that do not become independent during the period studied. This sample restriction limits the extent of bias introduced by the fact that some countries

might experience the decolonization shock at the same time as the competition shock. This is an additional robustness exercise as this channel is accounted for by controlling for independence and time since independence in columns (3) to (6). The coefficient on the number of reforms around has been multiplied by 100. It should be interpreted as the percentage point increase in the probability of becoming a tax haven when there is one new reform around. The average change in the number of reforms in a circle of 1000km from 1945 to 2000 in the sample is on average 8 conditional on being a tax haven.

Looking at all reforms in column (1), we observe that one additional tax haven reform around a given country increases its probability of becoming a tax haven by 0.12 percentage points, corresponding to 1 percentage point for 8 additional reforms. The effect is similar if we concentrate only on the first reforms. When looking at subsequent reforms made in countries that are already tax havens, 1 additional reform increases the probability of making a new reform by 0.34 percentage points. The effect is imprecisely estimated though and not significantly different from 0 at the 10% level. The level of demand, captured through the weighted level of taxation in foreign countries positively affects the probability of reform though not significantly.

The IV regressions confirm the above results: one new reform around a country increases the probability of doing a reform by 0.15 percentage points, of becoming a tax haven by 0.13 percentage points and of adopting a subsequent reform once a country is already a tax haven by 0.6 percentage points. When the sample is restricted to countries that never become independent in the sample, I find a large effect on subsequent reforms. A new reform in a circle of 1000km increases the probability of adopting a subsequent reform by 1.2 percentage points. This corresponds to an increase of 9.6 percentage points for 8 reforms in a circle of 1000km. However, despite being positive, the effect on first reforms is now lower than in the previous columns and not significantly different from zero. This suggests that for these countries, the level of competition played little in entry into the tax haven status.

Overall, these results show a large effect of competition on tax havens' policies. I now discuss a potential channel of this effect: the role of legal technologies and their diffusion.

Mecanism: legal technologies At least two channels, discussed in Proposition 2, can be at play. On the one hand, more competition in the market for tax havens services reduces the rent of tax havens. On the other hand, tax havens might want to adjust to this shock by updating their legal architecture to increase their rents.[25] This latter effect can benefit from the diffusion of new legal technologies.

The competition effect is therefore intertwined with a learning effect where actual and potential competitors can observe the type of laws used by other countries and can design their laws according to their perception of the effectiveness of these laws. This effect can be even more important given that the laws are generally written with the help of a small pool of lawyers advising several countries simultaneously.

25. Another alternative would be to compete on tax rates. The absence of historical information on the tax rate applied by tax havens prevents me from exploring this channel.

Table 4 – The impact of increased competition on the probability of reform

	(1) $\mathbb{1}_{Reform}$	(2) $\mathbb{1}_{FirstRef.}$	(3) $\mathbb{1}_{OtherRef.}$	(4) $\mathbb{1}_{Ref.}$	(5) $\mathbb{1}_{FirstRef.}$	(6) $\mathbb{1}_{OtherRef.}$	(7) $\mathbb{1}_{Ref.}$	(8) $\mathbb{1}_{FirstRef.}$	(9) $\mathbb{1}_{OtherRef.}$
ln(Av. Direct Tax/GdP)	0.0798	0.0236	-0.705	0.0886	0.0230	-0.199	0.733	0.177	8.435**
	(0.231)	(0.134)	(1.550)	(0.239)	(0.134)	(1.818)	(0.812)	(0.543)	(3.588)
# Reforms < 1000 km	0.122**	0.115*	0.341	0.149**	0.133*	0.566	0.220**	0.0928	1.189***
	(0.0607)	(0.0604)	(0.309)	(0.0745)	(0.0691)	(0.343)	(0.0929)	(0.0957)	(0.182)
K-P F-stat				640.3	621.7	74.30	484.5	257.7	483.5
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Post-1945	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Non independent only	No	No	No	No	No	No	Yes	Yes	Yes
Observations	4,139	3,488	651	4,138	3,488	650	1,389	1,119	253

Note: This table estimates equation 7. Coefficients on # *Reforms < 1000 km* have been multiplied by 100 for readability. Data on the share of taxes in GDP comes from Andersson and Brambor (2019b). Data on tax havens' reforms comes from own data collection detailed in section 2. Columns (1), (2) and (3) estimate OLS. Columns (4), (5) and (6), estimate an IV regression. Columns (7), (8), (9) estimate an IV regression restricted to the sample of never-independent territories. Additional controls are included in columns (1) to (6) and correspond to an indicator variable for being independent and the number of years since independence. All regressions include country and year fixed effects. "K-P F-stat" stands for the Kleibergen-Paap Wald rk F statistic. Robust standard errors clustered at the country level in parentheses. *** p<0.01, ** p<0.05, * p<0.1

This second effect dominates the first as we observe an increase in the number of reforms in tax havens hit by the competition shock. In particular, we see that tax havens react on the intensive margin. This intensive margin can be decomposed between reforms in an area of specialization in which the tax haven has already made a reform or reforms in a new area. An area of specialization corresponds to a broad type of legal technologies (*e.g.* "Individual", or "Banking"). This is what I explore in Appendix Table A.8. This table replicates columns (6) and (9) of Table 4 with indicator variables for "reforms in a new area" or "revisions" as dependent variables. The table shows that the competition shock has a larger impact on investment in new areas than in areas in which the tax haven is already specialized. This is true both for all countries and for only non-independent countries.

Innovation in a new area can be facilitated if investment in the architecture is not costly. This is the case when new legal technologies emerge (Hypothesis 3). For instance, International Business Companies constitute such a technology. Descriptive evidence in figure 2 shows that IBCs diffused quickly between countries despite being a relatively late innovation in the 20th century. The emergence of new legal technologies can favor learning by tax havens, which helps to mitigate the negative effects of decreased rents. Learning is particularly facilitated by the fact that laws are public and not protected from reproduction.

Here, I study the extent to which the diffusion of IBCs fueled the reaction of tax havens to the competition shock. To do so, I follow the structure of equation 7 and look at the impact of new IBC reforms in a circle of 1000km on the probability of introducing this type of reform in its legal architecture:

$$\mathbb{1}_{FirstReform_{it}^{IBC}} = \zeta_1 ln(D_{it}) + \zeta_2 \left(\sum_j Reforms_{jt}^{IBC} \times \mathbb{1}_{Dist_{ij}<1000km} \right) + CZ_{it} + \gamma_i + \gamma_t + u_{it} \quad (8)$$

where $\mathbb{1}_{FirstReform_{it}^{IBC}}$ is an indicator variable equal to 1 when an IBC reform is enacted in country i at date t for the first time. The country leaves the sample once it has enacted

Table 5 – Competition and the diffusion of International Business Companies

	(1)	(2)	(3)	(4)
			$\mathbb{1}_{FirstReform_{it}^{IBC}}$	
Number of IBC < 1000km	0.473**	1.567	0.350	8.344*
	(0.223)	(1.888)	(0.314)	(3.831)
K-P F stat	1109	48.65	1052	29.77
Controls	Yes	Yes	Yes	Yes
Country and year FE	Yes	Yes	Yes	Yes
Reform	All	Others	All	Others
Non-independent only	No	No	Yes	Yes
Observations	3,928	439	1,332	197

Note: This table estimates equation 8 for IBC reforms. Coefficients on # *Reforms < 1000 km* have been multiplied by 100 for readability. The sample is restricted to the "IV sample" of Table 4 *i.e* countries in Americas and Oceania, after 1945. "Number of IBC laws < 1000km" corresponds to the number of countries that have introduced IBC laws and that are located less than 1000km away from the country of interest. The dependent variable is an indicator variable equal to 1 if an IBC law has been implemented. Countries are dropped from the sample once they implement an IBC law. Additional controls are included: columns (1) and (2) include $ln(D_{it})$, an indicator variable for being independent and the number of years since independence. Columns (3) and (4) include $ln(D_{it})$ only. The other control variables cannot be included as the sample is restricted to non-independent territories. Data on tax havens' reforms comes from own data collection detailed in section 2. Details on the classification of reforms are displayed in Table 1. Robust standard errors clustered at the country level in parentheses *** p<0.01, ** p<0.05, * p<0.1

the reform for the first time. $\left(\sum_j Reforms_{jt}^{IBC} \times \mathbb{1}_{Dist_{ij}<1000km}\right)$ is a variable that counts the number of IBC reforms enacted in foreign havens distant by less than 1000 kilometers. Z_{it} is a vector of control variables, γ_i are country fixed effects and γ_t are time fixed effects. u_{it} are the residuals. The equation is estimated using a linear probability model.

The coefficient ζ_2 is interpreted as the effect of one additional IBC reform in a circle of 1000km on the probability of doing a reform in this category. A larger coefficient means that IBC reforms are more likely to diffuse geographically.

In Appendix table A.9, I first estimate this model using OLS for reforms in the four more important categories at the end of the sample: Banking, Exempt Companies (no IBC), IBCs, and Individual. The results reveal that IBC reforms, Finance reforms and Individual reforms are those that diffuse the most in the whole sample. One additional reform around a tax haven not yet specialized in IBCs increases its probability of implementing such reform by 0.4 percentage points. This effect is statistically significant at the 5% level. For reforms targeting individuals, this number increases to 0.6 percentage points while it is small and non significantly different from zero for Exempt Company reforms (excluding IBCs). These results suggest that the cost of implementation and diffusion differs by technology.

Table 5 analyzes the role of IBC reforms in the reaction to the competition shock using the same sample as in table 4.[26] Column (1) considers all reforms and includes independent and non-independent countries. The coefficient estimated is of similar magnitude (slightly higher) to that in the whole sample. It means that the diffusion patterns are close in this sample than in the whole sample. The Kleinbergen-Paap F statistic is above conventional levels. Column (2) restricts the sample to subsequent reforms once a country is already a tax haven. The coefficient estimated is large and positive but not estimated with a lot of precision. Column (3) limits the sample to non-independent countries. Again, the coefficient is close to the one estimated in column (1), but not significantly different from zero at conventional levels. Finally, column (4) looks at subsequent reforms, conditional of being a tax haven. I find a large, positive coefficient for IBCs, revealing an important diffusion pattern of International Business Companies among non-independent countries following the decolonization shock.

The results of this section suggest one mechanism to explain the observed effect of competition. Facing a negative shock on their rents, tax havens tend to explore new areas of specialization. New legal technologies, especially if implementation costs are low such as in the case of IBCs, facilitate the upgrading of tax havens following the shock. Legal innovations are therefore crucial to understanding tax haven dynamics, particularly when they face a negative shock on their rents.

7 The consequences of tax havens

This section studies the consequences of tax havens, on their own development, and on other countries. It tests Testable Implication 3 about the reaction of non-havens to the presence of tax havens.

From an accounting point of view, the mechanical impact of tax havens on GDP should be neutral at the world level: increases in private revenues and tax havens' tax revenues offset the decline of tax revenues in non-haven countries. Nevertheless, it is essential to take into account that this reallocation of revenues i) affects the investment behavior of countries and private agents, and ii) affects the tax-setting behavior of high-tax countries. The increase in tax havens' revenues and in private revenues might spur growth by increasing investment and consumption while the decrease in tax revenues in high-tax countries might affect public spending and therefore GDP. High-tax countries might also react by adjusting their tax policy. All these effects make the long-term effects of tax havens different from their short-run effects. Under some modeling assumptions, tax havens can even have positive spillovers on other countries in terms of welfare (Hong and Smart, 2010, Chu et al., 2015), or tax revenues (Johannesen, 2010). The empirical question of the global effect of tax havens on other countries is then left unanswered. The data collected for this paper offers an unique occasion to explore the causal impact of the offshore tax havens policies on domestic development and on other countries.

26. Because these regressions are done on a restricted sample, there are not enough reforms of other types to replicate the analysis for other technologies.

7.1 The consequences of becoming a tax haven

I first investigate the effects of becoming a tax haven on GDP per capita. I run an event study regression where I regress the log of GDP per capita on leads and lags of the event of becoming a tax haven. Data on GDP per capita is taken from the World Bank and begin in 1962. It is not available for all countries, especially for tax havens that are small, sometimes non-independent countries. This limits the number of tax havens that can be included in the estimation sample.

To identify causal effects of becoming a tax haven, we would like, in an ideal experiment, to compare the evolution of two similar countries with one that becomes a tax haven and the other not. In order to be as close as possible from this thought experiment, I adopt two different strategies. First, I run a difference-in-difference with heterogeneous timing of treatment following the methodology of de Chaisemartin and D'Haultfœuille (2020). To be able to effectively compare tax havens to similar countries, I restrict the sample to countries in the same region as new tax havens. This exercise is restricted to the Caribbean, the Middle East and the Pacific, and nine tax havens are included in the treated group.[27] Then, to include more tax havens in the estimation, I switch to a interactive fixed effects estimator. This estimator has been introduced by Gobillon and Magnac (2016) and Xu (2017) and recently discussed in Liu et al. (2022). It can be seen as an extension of generalized Synthetic Control Matching (Xu, 2017). By including interaction between an individual-specific effect and a time-specific effect, it captures more finely possible confounders that are time invariable but whose effect might vary over time. Fifteen treated countries are included in this estimation sample.[28] I estimate the following equation:

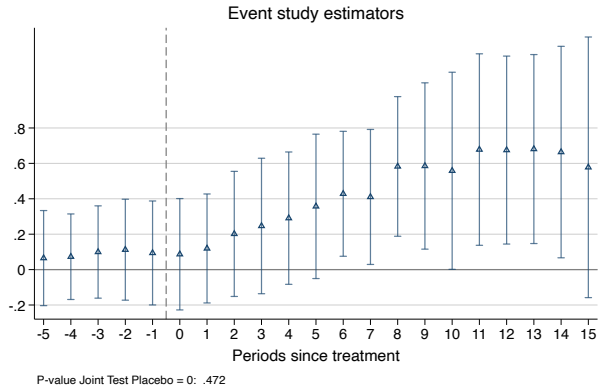
$$ln(GDPpc_{it}) = \sum_{k=-10}^{15} \theta_k Haven_{it}^k + \eta_i + \eta_t + \iota_{it} \tag{9}$$

where $GDPpc_{it}$ is the GDP per capita of country i at date t. $Haven_{it}$ is equal to 1 when country i becomes a tax haven. $Independent_{it}^k$ is a dummy variable equal to one for treated countries k years before or after they become independent. η_i and η_t are country and time fixed effects, and ι_{it} is the error term. The control group corresponds to countries that have never become tax havens.

