Sanction Havens: Offshore Financial Centers and Financial Sanction Evasion

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Abstract

This paper investigates the role of offshore financial centers ("tax havens") in the evasion of financial sanctions. By obscuring asset ownership, tax havens provide refuge for targeted actors, but their willingness to do so diminishes under credible enforcement pressure from hegemonic powers. We hypothesize that sanctioned entities shift funds into tax havens, but that this effect weakens when sanctions are backed by strong international actors. Using data from the Bank for International Settlements and the Offshore Leaks Database, we find robust evidence consistent with this expectation. Participation in sanctioning coalitions or membership in intergovernmental organizations such as the FATF or OECD does not reduce the flow of sanctioned funds into tax havens. By contrast, when the United States leads—rather than merely joins—a coalition, the attractiveness of tax havens as a refuge for sanctioned actors disappears. These findings suggest that while tax havens facilitate sanction evasion, U.S.-led enforcement can effectively constrain it. More broadly, the paper underscores the geostrategic importance of tax havens in the global financial system.

1   Introduction

Financial sanctions have become more common in recent decades. According to the Global Sanctions Database (GSDB) (Felbermayr et al., 2020), the number of new sanctions with a financial component rose from 51 in the 1980's to 255 in the last decade. Whereas in the 1980's about 40% of sanctions included a financial component, in the last decade this number rose to 70%. This rise in financial sanctions has two main reasons: (i) the growing importance of finance in global economic ties (Steil and Litan, 2008, 3), and (ii) the belief that financial sanctions are less harmful to civilian populations because they can be tailored to target the elites (Drezner, 2011, 96). Given these trends, understanding their sources of strengths and weaknesses has become more important.

The critical question is whether financial sanctions are effective in putting economic pressure on the targeted actors. They may prove ineffective if targeted elites can replace their lost wealth by extracting more from the common people; this 'burden-shifting' strategy is likely especially in authoritarian regimes (Kirshner, 1997; Pape, 1997; Brooks, 2002; Wood, 2008; Peksen, 2019). Another method is to transfer assets to locations that are out of the reach of sanctioning authorities. Although there is anecdotal evidence for this 'asset-shifting' strategy (e.g. Vittori, 2017; Miller and Woodman, 2022), data limitations have prevented researchers from studying it systematically. As a result, critical questions about the extent of financial sanction evasion and the effectiveness of counter-measures remain unanswered. Our main contribution is to address this gap theoretically and empirically.

Financial sanctions make it costly for targeted nations' citizens to hold assets in jurisdictions that comply with the sanctioning authorities. For example, US sanctions against Iran prompt banks worldwide to sever ties with Iranian customers to avoid regulatory risks (see, Salari, 2020). As a result, even if not individually targeted, individuals from sanctioned countries seek alternative jurisdictions where their assets are less exposed to enforcement. The broader the sanctioning coalition, the fewer such options remain. Tax havens become particularly attractive in this context because their financial secrecy shields account holders from scrutiny.[1] The same mechanisms that help individuals evade taxes or criminal organizations launder money can also protect sanctioned individuals from asset freezes. Consequently, we expect citizens of sanctioned countries to shift

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[1]We use the terms "tax havens" and "offshore financial sanctions" interchangeably.

their funds to tax havens, where they face lower risks of detection and enforcement.

We also test the effectiveness of two possible counter-measures: membership in intergovernmental organizations (IGOs) that are combating illicit finance (OECD and FATF)[2] and unilateral enforcement by the US. We hypothesize that among FATF or OECD members the effects of tax havens should be mitigated because these institutions specifically monitor their members' efforts to curb illicit activities. Our hypothesis regarding the US stems from the recent "weaponized interdependence" literature (Farrell and Newman, 2019), which argues that the US's privileged position in international finance gives it additional abilities to catch and punish sanction violators. This capability should deter tax havens from helping targeted actors evade economic sanctions.

Our main empirical strategy is to use data from the Bank of International Settlements (BIS) on bilateral deposits and compare a targeted state's deposits in tax havens to its deposits in non-havens. Crucially, in this analysis we can include origin (depositor) country-by-year fixed effects, destination (reporter) country-by-year fixed effects, and (directed) dyad fixed effects. These controls eliminate all potential confounders except at the dyad-year level. Our main finding is that, all else equal, if the whole world imposes financial sanctions on a country, we can expect it to increase its deposits in tax havens 70% more than its deposits in non-havens. This finding is in line with the idea that targets of financial sanctions transfer their assets to tax havens in order to remain connected to the global financial system.

We replicate this finding using data from the Offshore Leaks Database on shell companies established in tax havens. We estimate that relative to a country free from any financial sanctions, a maximally sanctioned country establishes 70% more entities in tax havens.

Finally, we test whether tax havens behave differently when they are members of issue-relevant IGOs, or when the US is in the sanctioning coalition. We do not find any evidence that membership in the FATF or the OECD has an effect on tax haven behavior. Turning to US participation, we find no evidence that tax havens receive less funds from states targeted by US sanctions. However, this null result regarding US participation conceals significant variation. When we concentrate on sanctions where the US is the initiator (and not only a participant), we find statistically and substantively significant effects. States targeted by US-led sanctions do not transfer more funds to

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[2]OECD stands for the Organisation for Economic Co-operation and Development. FATF stands for the Financial Action Task Force.

tax havens whereas states targeted by other sanctions do. Moreover, these effects apply mainly to the post-2001 period, in other words, after the Patriot Act gave the US government the legal power to use its financial power for geostrategic purposes.

For the big picture on hidden wealth and sanction evasion, how important is the implementation gap created by tax havens? Zucman (2021, 53) estimates that more than one-third of developing world elites' wealth is offshore (reaching 50% in Russia and Gulf countries) and potentially subject to asset freeze and seizure.[3] Therefore, if they are able keep this wealth out of the reach of the sanctioning countries, it will greatly blunt sanctions' power to hurt and produce policy change.

Our paper contributes to important literatures in political science and economics. Firstly, our findings are directly relevant to the literature on economic sanctions (Hufbauer et al., 2007; Bapat et al., 2013; Kavaklı, Chatagnier and Hatipoğlu, 2020). While there are several studies on the evasion of trade restrictions (for a recent review, see Early, 2021), to the best of our knowledge, our paper is the first systematic study on financial sanction evasion. Secondly, there is plenty of evidence that tax havens help human rights violators and dictators protect their wealth from domestic and foreign scrutiny. For example, Andersen et al. (2017) and Andersen, Johannesen and Rijkers (2022) show that elites in developing countries use offshore accounts to steal petroleum rents and foreign aid. Our paper contributes to this literature on illicit global finance by showing that tax havens are also 'sanction havens'.

The extant literature in finance focuses on the drivers of financial flows to tax havens and the effectiveness of international regulation in limiting the opacity of these transactions. A strand of this literature has investigated whether the black-listing of tax havens, rather than reducing international capital flows (through the so-called "stigma effect", Masciandaro 2005, Masciandaro 2008), induces a "race to the bottom" (Barth, Caprio and Levine, 2008) in which secrecy and non-compliance become attractive features of opaque jurisditicions (Houston, Lin and Ma, 2012). In this case, the so-called "stigma paradox" arises (Balakina, D'Andrea and Masciandaro, 2017; Kudrle, 2009). Balakina, D'Andrea and Masciandaro (2017) provides empirical evidence to the lack of a "stigma effect" in the case of blacklisting of tax havens. Opaque jurisdictions continue to attract international financial flows even when blacklisted. We complement this result showing that targets of financial sanctions are more actively directing their funds to tax havens. Despite not

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[3]Note that these estimates do not include non-financial wealth such as yachts, houses or diamonds kept offshore.

distinguishing between black-listed vs non-black listed tax havens, our finding suggests that target countries weigh the benefits that come from financial sanction elusion more than the reputational costs that may derive from trading with opaque jurisdictions. Lasty, the result that tax havens' participation in the FATF or OECD does not reduce their appeal as destination of financial flows from target sanctions confirms the reluctant nature of these jurisdictions in adopting *de-facto* cooperative attitudes (Masciandaro, 2005) even when participating in international organisations whose declared objectives include the fight against money-laundering and the promotion of global financial transparency.