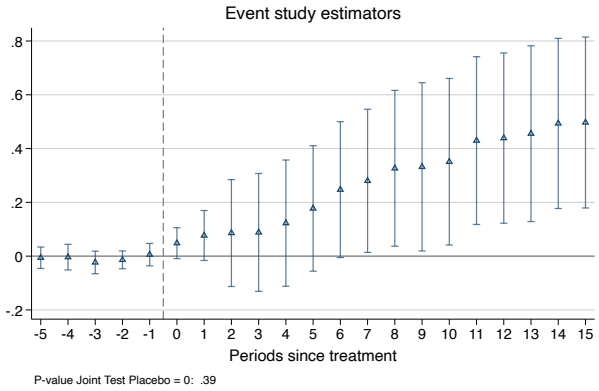
Results are displayed in Figure 5. Both panels of the figure go in the same direction and reveal an interesting pattern: becoming a tax haven increases GDP per capita by large amounts. The average growth rate estimated is almost 50% after 10 years in the restricted sample of panel (a). This number corresponds to an annual additional growth rate of the GDP per capita of 4.1%. In panel (b), the estimated effect is a bit lower, with a gain of 40% after 10 years, corresponding to an annual growth rate premium of 3.4 percentage points. This result is in line with the anecdotal observation that the countries in my sample experienced large growth rates at the end of the 20th century. For instance, one year after becoming a tax haven in 1986, Grenada experienced a 9.3% increase in its

27. The tax havens included in the sample are Dominica, Grenada, Jordania, Saint Kitts-and-Nevis, Saint Lucia, Marshall Islands, Tonga, Saint Vincent-and-the-Grenadines, and Western Samoa.

28. Belize, Hong-Kong, Mauritius, Malaysia, Singapore, and Seychelles are added to the previous list.



(a) Imputation estimator, restricted sample



(b) Interactive fixed effects

Figure 5 – Effect of becoming a tax haven on GDP per Capita

Note: This figure plots coefficients from an event-study regression following equation 9. In panel (a), I use the imputation estimator proposed by Borusyak et al. (2022), Liu et al. (2022), and Gardner (2022). The treated group is composed of 9 tax havens from the Caribbean, Middle East and Pacific: Dominica, Grenada, Jordania, Saint Kitts-and-Nevis, Saint Lucia, Marshall Islands, Tonga, Saint Vincent-and-the-Grenadines, and Western Samoa. The control group is composed of countries that never become tax havens from the same regions. In panel (b), I use interactive fixd effects following Gobillon and Magnac (2016), Xu (2017) and Liu et al. (2022). The treated group is composed of 15 tax havens: the 9 of panel (a) plus Belize, Hong-Kong, Mauritius, Malaysia, Singapore, and Seychelles. The control group is composed of all never-haven countries in the world. Both panels study how becomming a tax haven affect GDP per capita. 95% confidence intervals from bootsptrapped standard errors (500 repetitions). The Wald p-value tests for the absence of pre-trends.

GDP per capita.[29] The gains from becoming a tax haven virtually stagnate after 10 years on average and potentially decrease over time in panel (a). This pattern is not found in panel (b) even if gains appear smaller over time. Even if the premium from becoming a tax haven is mainly short-term, it creates long-term differences in GDP per capita. In both figures, the pre-trends are small, stable, and not significantly different from zero. This reinforces the causal interpretation of the results.

It must be noted that the GDP data should be taken with caution. First, it might not be very precise or be partly imputed, given the level of development of the countries that enter the estimation. This is a drawback that is hard to correct for. Measurement error appears here to be a confounding factor. However, this confounding factor would have to follow a very specific path to be consistent with the observed trend in Figure 5. Second, increases in GDP in tax havens can reflect revenues accruing only to foreigners that represent a large share of the economy. Therefore, increase in GDP might not reflect changes in real activity.

To check whether GDP changes are really linked to changes in the economic structure of tax havens, I study the evolution of agricultural land in Figure A.7. I find that becoming a tax haven decreases by 20% the share of agricultural land after 15 years, with a steadily decreasing trend. This effect suggests that at least part of the change in GDP per capita is driven by a transition of the economies of tax havens out of the agricultural sector.

29. Using different empirical settings, Hines (2005) and Butkiewicz and Gordon (2013) also find a positive impact of being a tax haven on GDP.

These results can be interpreted in the light of the tax competition theory. Countries become tax havens as long as there is a positive rent to do so. The marginal tax haven should be indifferent between becoming a tax haven or not (Slemrod and Wilson, 2009, Johannesen, 2010). The results here are at odds with this theoretical reasoning. There could be different reasons. First, I study here a specific group of tax havens. The large positive effects on GDP per capita would suggest that there are still rents to acquire by becoming a tax haven. In absence of structural changes in the international taxation environment, more countries would be expected to enter. Second, it might be possible that rents exist for some country characteristics but that no existing country has the required characteristics and then no country is willing to enter. Third, as discussed before, GDP per capita, overestimates welfare in tax havens. Using the right metric might decrease the potential gains from becoming a tax haven.

7.2 The effect of tax havens on other countries

It exists a large literature that shows the wide range of consequences of tax havens on other countries (see footnote 1). In particular this literature documents an erosion of mobile tax bases due to the use of tax havens (Torslov et al., 2022). These papers generally focus on the direct effects of tax havens on other countries, disregarding potential general equilibrium effects or the responses from affected countries as studied in the tax competition literature (Keen and Konrad, 2013). This subsection studies the long-term effects of tax havens on other countries' GDP per capita, tax revenues, and tax structure using the switch of non-haven to tax havens.

Even if the data at hand is ideal for this exercise, the empirical set-up is challenging. First, all countries appear to be treated when a new tax haven emerges. To solve this issue, I again rely on geographical variations. I make the hypothesis that a non-haven country is more intensively treated when a tax haven appears in its neighborhood. This assumption is motivated by the evidence discussed in Section 3 that the use of tax havens follows gravity patterns and that the costs of using tax havens increases with distance. In this exercise, I will consider that the treatment corresponds to the arrival of a new tax haven in a circle of 2500 kilometers around a given country.

Second, even once the treatment is defined, there might be multiple treatments (one for each new tax haven). I follow the recent developments in the difference-in-differences literature that extends the canonical set-up to more general settings. In particular, de Chaisemartin and D'Haultfœuille (2023) proposes an estimator robust to heterogeneous treatment effects that allows the estimation of the dynamic causal effect of multiple treatments. The main idea of this estimator is to compare switchers (countries that have new tax havens around them) l periods after treatment to groups that have not switched yet, but that have the same treatment at the beginning of the sample. I propose one baseline empirical model, and two robustness tests.

The tax revenues data for a large set of countries is only available from 1965. I cannot measure any effect of tax havens on tax revenues outcomes before this date. To take into account the fact that countries might have been affected by tax havens before this date

I design two different groups: the group of countries that have never been exposed to tax havens and the group of countries that have already been exposed to at least one tax haven. In both of these groups some countries might be further treated (*treatment group)* and some not (*control group*). This step is necessary because the estimator compares switchers to non-switchers with the same treatment at the beginning of the sample. To make the countries in the second group more similar, I also restrict the estimation to countries that have at most five tax havens in a circle of 2500km around them when they enter the sample.

I propose two alternative empirical settings in Figure A.8 of Appendix C. In the first one, I do not restrict the estimation to countries that have at most five tax havens in a circle of 2500km around them when they enter the sample. This estimation has the advantage of including more countries in the estimation sample at the expense of the quality of the control group. Secondly, instead of relying on the number of tax havens around, I use the share of countries in a circle of 2500km that are tax havens as my treatment variable. This specification allows to account for the fact that countries that have more neighbors are structurally more likely to have tax havens in their neighborhood. The estimator will compare switchers l periods after treatment to groups that have not switched yet, but that have the same share of tax havens around them at the beginning of the sample. This condition limits the number of countries in the estimation since some treated units might not have comparable units available. Both robustness exercise deliver similar point estimates, in particular 8 or more years after the first treatment.

I study the effects of new tax havens on other countries' GDP per capita, tax revenues and tax structure. I use the recent database made available by Bachas et al. (2022) that provides information on the tax revenues of a large number of countries for a long period in the second part of the 20th century. They separate these revenues between those levied on capital (corporate income taxes, wealth taxes, property taxes, and a share of personal income taxes) and those levied on labor (payroll taxes, social security payments, and a share of personal income taxes).The tax structure is studied through the differential taxation of labor *vs.* capital.

I estimate the following equation:

$$y_{it} = \sum_{k=-3}^{10} \beta_k \left(\sum_j Haven_j^k \times \mathbb{1}_{dist_{ij}<2500km} \right) + \mu_i + \mu_t + e_{it} \tag{10}$$

where y_{it} is the outcome of interest for country i at date t, either the logarithm of GDP per capita, total tax revenues as a share of Net Domestic Product (NDP), and the difference of tax revenues on labor and tax revenues on capital as a share of NDP. $\left(\sum_j Haven_j^k \times \mathbb{1}_{dist_{ij}<2500km} \right)$ corresponds to the number of new tax havens in a circle of 2500km around country i. μ_i and μ_t are country and year fixed effects. e_{it} are the residuals of the estimation.

The coefficient estimated at a given period k corresponds to the weighted average of the effect of current treatment and of its previous lags on the outcome under the no-anticipation assumption and the parallel trend assumption. The parallel trend assump-

tion requires that treated countries have the same expected evolution of their outcome as non-switchers with the same initial treatment if they had not been treated.

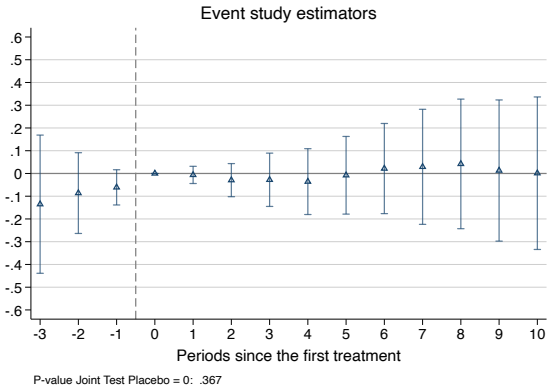
Results are displayed in Figure 6. Panel (a) plots the estimated effect of having a new tax haven in its neighborhood on GDP per capita. I find no distinguishable effects, with small coefficients and large confidence intervals. Panel (b) explores the effect on total tax revenues. First, we can see from the pre-event coefficients, that the assumption of parallel pre-trends is unlikely to hold. Actually, it supports the results of section 5 that tax havens appear in reaction to tax increases in neighboring countries. Post-event, there are no statistically significant effects of having new tax havens in its neighborhood even though the point estimates suggest a small negative effect on tax revenues. Combined with the results of the literature that documents a negative direct effect of tax havens on tax revenues, this suggests that governments, that want to collect a certain amount of tax revenues, react to losses in tax revenues due to tax havens by offsetting them through increased taxes on other bases. This view is in line with the results of Bilicka et al. (2023) that show that German municipalities highly exposed to tax avoidance by MNEs tend to have larger indirect tax revenues.

Finally, I explore the potential effect of tax havens on the tax structure of other countries in panel (c). I compare the taxation that falls on labor (a relatively immobile factor) to the taxation that falls on capital (a relatively mobile factor). Interestingly, the pre-trends are not significantly different from zero. It mean that if tax policy changes in non-haven countries do cause countries to become tax havens, it is not due to a differential increase of taxation of capital over labor. Following the first event, the relative taxation of labor increases compared to capital. The effect is large (+2 p.p of Net Domestic Product 6 years after the first treatment) and statistically significant at the 95% level. Given that the average difference in 2000 is about 4.5% of the NDP, it means that new neighboring tax havens increase this difference by around 44%. Importantly, this result shows that governments react to the use of tax havens by changing their tax structure. The taxation of capital decreases relative to the taxation of labor, that is much less mobile. This result documents a new channel through which globalization has affected the tax structure of countries over the second part of the 20th century (Egger et al., 2019, Bachas et al., 2022).

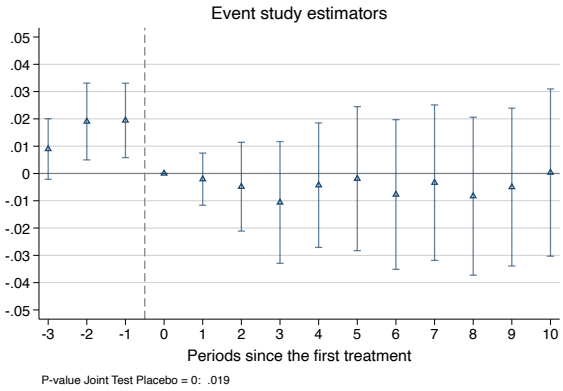
8 Conclusion

In this paper, I introduced a novel database that tracks the development of tax havens' legal architecture. Using this database, I highlighted the key role of market forces in tax haven creation and evolution. Demand matters through the market access of tax havens, while competition among tax havens appears as a primary driver of their development. Legal innovations also play a crucial role in how tax havens react to competition shocks. Lastly, I demonstrated that the gains from becoming a tax haven on GDP per capita come at the cost of a significant impact on the tax structure of non-haven countries.