2   The Argument

Economic sanctions are a coercive tool of foreign policy that aim to hurt a target economy by restricting its economic relations with the rest of the world. Traditionally sanctions have focused on trade but financial sanctions have become more common in recent decades.

Financial sanctions can hurt their targets in several ways. Sanctioned individuals are often prohibited from visiting a sanctioning country or holding assets in its jurisdiction. Sanctions can also prohibit a sanctioning country's citizens (e.g. Americans) from engaging in transactions that involve money, goods or services with a target. Lastly, these restrictions extend to entities owned by targeted individuals such as corporations.[4] Notice that these sanctions are especially costly if the US is among the sanctioning countries because then targets are excluded from the US dollar system, which is the most widely used currency in the global economy.

They may involve freezing the target's funds and assets or restricting their access to financial markets. They can be targeted (i.e. imposed against an individual, a corporate entity or a sector), or comprehensive (i.e. targeting a whole country). Recent examples of targeted sanctions are the measures against Russian oligarchs after the invasion of Ukraine, which include asset freezes and prohibitions on transacting with them and their companies. In short, financial sanctions hurt their targets by restricting their ability to move or spend funds, buy and sell services, or obtain credit and investment.

Financial sanctions can be devastating for their targets, especially when applied by a large

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[4]The definition of "owning" an entity varies by country. The US follows a 50% rule, which means that corporations owned 50 percent or more (individually or in the aggregate) by sanctioned individuals are also imposed US sanctions.

economic power like the United States. Take, for instance, Oleg Deripaska, who was among the Russian oligarchs sanctioned by the US in 2018 for supporting the Russian government's malign activities worldwide. The sanctions froze Deripaska's assets in the US and prohibited all US and non-US persons from dealing with Deripaska and his companies (US Department of the Treasury, 2018). Almost overnight his companies lost their Western buyers, suppliers, and investors. Deripaska's two most valuable companies, Rusal and EN lost more than 50% of their value and came close to collapse. Ultimately, to save his companies Deripaska was forced to give up their control (Verdier, 2020, 109-110). According to his Forbes profile, that year Deripaska's net worth fell from $6.7 billion to $3.6 billion (2022).

While targeted individuals must move their assets out of unsafe jurisdictions, they cannot transfer them to their home country either. Firstly, these assets are not dormant; often they are tied to investments in sanctioning states. Taking them to the target country will result in the freezing of investments and lost profits.

Secondly, targeted entities may fear expropriation of their assets in their home country. The events that trigger economic sanctions, such as revolution or war, can make the home country unsafe for the elites. Targeted governments may resort to expropriating elites' assets to make up for sanctions-related economic losses. For example, the Syrian government, which has been severely sanctioned since 2011, has preyed on regime insiders including Rami Makhlouf, Bashar Assad's cousin and formerly one of the richest men in Syria. Makhlouf's offshore assets helped him evade both Western sanctions and domestic expropriation (Moskovitz, 2020). Going beyond the anecdotes, systematic research shows that sanctioned governments violate property rights more often than other governments do (Peksen, 2017). In short, targeted entities may not want to transfer their funds home because they want to employ their assets profitably and they fear expropriation at home.

Actors targeted by financial sanctions can use essentially three methods to protect their funds and assets (JMLIT, 2022): sell them at a loss before sanctions take effect; transfer them to trusted proxies such as family members or employees; transfer them to non-sanctioning jurisdictions. The third method has significant advantages over the first two. A hasty sell-off can be undesirable if the expected price is low or the funds from the sale may be blocked as well. Transferring one's wealth to others requires a high level of trust in the proxies and the belief that the ruse will not be

discovered by the sanctioning authorities. The critical requirement for transferring wealth offshore is the availability of jurisdictions that are not participating sanctions or are willing to turn a blind eye to sanction evasion.

Offshore shell companies play a key role in sheltering individuals from the authorities. These companies do not conduct any substantive business and usually simply consist of an address. They may have legitimate functions such as providing limited liability, but they are also one of the most common means for busting sanctions, laundering money, committing bribery, tax evasion and financing terrorism (Findley, Nielson and Sharman, 2014, 3). Although shell companies are required by law to identify the name of the owner, this requirement can be evaded by, for example, assigning the company's legal ownership to a puppet individual while the real owner remains hidden (Findley, Nielson and Sharman, 2014). Offshore shell companies established in high secrecy jurisdictions can be even harder to investigate because, even if ownership information was collected, these jurisdictions often refuse to share this information and thereby provide additional cover to sanctioned actors.

At-risk individuals, i.e. those who fear they may be targeted one day, have incentives to keep some (but not all) of their money in tax havens even before sanctions begin. There are multiple reasons they may not keep all of their money in tax havens. One, it may be unfeasible because they want to use the money in places like the US or Europe and cannot do it under the cover of shell companies. Take, for example, their donations to charities under their names, the tuition they pay for their children, highly visible investments such as Russian oligarch Abramovich's purchase of Chelsea Football Club. Additionally, moving money through tax havens is costly and an individual may be unwilling to pay these costs if they perceive a low risk of losing their assets to sanctions (Gehlbach, 2022). Given these costs, it makes sense for at-risk individuals to keep at least some of their wealth in non-havens and transfer them to a tax haven only when necessary.

Of course, individuals' risk perception may be mistaken. They may overestimate the predictability of their home regime (as in the case of Russians in 2022) or their ability to transfer assets quickly. At the same time, there is evidence that many potential targets are able to transfer funds when the risk of sanctions suddenly increase. In short, the optimal portfolio of a potential sanction target should include some assets in tax havens and some assets in non-havens; we expect them to transfer a lot more to tax havens once sanctions are imposed.

3 Data and Estimation

Data on economic sanctions We obtain sanction data from the GSDB (Felbermayr et al., 2020), which lists 1101 sanctions between 1950 to 2019, 549 of which involve financial measures. Panel A of Appendix Figure A.4 shows that financial sanctions have steadily become more common over time. Panel B shows that financial sanctions make up a majority of new economic sanctions today. Often financial sanctions are bundled with other types of sanctions; only 42% of sanctions are purely financial. Financial sanctions are most often combined with trade sanctions (26%) and military sanctions (24%).

Our primary explanatory variable is *Financial Sanction Severity* and measures the total GDP of the countries imposing financial sanctions on a given state in a given year, over the world GDP. It is set to zero if a state is not under any sanctions. This variable captures the idea that sanctions imposed by a larger coalition (in terms of the number and economic power of sanctioners) economically hurt a target more because they leave the target with fewer outside options. Therefore the sanctioners' share of global GDP is an appropriate measure.

One of our control variables is *Trade Sanction Severity*, which is constructed very similarly to *Financial Sanction Severity*. The only difference is that here, instead of calculating the GDP share of countries imposing a financial sanction on a target, we calculate the GDP share of countries imposing a trade sanction.

We also construct an alternative *Financial Sanction Severity* measure. Here, instead of calculating the sanctioning coalition's share of world GDP, we calculate their share of foreign deposits. This measure takes into account the fact that some countries, despite having a small GDP, attract a lot of foreign deposits. For targets of financial sanctions, losing access to such jurisdictions may be more painful than their GDP would suggest. Our alternative measure captures this potentially important distinction between GDP and attractiveness to global finance.

Data on offshore assets Our primary data source on offshore deposits is the Bank of International Settlements. In subsequent analyses, we complement our analysis with data from the Offshore Leaks Database. These two sources complement each other in the sense that they cover different countries and are built on different data sources (official records vs leaked private records).

Our main results are consistent across the two data sources which increases our confidence in their validity.

Bilateral deposits Comparing the behavior of tax havens to non-havens requires a dataset that includes both types of destination countries. The Locational Banking Statistics of the Bank of International Settlements is ideal for this purpose.[5]

Countries adhering to the BIS report cross-country bilateral positions at a quarterly frequency. The publicly available BIS dataset includes 49 reporting countries and 209 counter-parties. Of the 49 reporters, 30 report bilateral data and these are the ones we use in our analysis. Data on sanctions is available only at the yearly level so we convert BIS data to yearly by averaging the quarterly values.

Eight of the reporting countries in the BIS dataset are tax havens: Guernsey, Hong Kong, Isle of Man, Ireland, Jersey, Luxembourg, Macao, and Switzerland.[6] Although our sample does not include all tax havens in the world, our estimates can serve as a good proxy of capital flight toward tax havens as long as the flows toward in-sample tax havens are correlated to the ones directed toward unobserved ones. This is a plausible assumption that is also corroborated by recent work by Andersen, Johannesen and Rijkers (2022).