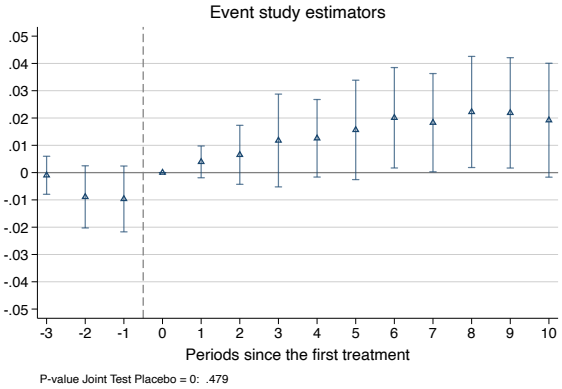
Recent developments in the regulation of tax havens, such as the OECD-led Common Reporting Standard (CRS) and the two-pillar reform of the international corporate



(a) GDP per capita



(b) Tax Revenues (% of NDP)



(c) Tax Rev. on L - Tax Rev. on K (% of NDP)

Figure 6 – Effect of tax havens on other countries

Note: This figure plots coefficients from an event-study regression following equation 10 and estimated using the estimator of de Chaisemartin and D'Haultfœuille (2023). In panel (a), the dependent variable is GDP per capita. In panel (a), the dependent variable is total tax revenues as a share of NDP. In panel (c), the dependent variable is the difference between revenues from the taxation of labor and revenues from the taxation of capital as a share of NDP. 95% confidence intervals from standard errors clustered at the country level.

tax system introduce substantial negative shocks on tax havens' rents (Gomez Cram and Olbert, 2022). Insights from this paper suggest that these policies may induce tax havens to update their legal architectures to introduce new legal technologies. This is confirmed by the fact that some tax havens have deepened their offshore legal architecture by implementing "high-risk" Citizenship-by-Investment schemes to circumvent the the CRS (Langenmayr and Zyska, 2021, OECD, 2022). These reforms generate for them substantial government revenue. [30]

An unintended consequence of regulations may be increased competition between tax havens and heightened aggressiveness in their regulations. Consequently, this paper underscores the importance of designing international regulations of tax havens to be robust against legal innovations and their diffusion.

30. According to the Eastern Caribbean Central Bank data, in 2021, Citizenship by investment schemes represent 9% of government's revenues in Antigua and Barbuda (0% in 2014), 54% of government's revenues in Dominica (12% in 2014), 4% of government's revenues in Grenada (0% in 2014), 51% of government's revenues in Saint-Kitts and Nevis (37% in 2014).

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Online Appendix

A Data sources

GDP and GDP per capita and population: Long-term GDP and population data from GapMinder that aggregates GDP from World Bank (World Development indicators), the Maddison Project, and the Penn World Tables. Details on the documentation: https://www.gapminder.org/data/documentation/gd001/. The event study on tax havens and GDP per capita uses GDP and population data from the World Bank's World Development Indicators.

Colonial History: I first associate each territory with a status relative to its sovereign history. Each country or territory can be either independent, non-independent and a colony, or non-independent and not a colony. This last status is created to deal with specific cases treated differently by different databases about colonial history. For instance, the islands of Jersey and Guernsey, despite being under the actual control of the United Kingdom, are generally not considered as colonies. However, for the purpose of this paper, it is important to highlight their link with the United Kingdom. To this purpose I use information from the Colonial Dates Dataset (Becker, 2020), the Cepii Gravity Dataset (Head and Mayer, 2014) and the ICOW colonial dataset (Hensel, 2018). The data is then manually completed when information is missing for a given territory using worldstatesmen.org, rulers.org, and wikipedia.org. The main colonial variable used in this paper record the last ruler of a territory (including its current ruler if applicable). It includes countries not generally considered as colonies, such as the Channel Islands.

Tax introductions: Data from Seelkopf et al. (2021).

Tax revenues: Data from Andersson and Brambor (2019a, 2019b).

Gravity data: Data from the U.S. International Trade Commission Gravity Portal (release 2.1), Gurevich and Herman (n.d.).

Swiss Market for haven's services: Data from Zucman (2013)

Fee revenues in Cayman Islands: Data from **cayman_islands_economics_and_statistics_office_2020_**

Citizenship by investment revenues: Data from the statistics portal of the Eastern Caribbean Central Bank (https://www.eccb-centralbank.org/statistics/fiscals/comparative-report/3).

Ideology of the Head of State: Data from Brambor et al. (2017), available at https://heads-of-government.github.io/.

Democracy: Data from VDEM's electoral democracy index (Coppedge et al., 2021). *v2x_polyarchy* variable.

B Supplementary tables

Table A.1 – Comparing different lists of tax havens.

Country	Lists	Country	Lists	Country	Lists	Country	Lists	Country	Lists	Country	Lists	Country	Lists
Bahamas	11	**Vanuatu**	10	**Monaco**	8	**Samoa**	6	Latvia	2	Campione	1	Nigeria	1
Bermuda	11	**Gibraltar**	9	**Nauru**	8	**Seychelles**	6	Madeira	2	Egypt	1	Northern Cyprus	1
Cayman	11	**Hong Kong**	9	**St Kitts & Nevis**	8	**Lebanon**	5	**Netherlands**	2	France	1	Palau	1
Guernsey	11	**Singapore**	9	**Andorra**	7	**Niue**	5	Philippines	2	Germany	1	Puerto Rico	1
Jersey	11	**St Vincent & the Grenadines**	9	**Anguilla**	7	**Macau**	4	South Africa	2	Guatemala	1	Russia	1
Malta	11	**Switzerland**	9	**Bahrain**	7	**Malaysia**	4	**Tonga**	2	Honduras	1	San Marino	1
Panama	11	**Turks & Caicos Islands**	9	Costa Rica	7	**Montserrat**	4	Uruguay	2	Iceland	1	Sao Tome e Principe	1
Barbados	10	**Antigua & Barbuda**	8	**Marshall Islands**	7	Maldives	3	**US Virgin Islands**	2	Indonesia	1	Sark	1
British Virgin Islands	10	**Belize**	8	**Mauritius**	7	United Kingdom	3	USA	2	Ingushetia	1	Somalia	1
Cyprus	10	**Cook Islands**	8	**St. Lucia**	7	Brunei	2	Alderney	1	**Jordan**	1	Sri Lanka	1
Isle of Man	10	**Grenada**	8	**Aruba**	6	Dubai	2	Anjouan	1	Marianas	1	Taipei	1
Liechtenstein	10	**Ireland**	8	**Dominica**	6	Hungary	2	Belgium	1	Melilla	1	Trieste	1
Netherlands Antilles	10	**Luxembourg**	8	**Liberia**	6	Israel	2	Botswana	1	Myanmar	1	Ukraine	1

Note: This table counts the number of tax havens lists in which each country is reported. Countries used in the sample of this paper are highlighted in **bold** font. The list of countries comes from table 1.4 of Palan et al. (2009). The eleven lists are the following: International Bureau of Fiscal Documentation (1977), Charles Irish (1982), Hines and Rice (1994), OECD (2000), IMF (2000), FSF (2000), FATF (2000,2002), TJN (2005), IMF (2007), STHAA (2007), Low-Tax.net (2008).

Table A.2 – Correlation of the instrument with shock-level variables.

	(1) KOF Econ.	(2) KOF Trade	(3) KOF Finance	(4) Financial Openess	(5) Tariff	(6) ln(GDPpc growth)	(7) Trade (% of GDP)
$\widehat{\frac{Direct\ Tax\ Revenues\_jt}{GDP\_jt}}^{IV}$	0.628	0.342	0.908	1.970	-70.18	-5.594	-0.162
	(0.455)	(0.591)	(0.891)	(2.324)	(134.1)	(6.952)	(0.822)
Adj. Within R-Squared	0.00733	0.00117	0.00495	0.00517	-0.00243	0.000219	-0.000955
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes

This table regresses shock-level variable on country-level characteristics to assess the validity of the instrument. variables are extracted from Gräbner et al. (2021). *KOF Econ*, *KOF Trade* and *KOF Finance* are the KOF globalization indexes computed by Gygli et al. (2019). They respectively capture *de jure* and *de facto* Economic globalization, Trade globalization and Financial globalization. *Financial Openness* corresponds to a text-based index for *de jure* financial openness computed by Quinn and Toyoda (2008) based on IMF's Annual Report on Exchange Arrangements and Exchange Restrictions. Robust standard errors clustered at the country level in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$

Table A.3 – The impact of demand on the probability of reform: robustness on the definition of demand

	(1) Reform	(2) First Reform	(3) Other Reforms
OLS			
Demand (within 5000km)	0.273***	0.261***	0.960
	(0.0917)	(0.0823)	(1.300)
Demand (within 5000km) × ln(Area)	-0.0341***	-0.0280***	-0.0514
	(0.00813)	(0.00678)	(0.118)
Standardized effect	0.576	1.580	0.281
Effect = 0 at size=	3028	11025	–
Effect = 0 at size percentile=	26	30	–
IV			
Demand (within 5000km)	0.331***	0.349***	0.685
	(0.118)	(0.116)	(1.579)
Demand (within 5000km) × ln(Area)	-0.0571***	-0.0415***	-0.113
	(0.0131)	(0.00958)	(0.125)
Standardized effect	0.698	2.113	0.200
Effect = 0 at size=	328	4466	418
Effect = 0 at size percentile=	12	27	14
K-P F-stat	293.1	195.8	18.96
Observations	15,733	14,086	1,647
Time FE	Yes	Yes	Yes
Country FE	Yes	Yes	Yes
Controls	Yes	Yes	Yes

Note: This table estimates equation 5. Data on the share of taxes in GDP comes from Andersson and Brambor (2019b). Data on tax havens' reforms comes from own data collection detailed in section 2. Column (1) includes all reforms as dependent variables. In column (2) tax havens leave the sample after the first reform. Column (3) only considers new reforms from countries that are already tax havens. Additional controls correspond to an indicator variable for being independent and the number of years since independence. The standardized effects are computed by multiplying the coefficient by the standard deviation of the residualized independent variable and dividing it by the average of the dependent variable in the sample. It can be interpreted as the percentage change in the probability of the event represented by the dependent variable when demand increases by one standard deviation. "K-P F-stat" stands for the Kleibergen-Paap Wald rk F statistic. Robust standard errors clustered at the country level in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$

Table A.4 – The impact of demand on the probability of reform: robustness for spatial auto-correlation and independent variable definition

	(1) Reform	(2) First Reform	(3) Other Reforms
Demand (within 2500km)	0.610***	0.879***	-2.135
	(0.224)	(0.264)	(2.142)
Demand (within 2500km) × ln(Area)	-0.0813***	-0.0811***	-0.132
	(0.0188)	(0.0184)	(0.152)
Observations	9,589	8,184	1,405
Time FE	Yes	Yes	Yes
Country FE	Yes	Yes	Yes
Controls	Yes	Yes	Yes
K-P F-stat	111.4	70.32	5.982

This table estimates equation 5 using the estimator of Colella et al. (2019) that takes into account spatial auto-correlation. I specify spatial clusters such as the correlation between error terms of two observations decreases linearly with distance and is zero when their distance is larger than 1000km and when they are separated by more than 10 years. Data on the share of taxes in GDP comes from Andersson and Brambor (2019b). Data on tax havens' reforms comes from own data collection detailed in section 2. Column (1) includes all reforms as dependent variables. In column (2) tax havens leave the sample after the first reform. Column (3) only considers new reforms from countries that are already tax havens. Additional controls correspond to an indicator variable for being independent and the number of years since independence. "K-P F-stat" stands for the Kleibergen-Paap Wald rk F statistic. *** p<0.01, ** p<0.05, * p<0.1

Table A.5 – The impact of demand on the probability of reform: number of tax introductions

	(1) $\mathbb{1}_{Reform}$	(2) $\mathbb{1}_{FirstReform}$	(3) $\mathbb{1}_{OtherReforms}$
Extensive margin			
# Direct $<$ 2500km	0.389***	0.254***	0.583
	(0.0783)	(0.0517)	(0.419)
# Direct $<$ 2500km $\times$ ln(Area)	-0.0338***	-0.0218***	-0.0196
	(0.00607)	(0.00401)	(0.0399)
Standardized effect	0.415	0.756	0.0769
Effect = 0 at size=	99515	117809	–
Effect = 0 at size percentile=	54	57	–
Time FE	Yes	Yes	Yes
Country FE	Yes	Yes	Yes
Controls	Yes	Yes	Yes
Observations	23,214	21,396	1,818

This table estimates equation (5). # Direct refers to the number of Corporate income taxes or Personal income taxes introduced within a distance range. The coefficient has been multiplied by 100 to ease interpretation. Data on the introduction of taxes comes from Seelkopf et al. (2021). Data on tax havens' reforms comes from own data collection detailed in section 2. Column (1) include all reforms as dependent variables. In column (2), tax havens leave the sample after the first reform. Columns (3) only considers new reforms from countries that are already tax havens. Additional controls correspond to an indicator variable for being independent, and the number of years since independence. The scaled effects are computed by multiplying the coefficient by the standard deviation of the residualized number of direct taxes introduced in less than 2500km and dividing it by the average of the dependent variable in the sample. It can be interpreted as the percentage change in the probability of the event represented by the dependent variable when demand increases by one standard deviation. *** p$<$0.01, ** p$<$0.05, * p$<$0.1

Table A.6 – Permutation tests

	OLS	IV
Share $\alpha_1^{placebo}$ as large as α_1	1.01%	2.47%
Share $\alpha_2^{placebo}$ as large as α_2	0.11%	$<$0.001%

This table shows the result of a permutation test. I run the OLS and IV specifications of column (1), Table 3 on a dataset where observations of the independent variables have been permuted between countries. In particular, it comes down to assigning the shocks received by a country j to another country i. I replicate this exercise with 200 different permutations of the data.

Table A.7 – Offshore entities and competition.

	(1) Number offshore entities
# Reforms $<$ 1000 km	-0.0596*** (0.0176)
Controls	Yes
Country and year FE	Yes
Observations	1,334

This table estimates with the Poisson pseudo-maximum likelihood estimator the following equation: $Number\ offshore\ entitites_{it} = \beta_1(\sum_{j \neq i} \mathbb{1}_{Reform_{jt}} \times \mathbb{1}_{Dist_{ij}<1000km}) + XZ_{it} + \mu_i + \mu_t + \epsilon_{it}$. $Number\ offshore\ entitites_{it}$ is the number of offshore entities recorded in the Offshore Leaks data for country i at date t. $\sum_{j \neq i} \mathbb{1}_{Reform_{jt}} \times \mathbb{1}_{Dist_{ij}<1000km}$ corresponds to the number of reforms made in foreign tax havens distant by less than 1000km. Z_{it} is a vector of controls. μ_i are country fixed effects, and μ_t are time fixed effects. Controls include an indicator variable for independence, an indicator variable equal to one the year an offshore reform is enacted, a count of the number of offshore reforms implemented in the country, and an indicator variable indicating whether an "Exempt Company" law has been previously implemented.*** p$<$0.01, ** p$<$0.05, * p$<$0.1

Table A.8 – Competition and type of reform

	(1) $\mathbb{1}_{Reform\ in\ new\ area}$	(2) $\mathbb{1}_{Revision}$	(3) $\mathbb{1}_{Reform\ in\ new\ area}$	(4) $\mathbb{1}_{Revision}$
# Reforms $<$ 1000 km	4.436***	0.632***	3.233***	0.788***
	(0.999)	(0.188)	(0.853)	(0.199)
K-P F-stat	74.30	74.30	483.5	483.5
Controls	Yes	Yes	Yes	Yes
Reforms	Next	Next	Next	Next
Post-1945	Yes	Yes	Yes	Yes
Non independent only	No	No	Yes	Yes
Observations	650	650	253	253

Note: Coefficients on # *Reforms $<$ 1000 km* have been multiplied by 100 for readability. The sample from columns (1) and (2) correspond to the sample of column (6) in Table 4.The sample from columns (3) and (4) correspond to the sample of column (9) of Table 4. Robust standard errors clustered at the country level in parentheses. "New area" corresponds to reforms made in a sub-category in which the country had done no reform before and "revision" corresponds to reforms made in a sub-category in which the country had already made a reform before. Sub-category classification is the following: Banking, Insurance, Exempt companies (IBC or not), MNE-specific, Holding regimes, Individual, Ships, and Other. Additional controls are included: in columns (1) and (2) they include $ln(D_{it})$, an indicator variable for being independent and the number of years since independence. In columns (3) and (4) they include $ln(D_{it})$. The other control variables cannot be included as the sample is restricted to non-independent territories. *** p$<$0.01, ** p$<$0.05, * p$<$0.1

Table A.9 – The diffusion of legal technologies

	(1) IBC	(2) Finance	(3) Indiv	(4) Exempt (no IBC)
Number of laws $<$ 1000km	0.385**	0.306***	0.590**	0.0932
	(0.151)	(0.110)	(0.253)	(0.0661)
ln(Av. Direct Tax/GdP)	0.0307*	0.0506	0.0202	0.0375*
	(0.0179)	(0.0327)	(0.0190)	(0.0212)
Independent	0.00251**	0.00484***	0.00275**	0.00236*
	(0.00123)	(0.00177)	(0.00117)	(0.00127)
Time from indep.	-7.59e-05***	-5.98e-05*	-5.00e-05**	-5.68e-05***
	(2.40e-05)	(3.24e-05)	(2.11e-05)	(2.07e-05)
Country and year FE	Yes	Yes	Yes	Yes
Reform	All	All	All	All
Non-independent only	No	No	No	No
Observations	22,971	22,503	22,871	22,394

Note: This table estimates equation 8 on the whole sample. Coefficients on # *Reforms* $<$ *1000 km* have been multiplied by 100 for readability. "Number of laws c $<$ 1000km" corresponds to the number of countries that have implemented an offshore law of the type indicated in the column header and that are located less than 1000km away from the country of interest. The dependent variable is an indicator variable equal to 1 if a law of the type indicated in the panel header has been implemented. Countries are dropped from the sample once they implement a law the category studied. Data on tax havens' reforms comes from own data collection detailed in section 2. Details on the classification of reforms are displayed in Table 1. Robust standard errors clustered at the country level in parentheses *** p$<$0.01, ** p$<$0.05, * p$<$0.1

C Supplementary figures

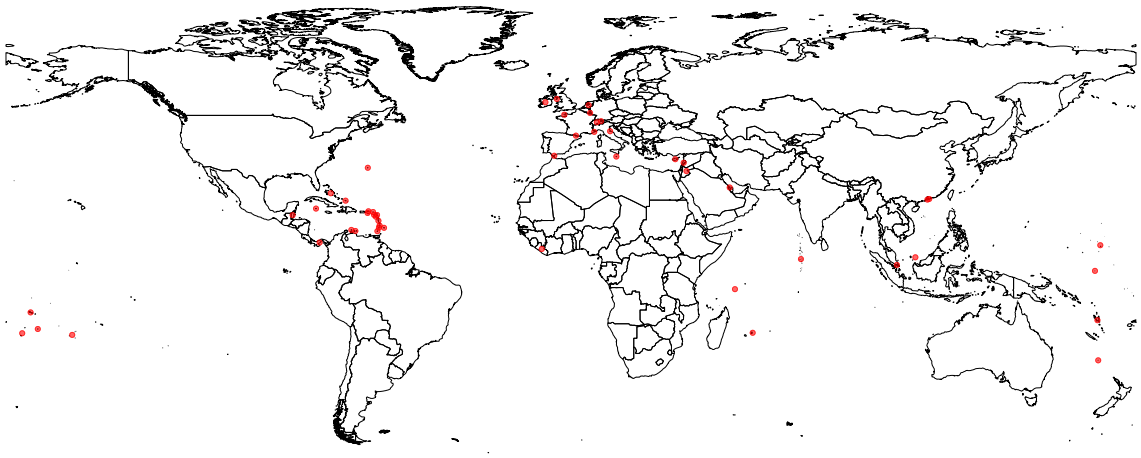


Figure A.1 – The location of contemporary tax havens.

Note: This map depicts tax havens nowadays. This list of tax havens is discussed in section 2 and presented in appendix Table A.1.

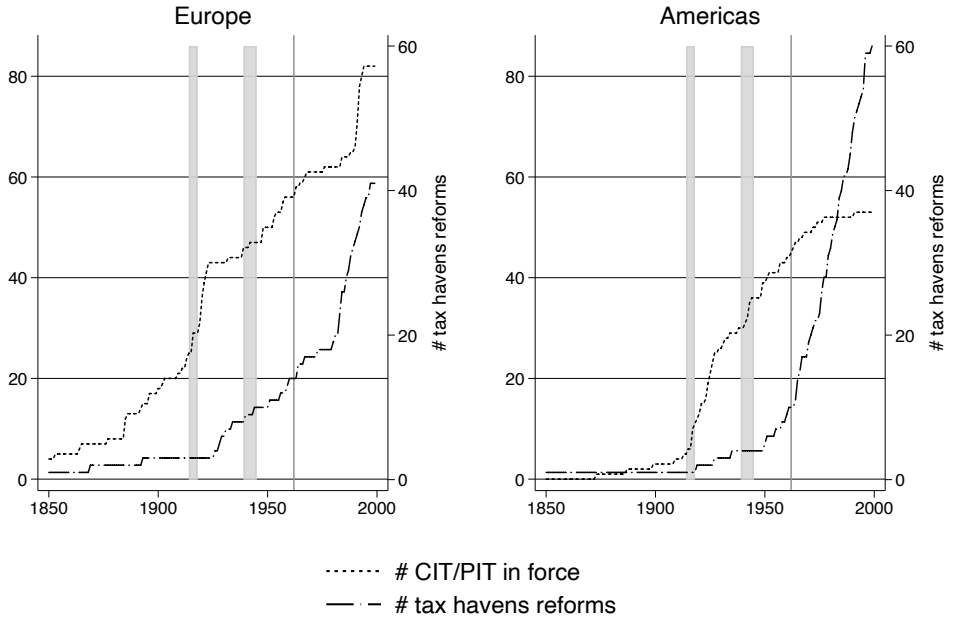


Figure A.2 – The building of tax havens' legal architecture and the rise of direct taxation.

Note: This figure plots the number of direct taxes (Corporate income taxes and Personal income taxes) introduced and the number of tax haven reforms for Europe and the Americas. Data on the introduction of taxes comes from Seelkopf et al. (2021). Data on tax havens' reforms comes from own data collection detailed in section 2. Shaded areas indicate the world wars and the vertical line (1962), the beginning of the independence wave in the U.K.-dominated Caribbean area.

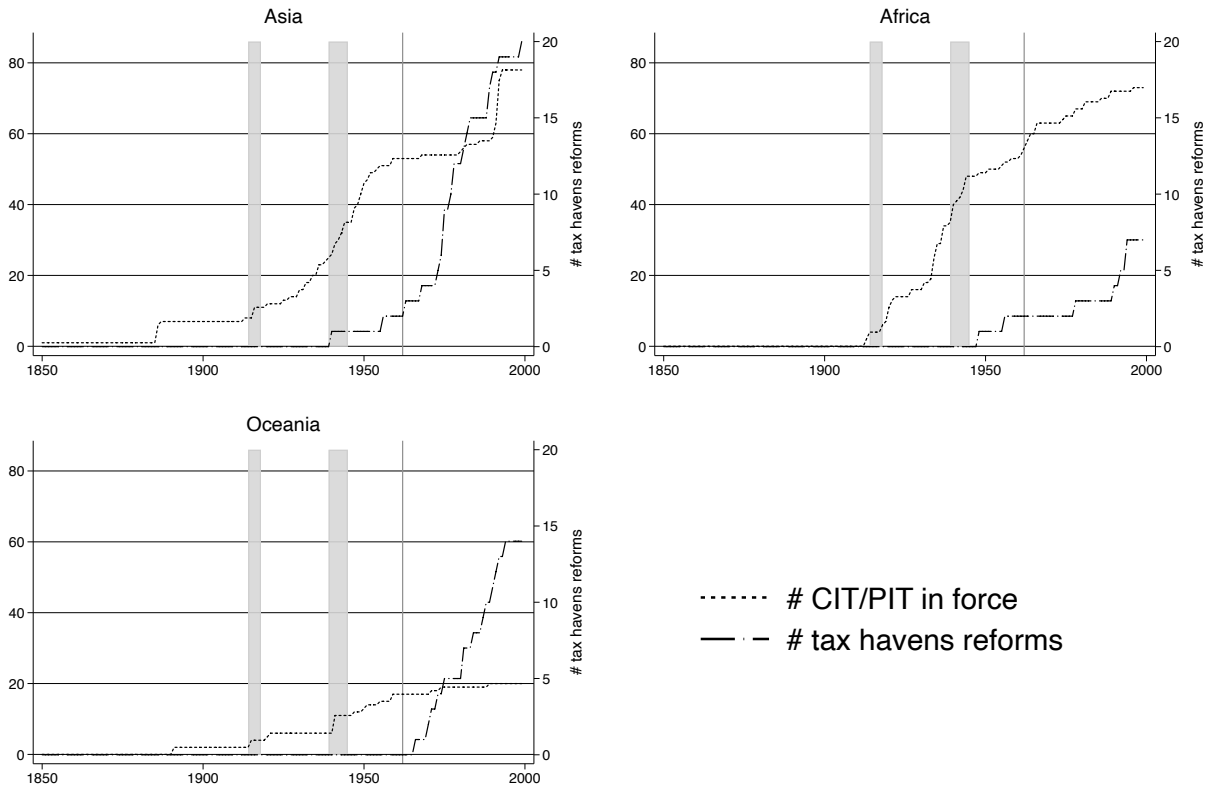


Figure A.3 – The building of tax havens' legal architecture and the rise of direct taxation (other regions)

Note: This figure plots the number of direct taxes (Corporate income taxes and Personal income taxes) introduced and the number of tax havens reforms for Africa, Asia, and Oceania. Data on the introduction of taxes comes from Seelkopf et al. (2021). Data on tax havens' reforms comes from own data collection detailed in section 2. Shaded areas indicate the world wars and the vertical line (1962), the beginning of the independence wave in the UK-dominated Caribbean area.

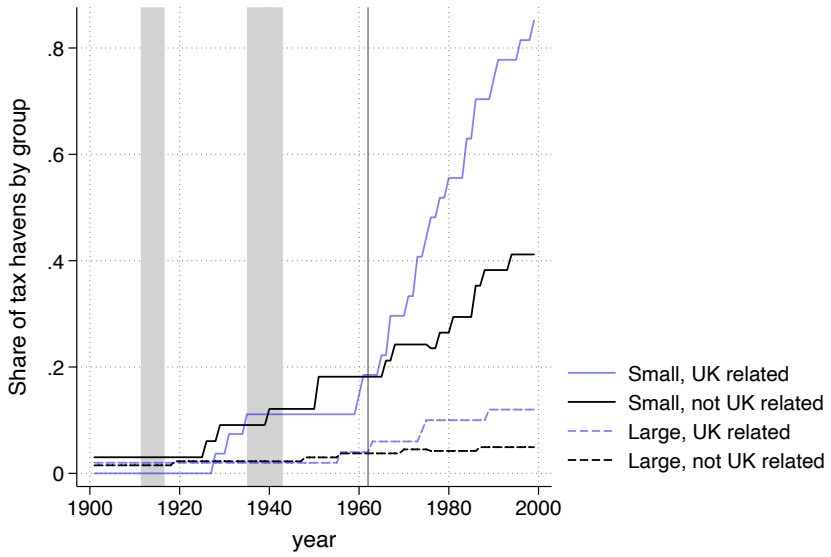
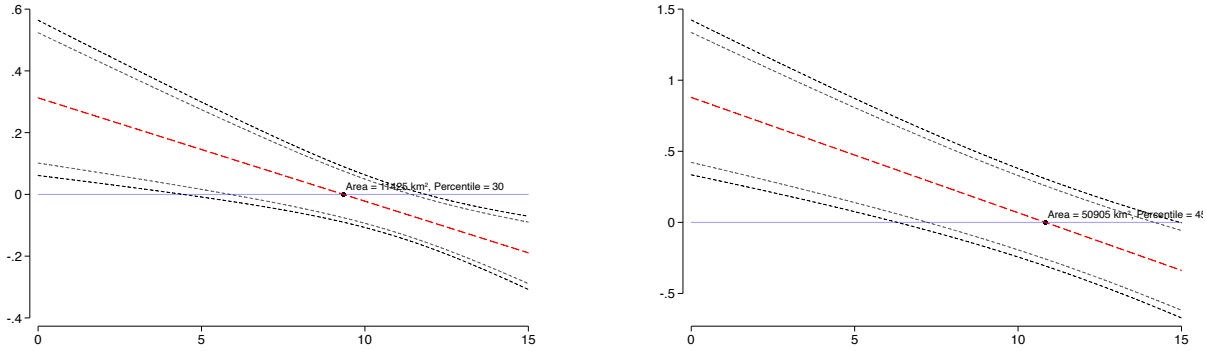


Figure A.4 – Tax havens characteristics: size and colonial history

Note: This figure plots the share of tax havens in two size groups (small and large countries) crossed with groups constructed according to colonial history (UK related or not). The group of small countries corresponds to countries in the first quartile of country size. Other countries are classified as large. UK-related colonies correspond to colonies for which the last ruler is the United Kingdom. The construction of colonial history is detailed in section 2. Data on tax havens' reforms comes from own data collection detailed in section 2. Shaded areas indicate the world wars and the vertical line (1962), the beginning of the independence wave in the UK-dominated Caribbean area.