The BIS data includes liabilities banks report toward both non-bank creditors and other banks. As suggested by the literature, we focus on the non-bank deposits as we aim at capturing the responses of targeted individuals to financial sanctions, rather than the movements across banks' balance sheets.

The appeal of the data lies on its reliability given that they are sourced directly from the banks' balance sheets. The accuracy of the data is testified by its wide usage by both central banks and academics. Central banks use this data to estimate capital accounts, and academics use them to measure net wealth positions, funds diversion, or to provide estimates of offshore tax evasion (Lane and Milesi-Ferretti, 2007; Zucman, 2013; Johannesen, 2014; Johannesen and Zucman, 2014). Moreover, given its wide coverage, the dataset well serves the aim of following capital flows in response to sanctions. Of the 49 reporting countries, we observe 25 of them imposing a financial

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[5]https://www.bis.org/statistics/bankstats.htm?m=2069

[6]BIS makes publicly available only a subset of the information it collects. Other tax havens that report to the BIS but whose data are not publicly available are: Bahamas, Bahrain, Bermuda, Cayman Islands, Liechtenstein, Netherland Antilles, and Panama.

sanction at least once and, among the 209 counter-parties, 103 of them were the target of a financial sanction at least once between 1977-2020 (Figure A.1).

We apply two data processing steps. First, when deposit values are missing, it is unclear whether (i) the depositing country held no funds in the reporting country that quarter (i.e., the true value is zero), or (ii) the reporting country failed to disclose positive deposits. Therefore, we restrict the analysis to non-missing values to avoid uncertain imputations. As a robustness check, we re-estimate our main specifications and impute missing deposit values as zeros. Second, we winsorize deposit amounts at the 99% level annually to reduce the impact of outliers.

Despite these precautions, two limitations remain. First, the data reflect the net position of the last depositor, not necessarily the ultimate owner. For example, if Russian funds in Switzerland are routed through an offshore company in Panama, the Locational Banking Statistics record this as a Swiss liability to Panama, not Russia. Second, the data cover only financial wealth in the form of deposits and debt securities. Residents may shift capital via other assets, such as real estate, artwork, or crypto-currencies, that are excluded from this dataset. As long as these alternative investments are correlated with financial flows, our measure likely underestimates the capital movement triggered by sanctions.

Tax havens We adopt the widely-used categorization by Hines Jr (2010). Although different sources have compiled various lists of tax havens, they all aim to capture two core features, low tax rates and lack of transparency, and generally produce comparable results (Hines Jr, 2010). As a robustness check, we re-run our tests using the categorization proposed by Andersen, Johannesen and Rijkers (2022).[7]

Additional data sources We complement our analysis with the following data sources: data on countries' real GDP and population from the World Bank, information on countries membership to the Financial Action Task Force (FATF) and Organisation for Economic Cooperation and Development (OECD) respectively from the institutions' websites, data on conflicts and their intensity from the Uppsala Conflict Data Project (UCDP), and data on democracy levels from the Varieties of Democracy (VDEM) project.

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[7]There are only four differences between the two lists: Ireland and Cyprus appear only in Hines Jr (2010), whereas Belgium and Austria appear only in Andersen, Johannesen and Rijkers (2022).

4 Empirical Analysis

We begin with a monadic analysis to examine how the share of a sanctioned country's deposits in tax havens responds to financial sanctions imposed by a large share of the world's GDP. This approach provides a straightforward way to assess whether increasing sanction pressure leads to greater reliance on tax havens.

Our initial specification employs a two-way fixed effects (TWFE) model to estimate the relationship between financial sanctions and offshore deposits. We find that as the share of global GDP imposing sanctions increases, so does the sanctioned country's share of deposits held in tax havens. However, this approach may suffer from bias due to the continuous and reversible nature of sanctions, which change at each period for each sanctioned country (see, ?Sun and Abraham, 2020; Goodman-Bacon, 2021; Callaway and Sant'Anna, 2021). To address this issue, we implement a difference-in-differences (DiD) specification that accounts for the dynamic nature of sanctions. A key limitation of this approach, however, is the potential for measurement error: discretizing the sanctions variable requires treating small-scale sanctions imposed by a limited share of global GDP in the same way as comprehensive, high-impact sanctions.