(a) OLS results

(b) IV results

Figure A.5 – Effect of demand on the probability of becoming a tax haven:

Note: This figure plots the estimated effect of the impact of demand on the probability of becomming a tax haven for the OLS estimation (panel (a)) and the IV estimation (panel (b)). The confidence interval corresponds to a 5% confidence interval. Estimates are based on the specification of column (2) of Table 3. The graph reports the size (and the corresponding decile) for which the estimated effect is exactly equal to zero.

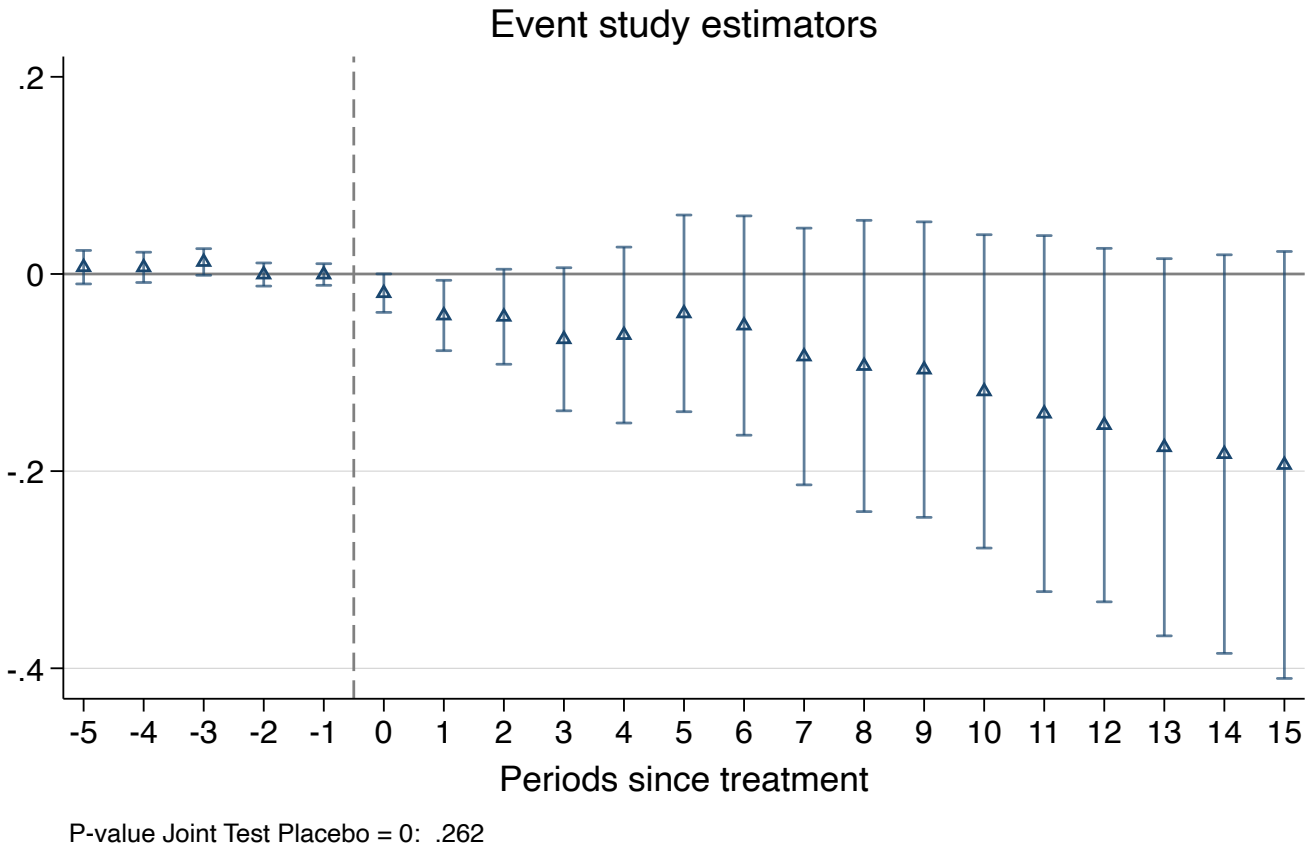
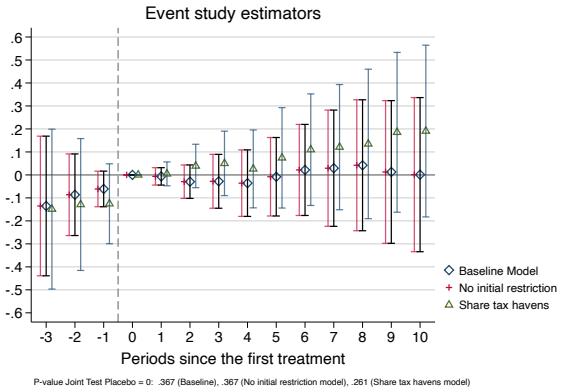


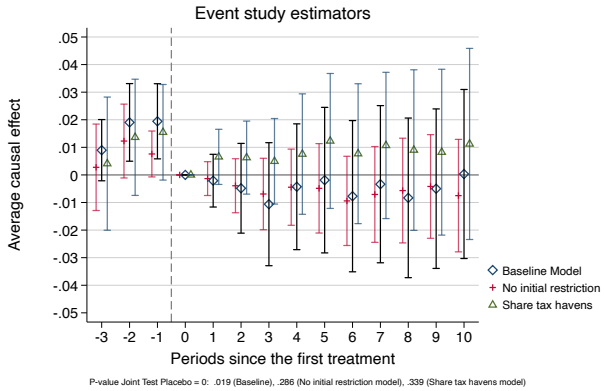
Figure A.6 – Share of agricultural lands

Figure A.7 – Effect of becoming a tax haven on agricultural lands

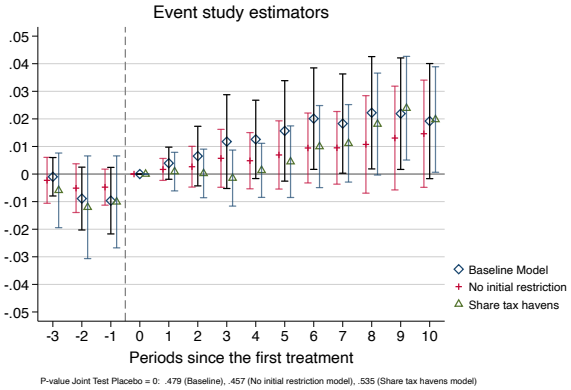
Note: This figure plots coefficients from an event-study regression following equation 9 using interacted fixed effects following Gobillon and Magnac (2016), Xu (2017) and Liu et al. (2022). It studies the impact of becomming a tax haven on the share of agricultural land. The treated group includes 15 countries: Belize, Dominica, Grenada, Hong-Kong, Jordania, Marshall Islands, Saint Kitts-and-Nevis, Saint Lucia, Saint Vincent-and-the-Grenadines, Seychelles, Mauritius, Malaysia, Singapore, Tonga, and Western Samoa. The control group is composed of all never-haven countries in the world. 95% confidence intervals from bootsptrapped standard errors (500 repetitions). The p-value tests for the absence of pre-trends.



(a) GDP per capita



(b) Tax Revenues (% of NDP)



(c) Tax Rev. on L - Tax Rev. on K (% of NDP)

Figure A.8 – Effect of tax havens on other countries: robustness

Note: This figure plots coefficients from an event-study regression following equation 10 and estimated using the estimator of **de_chaisemartin_difference–differences_2020**. In panel (a), the dependent variable is GDP per capita. In panel (a), the dependent variable is total tax revenues as a share of NDP. In panel (c), the dependent variable is the difference between revenues from the taxation of labor and revenues from the taxation of capital as a share of NDP. The three figures estimates three diffirent empirical models for the identification of the effect of tax havens on other countries' outcomes. This first model is the baseline model and restricts the estimation to countries that have at most five tax havens in a circle of 2500km around them when they enter the sample. The second model ("No initial restriction") does not restrict the estimation to this subsample of countries. The Third model ("Share tax havens") uses the share of countries in a circle of 2500km that are tax havens as the treatment variable. 95% confidence intervals from standard errors clustered at the country level.

D Offshore Leaks

The Offshore Leaks data is used at several instances in the paper. The data has been released by the International Consortium of Investigative Journalists (ICIJ, 2022a, 2022b). It is the result from different leaks:

— Panama Papers (2016): entities registered by the law firm Mossack Fonseca.
— the Paradise Papers (2017): clients of the law firm Appleby and seven tax havens' corporate registries.
— the Pandora Papers (2021): data leaked from 12 offshore service providers.
— the Bahamas leaks (2016): Bahamas corporate registry containing information on Bahamian Companies, trusts and foundations.
— the Offshore Leaks (2013): entities incorporated through two service providers.

The data allows linking entities registered in tax havens to their owners (beneficial owners when available) and to the intermediaries participating in the offshore structure. The ICIJ has linked the owners (individuals or companies, named *officers* in the database) to specific countries using their registered addresses. The database provides information on more than 800,000 offshore entities. It also provides information about the date when the offshore entity was opened. For the purposes of this paper, the raw data has been used to construct two different datasets.

Panel data on offshore entities First, I make use of the panel structure of the data in section 3 and 6, and in appendix E. I create a dataset that counts the number of offshore entities located in a tax haven i at date t. To do so, I simply collapse the data at the $incorporation\ country \times year$ level. This dataset allows me to track the number of offshore entities recorded in each tax haven over time.

Bilateral data on offshore entities Second, I use the bilateral information provided by the dataset in section 3. This data allows me to track the number of links between a tax haven j and a non-haven country i. In 8.6% of the cases, a given officer is linked to more than one country. I drop cases where a given officer is linked to more than three countries (0.87% of the cases). Otherwise, I assign to the officer all the countries listed. I drop entities without any officer listed. I then count any observed entity linked to a given officer as a "link" between the tax haven in which the entity is registered and the country to which the officer has been assigned (if there are multiple countries, I count one different link for each different country). I obtain a dataset where I observe the number of offshore links for each pair of countries available in the data and for each different leak source. Keeping the heterogeneity coming from the source provider allows me to control for additional non-observed factors (such as the differential propensities for some law firms to work with tax havens or origin countries) through fixed effects.

I drop same-country pairs. The rest of this exercise assumes that the links available in the Offshore Leaks are a good proxy for the actual (unobserved) links. It should be the case as long as the entities revealed by the leaks are not correlated with the origin countries of officers. In all likelihood, this is not a strong assumption given the number of independent sources and the fact that the ICIJ has released data indistinctly from these

considerations. This data is then merged with the USITC gravity dataset (Gurevich and Herman, n.d.) to perform gravity estimations.

E Data Consistency

From reforms to service provision To investigate whether the provision of tax havens services follows new reforms, I use the micro-level data from the Offshore Leaks database described in appendix D. I use a feature of this database that allows me to observe offshore entities, identified by their country of registration and year of creation. I can therefore track the number of entities registered in a tax haven, before and after a reform. Entities are seen as a proxy for the provision of offshore services. For this exercise, I concentrate only on reforms that aim at allowing for the registration of International Business Companies. This is the type of legal technology that corresponds best to the entities registered in the database. I estimate the following event-study regression:

$$arcsinh(Entities)_{it} = \sum_{k=-10}^{15} \zeta_k Haven_{it}^k + u_i + u_t + v_{it} \tag{11}$$

where $arcsinh(Entities)_{it}$ is the inverse hyperbolic sine transform of the (cumulated) number of offshore entities registered in tax haven i at date t. This transform is used to smooth the data while keeping zeros in the estimation (Bellemare and Wichman, 2020). $Haven_{it}^k$ is a dummy variable equal to one for treated countries k years before or after it becomes a tax haven. u_i and u_t are country and time fixed effects and v_{it} is the error term. The control group corresponds to tax havens that have never enacted any International Business Company reform. The equation is estimated using the imputation estimator proposed by Borusyak et al. (2022), Liu et al. (2022), and Gardner (2022) to account for potential heterogeneous effects in a generalized difference-in-difference setting with different treatment dates.

Figure A.9 illustrates the impact of IBC reforms on offshore service provision. IBC reforms appear efficient in terms of entity incorporation. Following the reform adoption, the number of offshore entities recorded in the Offshore leaks data increases by 640% after 9 years.[31] The effects appear immediately after the reform and increase during the next years. Estimates before the treatment are very close to zero and not statistically significantly different from zero. This figure shows that tax-haven reforms, in the context of IBC incorporation at least, materialize into an increase in the provision of tax haven services.

31. The coefficient after 9 years is equal to 2. $exp(2) - 1 = 6.4$. To compute this effect, I follow Bellemare and Wichman (2020) that provide elasticity formulas for inverse hyperbolic sine transformations. This computation holds in particular for large values of the dependent variable which is verified in this case. The average value of the number of entities in the estimation sample is 1080 for countries that have implemented an IBC reform is 835.

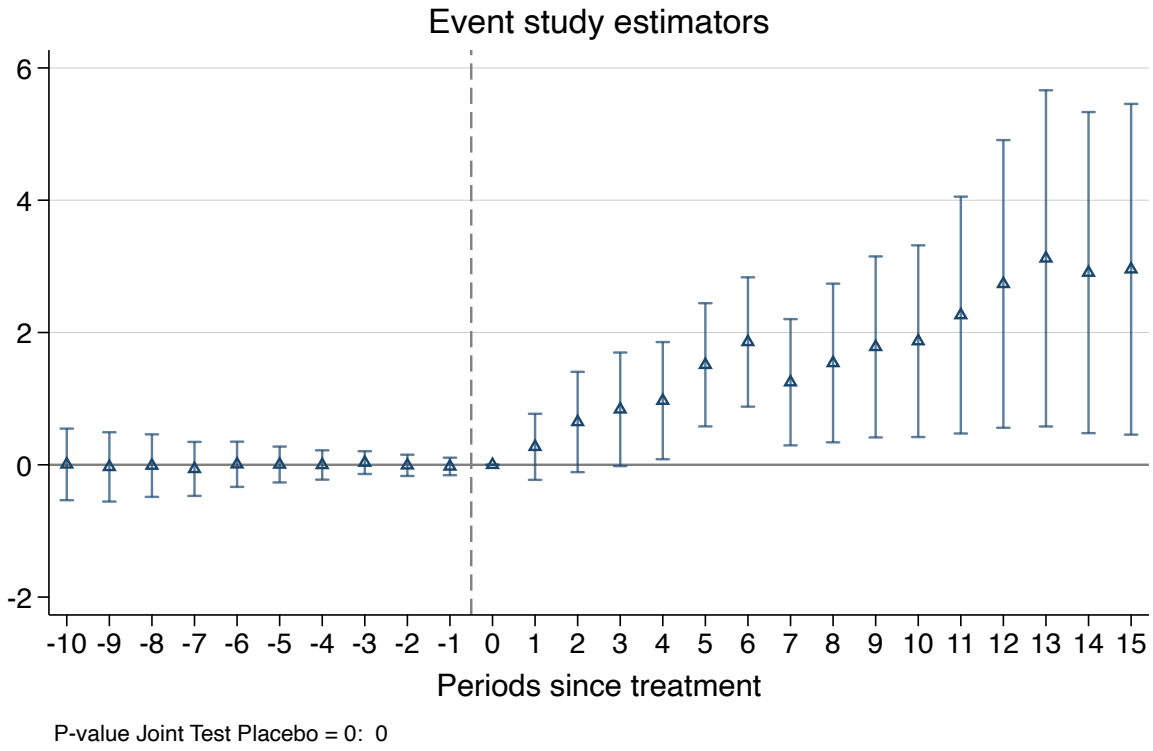


Figure A.9 – "International Business Companies" reforms and tax havens services: Event study

Note: This figure plots coefficients from an event-study regression following equation 11 estimated using the estimator of **de_chaisemartin_difference–differences_2020**. The treated group is composed of tax havens introducing "International Business Companies" reforms. It studies how the number of offshore entities registered in a tax haven changes when the country enacts a new IBC reform. The dependent variable has been transformed using the inverse hyperbolic sine transformation to keep zeros in the estimation. The control group corresponds to tax havens that have never enacted any exempt company reform. The mean of the dependent variable one year before the treatment is 1.94. 95% confidence intervals from clustered standard errors. The p-value tests for the absence of pre-trends.

F The Swiss Market for Tax Evasion

This appendix studies whether the arrival of new tax havens substituted or complemented the already-existing tax havens.

The first challenge to answering this question is finding historical data about tax havens services' market size. To solve this issue, I use data from Zucman (2013) that collects fiduciary deposits in Switzerland by country of origin between 1976 and 2014 from the Swiss National Bank (SNB). Fiduciary deposits are deposits collected by Swiss banks and invested on behalf of their clients. As described by Zucman (2013), fiduciary deposits are used to avoid paying the 35% Swiss advance tax.[32] An interesting feature of this data is that the SNB records the origin of the last owner and does not see through conduit entities in tax havens. Consequently, it records investments made through tax havens from other places. Zucman (2013) argues that the majority of these investments are actually coming from European ultimate owners and are going to Switzerland through conduits in tax havens. Going through tax havens adds layers of secrecy between Swiss accounts and their actual owners. Assuming that the bulk of fiduciary deposits of tax havens corresponds to the use of sham corporations (such as IBCs for instance), an increase in the share of fiduciary deposits from tax havens corresponds to an increase in tax havens' market size for the Swiss market. The Swiss market is one of the largest ones for individuals' tax avoidance: according to Zucman (2013) it represented 34% of all offshore financial wealth in 2008 and it was probably even larger before this date (Alstadsæter et al., 2018). An increase in the share of fiduciary deposits from a given tax haven corresponds to an increase in market share from this tax haven in the Swiss offshore market.

Figure A.10 plots the market size of tax havens and decomposes it between countries that become tax havens before 1960 and countries that become tax havens after this date. This year represents the moment of the entry of new tax havens following decolonization (see Figure A.4 in appendix). These tax havens will develop their activity gradually during the end of the 20th century. We observe that the global size of the tax haven market in the Swiss place has been increasing over the period, especially since the beginning of the nineties. The share of the older tax havens has been oscillating around 30% of all deposits with a little upward trend since the nineties.

Importantly, the market share of new tax havens has constantly been increasing, reaching the level of old tax havens after 2010. This increase in the share of new tax havens is not associated with a sharp decrease in the share of old tax havens, indicating that substitution between new and old tax havens should have been limited. On the contrary, the total market share of tax havens in Switzerland, proxied by the thick black line, has constantly increased. We can conclude from this graph that there is a positive correlation between the entry of new tax havens since the sixties and the increase in the market size of tax havens. In other words, the entry of new tax havens has contributed to the increase in the market size of tax havens. It must also be noted that the increase

32. More precisely, any interest received on fiduciary deposits are considered as paid by foreigners. The bank acts as "fiduciary". This feature then creates a tax exemption. Fiduciary deposits represent one quarter of all foreign holdings in Switzerland in 2008.

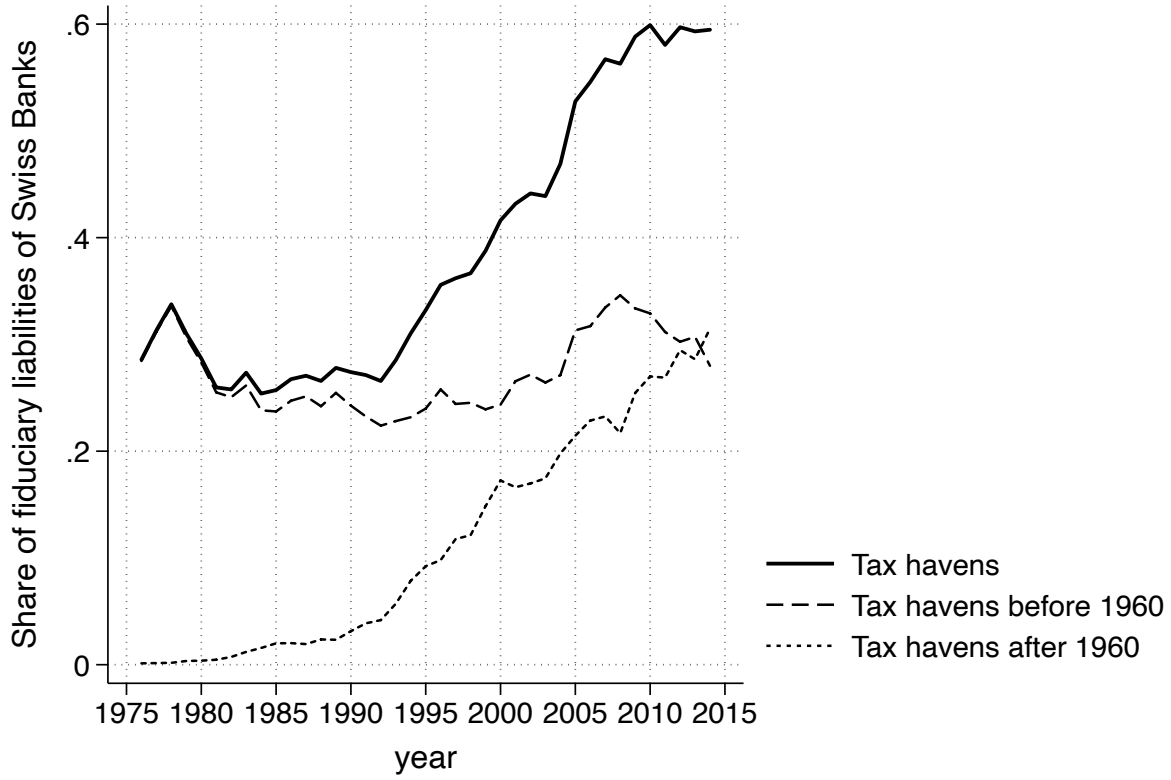


Figure A.10 – The Swiss Market for tax havens' services

Note: This figure plots the share of fiduciary liabilities of Swiss banks by the origin country of the direct owner. Fiduciary deposit data is from Zucman (2013) which collects fiduciary deposits in Swiss by origin from the Swiss National Bank (SNB). Fiduciary deposits are deposits collected by Swiss banks and invested on behalf of their clients. They are used to avoid paying some Swiss taxes. The SNB records the last owner's origin and does not see through conduit entities in tax havens. Data on tax havens' reforms comes from own data collection detailed in section 2. The category "Tax havens" includes all tax havens covered in the SNB dataset. This represents the market share of tax havens in Swiss fiduciary deposits. "Tax havens before 1960" includes entities that become tax havens before 1960: Andorra, Netherlands Antilles, Bahamas, Bermuda, Cayman Islands, Honk-Kong, Isle of Man, Ireland, Jersey, Lebanon, Liberia, Liechtenstein, Luxembourg, Monaco, Netherlands, and Panama. "Tax havens before 1960" includes entities that become tax havens after 1960: Aruba, Antigua and Barbuda, Bahrain, Belize, Barbados, Cyprus, Dominica, Guernsey, Gibraltar, Grenada, Jordan, Saint Kitts-and-Nevis, Saint Lucia, Macao, Marshall Islands, Malta, Mauritius, Malaysia, Nauru, Singapore, Seychelles, Turks and Caicos Islands, Tonga, Saint Vincent-and-the-Grenadines, Virgin British Islands, Vanuatu, and Western Samoa.

Table A.10 – Offshore entities and fiduciary deposits.

	(1)	(2)	(3)
	arcsinh(Fiduciary deposits)		
arcsinh(Number entities)	0.394***	0.415***	0.370***
	(0.0682)	(0.0770)	(0.0962)
Observations	934	404	524
R-squared	0.910	0.901	0.930
Sample		IBC reform	Other exempt reform
Country and year FE		Yes	Yes

This table display the results of the estimation of the following equation: $arcsinh(Fiduciary\ deposits_{it}) = \kappa_1 arcsinh(Number\ entities_{it}) + a_i + a_t + u_{it}$. $Fiduciary\ deposits_{it}$ correspond to Swiss fiduciary deposits coming from country i at date t, $Number\ entities_{it}$ corresponds to the number of offshore entities recorded in the Offshore Leaks in country i at date t, a_i are country fixed effects, a_t are year fixed effects and u_{it} are the residuals. "IBC reforms" stands for countries that have implemented IBC reforms. "Other exempt reform" stands for countries that have implemented other exempted company reforms. Robust standard errors clustered at the country level in parentheses.*** p<0.01, ** p<0.05, * p<0.1

in the share of fiduciary deposits held in Switzerland is positively correlated with the increase in offshore entities recorded in the Offshore Leaks (see Table A.10).

G Tax rates in tax havens

One assumption of the theoretical framework is that the tax rate on the domestic and offshore economies are correlated in tax havens. Consequently, tax rates in tax havens should be lower than in comparable countries. This section explores this hypothesis. I explore this hypothesis by collecting corporate and individual tax rates from KPMG tax rates tables (KPMG, n.d.). [33] Data are provided for 151 countries between 2011 and 2021. For corporate tax rate it lists the statutory tax rate for a large firm, including local taxes when substantial. For individual tax rates, it generally lists the top marginal income tax rate and does not include deductions or special rules.

Table A.11, describes the average tax rate applicable in tax havens for corporate income tax and individual income tax. It reveals substantial differences in tax rates between tax havens and non-havens. The corporate tax rate in tax havens is, on average, about 7 percentage points lower. It is, on average, 5 percentage points lower for the personal income tax rate. However, it is uncertain if this difference is driven by the fact that tax havens have specific characteristics such as being small countries or because they are tax havens, all other things being equal. The tax competition literature has shown that small countries have lower tax rates in equilibrium than larger countries, even in models that do not include tax havens (Bucovetsky, 1991). Consequently, tax havens tax rates should be compared to those of similar countries.

Table A.11 – Comparison of tax rates between havens and non-havens

	Corporate Income Tax	**Personal Income Tax**
Tax havens	17.3	24.0
Non-havens	24.2	29.1

Note: Average tax rates for tax havens and non-havens in 2021. Data on statutory income tax rates is taken from KPMG Tax Rates Tables. Corporate income tax corresponds to the statutory tax rate including local tax rates when applicable. Personal income tax corresponds to the top marginal tax rate and does not include deductions or special rules. The list of tax havens used is described in section 2 of the paper and available in Table A.1 of the appendix.

To do so, I estimate the following equation by OLS:

$$Rate_{it} = \beta_1 Tax\ Haven_i + CZ_i + \mu_t + \epsilon_{it}$$

with $Rate_{it}$ being the statutory tax rate (either corporate or personal), $Tax\ Haven_i$ an indicator variable equal to 1 if country i is a tax haven, Z_i a vector of country-level characteristics such as its size, its GDP or its legal origins, C is the vector of coefficients associated. μ_t is a year fixed effect and ϵ_{it} is the error term.

In figures A.11 and A.12, I plot the estimation of β_1 along with its 95% confidence interval for different models. Figure A.11 reveals that for all models, corporate income tax rates are lower in tax havens than in comparable countries by 3 percentage points

33. See https://home.kpmg/xx/en/home/services/tax/tax-tools-and-resources/tax-rates-online/corporate-tax-rates-table.html and https://home.kpmg/xx/en/home/services/tax/tax-tools-and-resources/tax-rates-online/individual-income-tax-rates-table.html

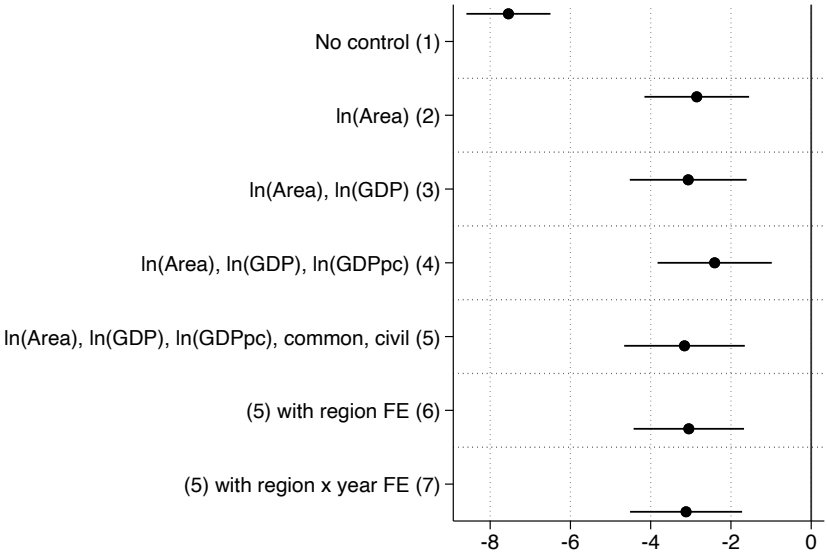


Figure A.11 – Estimation of β_1 for corporate income taxes

Note: This figure plots the estimation of β_1 along with its 95% confidence interval (robust standard errors) for different models. The dependent variable is the statutory corapote income tax rate including local taxes if applicable. Data on statutory income tax rates is taken from KPMG Tax Rates Tables.

on average. This effect is significantly different from zero at the 5% level. It is also true when we control for size, GDP, GDP per capita, legal origin and include region $\times$ year fixed effects. Interestingly, adding controls to the regression decreases by approximately 2.5 the estimated coefficient of tax havens. It confirms that a part of the lower tax rates in tax havens can be explained by their characteristics, particularly their size. However, controlling for these characteristics cannot fully explain why tax havens have lower tax rates than comparable countries.