A major advantage of the monadic approach is that it allows us to apply recent advances in event-study estimation. Given that financial sanctions represent a reversible and non-absorbing treatment, we employ the methodology proposed by (Liu, Wang and Xu, 2024), which is specifically designed for such contexts. Additionally, we incorporate a stacked difference-in-differences approach following Cengiz et al. (2019) and Deshpande and Li (2019), which provides further validation of our results. Both approaches yield consistent findings, strengthening the robustness of our estimates.

Despite these advantages, the monadic framework has notable limitations. Because financial sanctions are typically imposed in response to broader geopolitical events—such as conflicts, political instability, or economic crises—changes in offshore deposits may not be attributable solely to sanctions. For instance, if a country experiences a military conflict concurrent with sanctions, the resulting economic uncertainty may itself trigger capital flight, making it difficult to disentangle the specific effects of sanctions from those of the broader crisis.

To overcome this limitation, we adopt a dyadic framework that tracks deposit flows between specific country pairs rather than relying on aggregate figures. This approach offers several key

advantages. First, it allows us to compare the sanctioned country's deposits in tax havens to its deposits in other jurisdictions, rather than merely observing total offshore movements. This distinction is crucial, as it enables us to test whether financial sanctions specifically drive capital into secrecy jurisdictions rather than simply prompting broader capital outflows. Second, the dyadic framework controls for origin-country-by-year fixed effects, accounting for any simultaneous economic or political developments that might affect offshore deposits, such as currency crises, domestic banking restrictions, or international conflicts. By comparing deposit flows to tax havens versus non-tax havens, we can more precisely identify the extent to which financial sanctions lead to a reallocation of assets toward secrecy jurisdictions rather than merely driving capital abroad.

4.1 Monadic Analysis

We now turn to a monadic analysis to assess how the share of a sanctioned country's deposits in tax havens varies with the severity of financial sanctions. Figure 1 provides a preliminary overview, plotting the average *Financial Sanction Severity* experienced by each country (1977–2019) against that country's average share of foreign deposits held in tax havens. The figure presents binned scatterplots and a best-fit linear trend (in red).

Consistent with our expectations, there is a positive relationship: on average, countries that were under heavier financial sanctions deposited more of their assets in tax havens.[8] This pattern is consistent with the idea that tax havens are considered safe by sanction targets.

TWFE Analysis   Table 1 offers a closer look at how financial sanctions correlate with a country's share of deposits in tax havens. It reports results from a two-way fixed effects (TWFE) regression, in which we regress the *Share of Deposits in Tax Havens* on *Financial Sanction Severity* and a set of additional controls, while also including country and year fixed effects. We implement a Poisson Pseudo-Maximum Likelihood (PPML) estimator (Silva and Tenreyro, 2006; Head, Mayer and Ries, 2010), which is well suited to accommodate the heavily right-skewed nature of the dependent variable.[9]

Consistent with our argument, the estimated effect of *Financial Sanction Severity* is positive

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[8]In Figure 1, the linear estimate is not statistically significant ($\beta = 0.09$, $p = 0.2$), but becomes significant if we exclude countries that were never sanctioned in these years ($\beta = 0.11$, $p < 0.01$).