Figure A.12 repeats the exercise for the individual tax rate. In models (1) to (5), including a diverse set of controls and year fixed effects, we observe a lower tax rate in tax havens than in comparable countries by about 2 percentage points. We add region fixed effects and region $\times$ year fixed effects in models (6) and (7). These models compare countries to similar countries in the same broad world region. The coefficient estimated appears negative but lower than in other models. This coefficient is also imprecisely estimated and not significantly different from zero at the 5% level.

Overall, these results do not contradict the assumption made in the theoretical framework that the domestic tax rate is not independent of the tax rate on the offshore economy. Indeed, tax rates on the domestic economy tend to be lower in tax havens than in comparable countries.

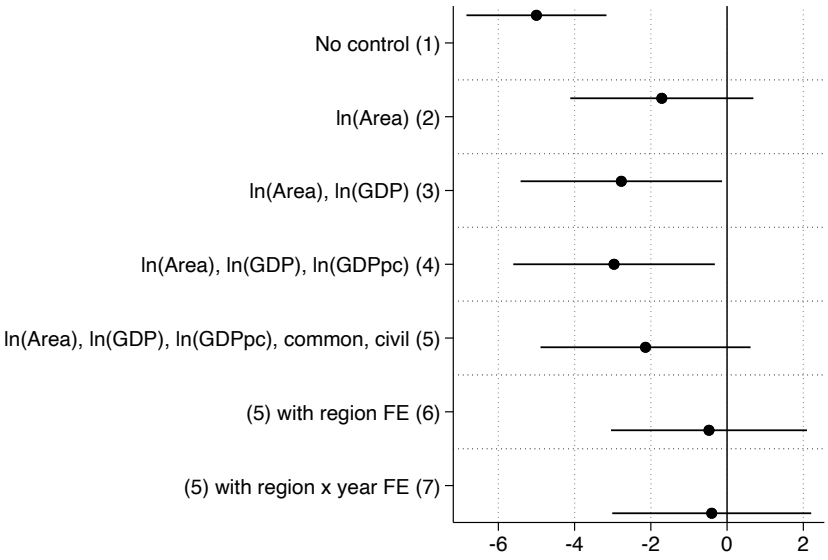


Figure A.12 – Estimation of β_1 for individual income taxes

Note: This figure plots the estimation of β_1 along with its 95% confidence interval (robust standard errors) for different models. The dependent variable is the statutory personal income tax rate base on the top marginal tax rate. Data on statutory income tax rates is taken from KPMG Tax Rates Tables.

H A Theoretical Framework

This appendix presents a theoretical framework that formally derives the Testable Implication 1 of the main text.

To build the theoretical framework, I use the legal capacity building framework of Besley and Persson (2011). In this 2-periods framework, a utility-maximizing government chooses its tax rate and the its level of productive infrastructures. Between the two periods, it can decide to invest in its productive infrastructure in order to increase revenues in period 2. To attract more tax revenues, he can also decide to become a tax haven by setting up an offshore legal architecture. This legal architecture can be upgraded through investment in legal technologies' quality between period 1 and period 2. Comparing its utility over the two periods, the government chooses before period 1 if it becomes a tax haven or not.

A simple economy Consider a simple economy where a government makes its choices taking the state of the economy in foreign countries as granted (mimicking the small open economy framework). There are two time periods $s = 1, 2$ and the population corresponds to N homogeneous individuals. The utility of a given individual is $u_s = (1 - t_s)y(\pi_s) + \alpha_s g_s$ with y its revenues, t_s the income tax rate, and g_s its consumption of a public good. Revenues are a positive function of the level of infrastructure in the country, π_s. π_s encompasses the legal support such as the administrative support or property rights protection but also more generally the level of public infrastructures in the economy such as education or health infrastructures.[34] It can be seen as the productivity of the real sector of the economy. $\alpha_s \geq 1$ is the value of the public good.

The tax rate t_s and the level of infrastructure π_s are constrained by the fiscal capacity τ_s and the infrastructure capacity Π_s. As seen later, in this simple model a non-haven government sets the highest possible tax rate and infrastructure level. The fact that they are constrained will push governments to invest in their respective capacities in order to increase future revenues. Here, because we are interested in tax havens that generally set taxes under the level of fiscal capacity, we consider the fiscal capacity as fixed: $\tau_s = \tau$. The government can invest in infrastructure by paying a cost defined as follows: $\mathcal{L}(\pi_2 - \pi_1)$. The cost is a positive and convex function of the difference between the levels of infrastructure in period 2 and in period 1 with $\mathcal{L}(0) = 0$.

Before considering the model where a country can choose to become a tax haven, I describe the optimum solution in the standard case.

The government budget is :

$$\underbrace{t_s y(\pi_s) N}_{\text{Revenues}} = \underbrace{g_s N + m_s N}_{\text{Expenses}}$$

$$\text{s.t. } t_s < \tau,$$

$$\pi_s < \Pi_s$$

34. This enlarges the definition of the fiscal capacity from Besley and Persson (2011). However, it is in line with their interpretation that investment in productive infrastructures and legal capacity share many similarities, see section 3.2 of their book.

with m_s the cost of investment per capita (which is 0 when $s = 2$). The tax revenues on the left-hand side should equal the government expenditures on the right-hand side: public goods provision and investment in infrastructures. As described in detail later, becoming a tax haven will precisely affect the government budget by bringing tax revenues from the taxation of offshore activity. Note that in the non-haven case, the size of the population will not matter. It will become important when introducing tax havens.

The timing is the following: τ_1, Π_1, α_1 and α_2 are given in stage 0.At the beginning of period 1, the government chooses a set of period-1 policies: $\{t_1, \pi_1, g_1\}$ and invest to determine Π_2. At the beginning of period 2 the government chooses a set of period-2 policies: $\{t_2, \pi_2, g_2\}$. The model is solved by backward induction.

A non-haven government maximizes:

$$\begin{aligned} u_s^I &= (1 - t_s)y(\pi_s) + \alpha_s g_s \\ \text{s.t } t_s y(\pi_s) &= g_s + m_s, \\ t &\leq \tau, \\ \pi_s &\leq \Pi_s. \end{aligned}$$

The level of public goods can be written as a residual from the government constraint: $g_s = t_s y(\pi_s) - m_s$. Therefore, taking into account the level of the public goods, the government now maximizes:

$$u_s^I = (1 - t_s)y(\pi_s) + \alpha_s \left(t_s y(\pi_s) - m_s\right)$$

What is the level of infrastructures and taxes? A first result of the model is that they are both set at their maximum possible level, those of their respective capacities.

Proof: the first order conditions are

$$\begin{aligned} \frac{\partial u_s^I}{\partial \pi_s} &= (1 - t_s)\, y_\pi + \lambda_s t_s y_\pi \geq 0 \text{ (infrastructures)} \\ \frac{\partial u_s^I}{\partial t_s} &= -y_\pi + \lambda_s y_\pi \geq 0 \text{ (taxes)} \end{aligned}$$

with $y_\pi = \frac{\partial y(\pi_s)}{\partial \pi_s}$. This notation, where derivation is noted with subscripts is applied for other variables in the rest of the paper.

Increasing the level of infrastructures or the level of taxation always increases utility. At the optimum, $t_s = \tau$ and $\pi_s = \Pi_s$. To increase utility in period 2, the government can invest in the infrastructure capacity, which will increase the general level of infrastructures in period 2, therefore increasing revenues.

I now describe how the level of investment is set. The investment in infrastructure capacity is an intertemporal problem. The government sets the optimal level of infrastructures in period 2 by maximizing its utility over the two periods.

$$W = (1 - t_1)y(\pi_1) + \alpha_1 \left(t_1 y(\pi_1) - m_1 \left(\pi_2 - \pi_1\right)\right) + (1 - t_2)y(\pi_2) + \alpha_2 \left(t_2 y(\pi_2)\right)$$

The level of investment in the public infrastructures that maximizes W is defined by:

$$\underbrace{\alpha_1 \mathcal{L}_\pi(\pi_2 - \pi_1)}_{\text{Marginal cost of investment}} \geq \underbrace{y_\pi \left[1 + (\alpha_2 - 1)t_2\right]}_{\text{Marginal benefits from investment}} \tag{12}$$

The government invests in the infrastructure capacity until the marginal cost of investment (lower public goods provision in period 1) is equal to or larger than the marginal benefits (higher revenues and higher public goods provision in period 2). The left-hand side is equal to 0 when there is no investment. The right-hand side is always positive because $\alpha_2 \geq 1$. Therefore, investment in the public infrastructure capacity will be positive. I use this condition as a benchmark to compare it with the situation where the country is a tax haven.

The tax haven option I now introduce the possibility for a country to become a tax haven. The government can choose to write a law before period 1 to introduce a legal technology and make its country a tax haven for periods 1 and 2. I assume that the government of a tax haven has the ability to tax foreign offshore revenues, ω_s^F. This modeling of tax evasion aims at being very simple to be as broad as possible and cover different uses of tax havens. It is possible to interpret it as individual tax evasion when an individual uses a trust structure or opens an international business company to channel its revenues in the tax haven in exchange of a small tax or a fee. It can also be interpreted as a firm shifting its revenues to the tax haven. Benefits of becoming a tax haven only come from higher tax revenues. Tax havens benefit from tax evaders only through additional taxes. As noted by Slemrod and Wilson (2009), this could extend to any indirect source of revenues such as revenues from tourism.

This new source of revenues comes with a constraint: the tax rate on the domestic economy and on the offshore revenues cannot be independent (see Hypothesis 2 of the main text). I assume that the tax rate on the domestic economy is proportional to the tax rate on the offshore revenues: $t_s = \delta t_s^o$ with t_s the tax rate on the domestic economy, t_s^o the tax rate on the offshore economy and $\delta \geq 1$. In absence of this constraint, becoming a tax haven is always utility-maximizing.

The demand for tax haven services Before describing how becoming a tax haven affects the choices of the country, I put more structure on ω_s^F, the demand for tax haven services addressed to the country of interest. Concretely, I provide here a functional form to equation 3. To do so, I look at the behavior of taxpayers in other countries indexed by n. The utility of an individual a when she pays taxes in n (no evasion) is: $V_n^a = (1 - t_n)\omega_n + \varkappa_{na}$ with ω_n its revenues and $\varkappa_{na}$ the preference of individual a for paying its taxes in n, distributed Gumbel. Time period subscripts s are omitted. We can interpret it as tax morale for instance. The individual can also choose to evade its taxes by locating all of its revenues in a tax haven $i \in \{TH\}$. In this case, the individual preference can be interpreted as an individual's taste for a given tax haven. These random parameters are assumed tobe independent across countries.

The service of tax evasion is sold competitively in each tax haven. I assume its marginal cost to be $\frac{1}{p_i}$ with p_i the quality of tax haven i's legal infrastructure. The qual-

ity of the tax haven's legal infrastructure represents how effective is the process of tax evasion in a country. It can be mediated through better legal technologies, better communication and travel infrastructure, better administrative and legal efficiency in the offshore sector, incentives for foreign banks and law firms to establish, *etc*. It works as a cost shifter that decreases the cost of using the country as a tax haven when it increases. On top of this cost, an individual from n has to pay an iceberg bilateral cost τ_{ni} that corresponds to communication costs, transport costs, and any other bilateral cost (the compatibility between the law systems of n and i for instance). This assumption is empirically relevant as demonstrated in Section 3. I also assume that one has to use an intermediary in i to use it a tax haven. The taxes paid by the intermediary firms in tax havens are fully passed-through to consumers. [35]

The total cost of evading taxes in country i is therefore: $\frac{\tau_{ni}\omega_n}{p_i(1-t_i^o)}$ The utility of the individual that evades taxation is i is $V_i = (1-t_i^o)\omega_n - \frac{\tau_{ni}\omega_n}{p_i(1-t_i^o)} + \varkappa_{na}$. Using the properties of the Gumbel distribution and noting U_k the deterministic part of the utility, the probability that an individual in n pays its taxes in country i, noted $\mathbb{P}_{ni}$, is

$$\begin{aligned}\mathbb{P}_{ni} &= \mathbb{P}\left(V_i > V_k, \forall k\right) = \mathbb{P}\left(\varkappa_{ka} < \varkappa_{na} + U_i - U_k\right) \\ &= \frac{exp\left(\left(1-t_i^o\right) - \frac{\tau_{ni}}{p_i(1-t_i^o)}\right)}{\sum_{k\in\{TH\}} exp\left(\left(1-t_k^o\right) - \frac{\tau_{nk}}{p_k(1-t_k^o)}\right) + exp(1-t_n)}\end{aligned}$$

This represents the share of people evading taxation in country n to tax haven i. As an individual that evades taxes shelters all his revenues in the tax haven, we can deduct the total amount of revenues sent from country n to tax haven i, which represents the demand from n to i and the total demand addressed to i:

$$\omega_s^F \equiv \omega_{i,s}^F = \sum_n D_{ni} = \sum_n N_n \omega_n \mathbb{P}_{ni} \tag{13}$$

Demand has the desired properties as it decreases with the tax haven's tax rate and the bilateral costs. It increases with the quality of the tax haven. Importantly it also decreases with the number of competitors and their bilateral costs relative to non-haven countries.

Tax rate, legal support, and tax haven quality The optimal public good level is set similarly as in the non-haven case. The new government objective function writes:

$$u_s^I = (1-\delta t_s^o)y(\pi_s) + \frac{\alpha_s}{N}\left[\delta t_s^o y(\pi_s)N + \underbrace{t_s^o \omega_s^F\left(p_s, t_s^o\right)}_{\text{Haven-specific revenues}} - m_s N\right]$$

Once a country is a tax haven it has to choose its quality p_s. By increasing its quality, the tax haven becomes more attractive, which increases ω_s^F. The quality of the tax haven is constrained by the "tax-haven-quality" capacity noted P_s. Between periods 1 and 2, the government can invest in P in order to be able to increase the quality of its legal

35. This assumption makes the demand to be zero when taxes in the tax haven are equal to one.

technologies in period 2. The cost of investment is noted $\mathcal{P}(p_2 - p_1)$ and has the same properties as $\mathcal{L}$.

Intuitively, as we can see π_s as the productivity of the real sector, p_s can be interpreted as the productivity of the offshore sector. Their relative strength can therefore be indicative of the advantage a country has in each sector.

We can now solve for the optimal tax rate, legal support and tax haven quality. To set its tax rate, the government maximizes its utility. Contrary to the non-haven case, where the tax rate is set at the level of the fiscal capacity, in this case, the tax rate might be set at a rate lower than the fiscal capacity. Therefore the tax rate is determined following the first-order condition:

$$\frac{\partial U_s}{\partial t_s} = \delta y(\pi_s)(\alpha_s - 1) + \frac{\alpha_s}{N}\left(\omega^F + t_s^o \omega_t^F\right) = 0 \tag{14}$$

with ω_t^F, the partial derivative of ω_s^F by t_s^o. The tax rate is set at the point where the marginal revenues from a higher tax rate equal the marginal losses on the offshore economy. There is no explicit solution to this equation. I note t_s^{o*} the solution of this equation. The tax rate on domestic activity is set to $t_s = min\{\delta t_s^{o*}, \tau_s\}$. In the rest of the exposition, I will consider that $t_s = \delta t_s^{o*}$, *i.e.* that δt_s^{o*} is small enough to be lower than the fiscal capacity. The optimal infrastructure level and tax haven quality are set the same way as in the non haven case. They are set at their maximum possible level, *i.e.* at their respective capacities (see proof in appendix I).

Investment in legal support and tax haven quality In order to enhance its expected utility over the two periods, the government can now invest in its infrastructure capacity and the quality of its legal architecture. It does so by maximizing its expected utility over the two periods.

Implication 1 : Tax havens always invest in the quality of their legal architecture. The more so if the costs of investment are low. In particular this is the case when the quality of the tax haven is small (as the cost function is convex) and when new legal technologies reduce the marginal cost of investment, $\mathcal{P}_p$, for all p. The introduction of a new legal technology that decreases costs therefore increases investment in quality. This implication corresponds to Hypothesis 3 of the main text.

Proof: the two following conditions describe investment in infrastructure capacity and tax-haven quality:

$$\alpha_1 \mathcal{L}_\pi(\pi_2 - \pi_1) \geq y_\pi \left[1 + (\alpha_2 - 1)\delta t_2^o\right] \tag{15}$$

$$\alpha_1 \mathcal{P}_p(p_2 - p_1) \geq t_2^o \frac{\alpha_2}{N} \omega_p \tag{16}$$

The government invests in the infrastructure and tax haven quality until the left-hand side of equations 15 and 16 are larger than the right-hand side. The left-hand side corresponds to the marginal cost of investment weighted by α_1, the marginal value of foregone tax revenue in period one. The right-hand side corresponds to the marginal gains of investment. As $\mathcal{L}(0) = 0$ and $\mathcal{P}(0) = 0$, it means that investment in infrastruc-

ture and tax haven quality will be positive as long as the right-hand side is positive. This is the case because $\alpha_1 - 1 > 0$.

Note that investment in the general public infrastructure is lower in tax havens than in non-haven countries. This result comes from the comparison of the investment condition in infrastructure when the country is a tax haven and when it is not. Both are very similar since the only difference is that it is scaled by a different tax rate. Because the equilibrium tax rate on the domestic economy is lower in tax havens than in other countries, this makes the investment in productive infrastructure less valuable. This result implies that tax havens, despite maximizing welfare, will invest less in the general public infrastructure than if they were not tax havens.

Which countries become tax havens? We now have all the elements to compare the utility when a government chooses to make its country a tax haven or not. The government does so by comparing utilities in both cases. The country becomes a tax haven if $U^H > U^{NH}$ over the two periods: $\mathbf{1}\{Haven\} = \mathbf{1}\{U^H > U^{NH}\}$. I define $\Delta_U = U_1^{TH} - U_1^{NTH} + U_2^{TH} - U_2^{NTH}$, the difference between the utility when the country is a tax haven and when it is not. When an ambiguity is possible, I note the optimal choice of the non-haven government with the superscript NH, and the optimal choice of the tax haven government with the superscript H.

$$\begin{aligned}\Delta_U = & \underbrace{y(\pi_1^*)\left(\delta t_1^{o*} - t_1^{NH*}\right)}_{\text{More domestic revenues in non-haven countries}} \underbrace{(\alpha_1 - 1)}_{\text{Net value of publics funds}} \\ & + \frac{\alpha_1}{N}\left(\underbrace{t_1^{o*}\omega_1^F}_{\text{Offshore sector revenues}}\right) + \underbrace{m_1^{NH*} - m_1^{H*}}_{\text{Differences in investment}} \\ & + \left(1 + (\alpha_2 - 1)\,\delta t_2^{o*}\right) y(\pi_2^{H*}) - \left(1 + (\alpha_2 - 1)\, t_2^{NH*}\right) y(\pi_2^{NH*}) \\ & + \frac{\alpha_2}{N} t_2^{o*}\omega_2^F\end{aligned}$$

The first line shows the losses from becoming a tax haven due to lower tax revenues on the domestic economy. These lower tax revenues only impact the difference in utility if the net value of public funds is strictly positive. The level of infrastructures, by increasing revenues, increases the value of these losses. The second line shows the gains from becoming a tax haven due to higher tax revenues on the offshore economy. It also shows the role of the differences in investment in legal capacity and tax haven quality. The third and fourth line are the equivalent of the two first lines for the second period. The only difference is that $y(\pi_2^{H*}) < y(\pi_2^{NH*})$ because the investment in infrastructures has been lower in the tax haven. As a consequence, the higher the cost of investment in infrastructure, the higher the probability of becoming a tax haven all other things being equal.

I now describe how ΔU is impacted by country size (N), changes in foreign tax rates (t_i), and initial levels of infrastructure and haven quality (π_1 and p_1) .

Implication 2: The probability that a country becomes a tax haven decreases with its size.

Proof in appendix I where I show that $\frac{\partial \Delta_U}{\partial N} \leq 0$. This result is due to the fact that a large population size provides more domestic tax receipts while not affecting offshore tax receipts. This result is in line with observations that tax havens are generally small countries. A similar result, with a different theoretical setting, is obtained by Slemrod and Wilson (2009).

Implication 3 (Testable Implication 1 of 4): The introduction of taxes in foreign countries increases the probability that a country becomes a tax haven. This probability decreases when distance with these countries increases and decreases with country size.

Proof in appendix I. This Implication corresponds to the Testable Implication 1 of the main text. Intuitively, the introduction of taxes in foreign countries increases demand all other things being equal. Therefore it increases the potential revenues from becoming a tax haven. This benefits more tax havens that are closer to the country that introduces taxes because costs rise with distance, and tax havens that are smaller because the benefits of becoming a tax haven decrease with size. This result shows the key role of the market access of tax havens.

Implication 4: The higher the initial tax haven quality p_1, the higher the probability of becoming a tax haven. On the contrary the higher the initial level of infrastructure Π_1, the lower the probability of becoming a tax haven. This implication exhibits the role of absolute advantages. Countries with large p_1 compared to π_1 will have more incentives to become tax havens.

Proof in appendix I. This result is due to the fact that higher initial quality will increase the utility of becoming a tax haven compared to staying a non-haven country. As a consequence, if we make the hypothesis that the common law provides key legal instruments for offshore activity, common law countries are more likely to become tax havens, all other things being equal. The hypothesis of a greater offshore potential of the common law lies in the fact that trust laws are a key instrument of offshore practices and that they find their origins in the English common law (see Palan et al., 2009, Pistor, 2019 or Harrington, 2016 for discussions). Besides, if we assume the newly decolonized countries have a low level of infrastructure, we find that U.K. newly decolonized countries are more likely to become tax havens. This can explain the pattern found in Figure 4 that shows a causal impact of decolonization on the number of tax haven's reforms for former U.K. colonies. It also confirms that the reaction of countries to this shock directly depends on their characteristics. [36]

36. On a side note, combined with Implication 1, these results can shed light on the empirical results of Dharmapala and Hines (2009). The authors argue that, on average, tax havens are better-governed countries than other countries. They also write that they cannot establish the direction of the causality. In their empirical framework, governance is measured by voice and accountability, political stability, government effectiveness, rule of law and control of corruption. One can argue that these variables are associated with a larger tax haven quality p_s. Indeed all these variables are likely to decrease the cost of using a tax haven by providing stability and predictability to its users. Implication 3 implies that a higher initial p_1 is associated with a higher likelihood of becoming a tax haven, while Implication 1 suggests that tax havens invest in their governance. In other words, the causality likely goes in both directions.

I Theoretical proofs

Infrastructure level and tax haven quality. Proof that the level of infrastructure and the quality of the tax haven are set at their maximum in the non-haven case:

The firs-order condition for infrastructure maximization is:

$$\frac{\partial u_s^I}{\partial \pi_s} = \underbrace{y_\pi \left(\delta t_s(\alpha_s - 1)\right)}_{\geq 0} + t_\pi \underbrace{\left(\delta y(\pi_s)(\lambda_s - 1) + \frac{\alpha_s}{N}\left(\omega^F + t_s \omega_t^F\right)\right)}_{=0 \text{ using } 14} \geq 0$$

Therefore $\frac{\partial u_s^I}{\partial \pi_s}$ is always positive. The level of infrastructure is set at his maximum, constrained by the infrastructure capacity.

The first-order condition for tax haven quality maximization is:

$$\frac{\partial u_s^I}{\partial p_s} = t_p \underbrace{\left(\delta y(\pi_s)\left(\alpha_s - 1\right) + \frac{\alpha_s}{N}\left(\omega_s^F + \omega_t t_s\right)\right)}_{=0 \text{ using } 14} + \frac{\alpha_s}{N} t_s \frac{\partial \omega}{\partial p} \geq 0$$

Therefore $\frac{\partial u_s^I}{\partial p_s}$ is always positive. The tax haven quality is set at his maximum, defined by the tax haven capacity.

Implication 2 I compute $\frac{\partial \Delta U}{\partial N}$:

$$\frac{\partial \Delta U}{\partial N} = \sum_s t_{sN}\left(y\left(\pi_s\right)\left(\alpha_s - 1\right)\delta + \frac{\alpha_s}{N}\left(\omega_s^F + t_s^H \omega_{st}^F\right)\right) - \frac{\alpha_1}{N^2} t_s^H \omega_s^F$$

Because of the first-order condition on tax rate, $y\left(\pi_s\right)\left(\alpha_s - 1\right)\delta + \frac{\alpha_s}{N}\left(\omega_s^F + t_s^H \omega_{st}^F\right) = 0$ (this is the envelope condition). It follows that

$$\frac{\partial \Delta U}{\partial N} = -\sum_s \frac{\alpha_1}{N^2} t_s^H \omega_s^F \leq 0$$

Implication 3 To show that an increase in taxes in other countries increases the probability that a country become a tax haven, I compute $\frac{\partial \Delta U}{\partial t_i}$. I can make use of the envelope theorem to derive only the direct effect of t_i on ΔU, not considering effects of change in t_i in the endogenous variables.

$$\frac{\partial \Delta U}{\partial t_i} = \sum_s \frac{\alpha_s}{N}\left(t_s^H \omega_{t_i}^F\right)$$

with $\omega_{t_i}^F = \sum_i \omega_i N_i \mathbb{P}_{ih} \frac{exp(1-t_i)}{\left(\sum_{k\in\{TH\}} exp(A_k) + exp(1-t_i)\right)} \geq 0$

Additionally we can show that $\frac{\partial \Delta U}{\partial t_i \partial N} \leq 0$ and $\frac{\partial \Delta U}{\partial t_i \partial \tau_{ih}} \leq 0$:

$$\frac{\partial \Delta U}{\partial t_i \partial N} = -\sum_s \frac{\alpha_s}{N^2}\left(t_s^H \omega_{t_i}^F\right) \leq 0$$

$$\frac{\partial \Delta U}{\partial t_i \partial \tau_{ih}} = \sum_s \frac{\alpha_s}{N}\left(t_s^H \sum_i \omega_i N_i \frac{exp(1-t_i)}{\left(\sum_{k\in\{TH\}} exp(A_k) + exp(1-t_i)\right)} \mathbb{P}_{ih}\left(\frac{-1}{p_h(1-t_h)}\right)\right) \leq 0$$

Implication 4 To show that, the higher the level of initial tax haven quality, the higher the probability to become a tax haven, I compute $\frac{\partial \Delta U}{\partial p_1}$. To show that the higher the initial level of infrastructure, the lower the probability to become a tax haven, I compute $\frac{\partial \Delta U}{\partial \pi_1}$. Again, I make use of the envelope theorem.

$\frac{\partial \Delta U}{\partial p_1}$ gives:

$$\frac{\partial \Delta U}{\partial p_1} = \frac{\alpha_1}{N}\left(t_1^H \omega_p^F\right)$$

with

$$\omega_p^F = \sum_i N_i \omega_i \frac{\tau_{ih}}{p^2\left(1-t_h\right)}\left(\mathbb{P}_{ih} - \mathbb{P}_{ih}^2\right) \geq 0$$

$\frac{\partial \Delta U}{\partial \pi_1}$ gives:

$$\frac{\partial \Delta U}{\partial \pi_1} = y_\pi(\pi_1)\left(\delta t_1^H - t_1^{NH}\right)(\alpha_1 - 1) \leq 0$$

This result is obtained because $\alpha_1 \geq 1$ and $\delta t_1^H - t_1^{NH} \leq 0$.

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