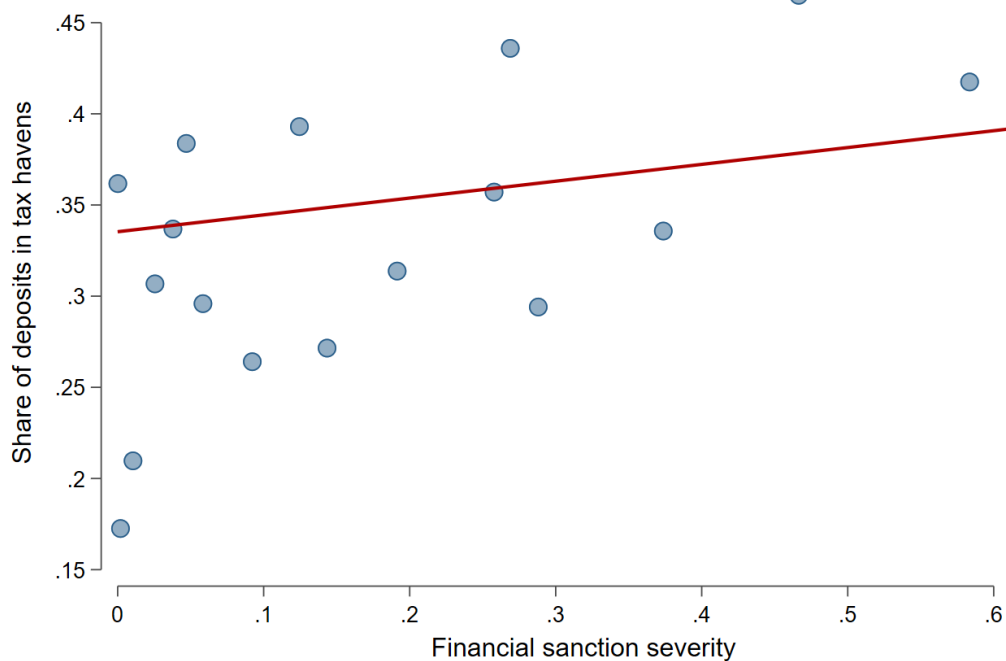[9]Intuitively, most countries hold only a small share of their total deposits in tax havens.

Figure 1: Average Financial Sanction Severity and Average Share of Foreign Deposits in Tax Havens (1977-2019)

Notes: This figure plots the relationship between the average *Financial Sanction Severity* for each country in 1977-2019 versus the average share of that country's foreign deposits that were held in tax havens in 1977-2019. The red line shows the linear best fit and the dots represent the countries (binned).

and statistically significant across all specifications. Substantively, as a country moves from a sanction severity of 0 to 1 (i.e., from no sanctioning coalition to a coalition representing the entire world GDP), the share of its foreign deposits in tax havens is expected to increase by roughly 30%. This finding is robust to various model specifications. For instance, it holds when we include lagged values of sanction severity to account for anticipation effects (Model M3), control for trade sanctions to isolate the impact of financial sanctions (Model M4), or replace our main measure of sanction severity with the share of total foreign deposits held by sanctioning countries (Model M5). These results strengthen our conclusion that, as the scope of financial sanctions expands, sanctioned countries tend to hold a larger fraction of their deposits in secrecy jurisdictions.

Difference-in-Differences Analysis   To strengthen the causal interpretation of our findings, we employ a modern difference-in-differences (DiD) methodology. Two features of our setting motivate this choice. First, sanctions are imposed at different points in time across countries (i.e., staggered treatment). Second, sanctions are typically reversed rather than being permanent, making them non-absorbing. Appendix Figure A.5 illustrates the distribution of sanctions across country-years in our sample.[10]

Because conventional TWFE can produce biased estimates under staggered treatments with heterogeneous treatment effects (Goodman-Bacon, 2021; Sun and Abraham, 2020; De Chaisemartin and d'Haultfoeuille, 2020; Callaway and Sant'Anna, 2021), we follow Liu, Wang and Xu (2024) and treat the outcome under treatment—in our case, the share of deposits in tax havens—as missing. We then use data from non-sanctioned periods to construct counterfactual outcomes. Unlike standard approaches, this procedure avoids relying on early-treated units as controls for later-treated ones. It instead exploits all available data from sanctioned and non-sanctioned countries when they are not under treatment to predict what would have happened to the treated units without sanctions. By comparing these predicted outcomes (the counterfactuals) to the actual post-treatment outcomes, we obtain an estimate of the average treatment effect on the treated (ATT). Averaging over relative time periods rather than the full post-treatment horizon also produces event-study-like results, clarifying how the effect of sanctions evolves over time.

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[10]Figure A.5 also shows that sanction severity varies over time and across units. Existing DiD methods cannot easily accommodate this continuous measure, especially with a non-absorbing treatment, so we dichotomize the treatment instead.

Table 1: **Financial Sanctions and Share of Deposits Held in Tax Havens**

	Minimal specification (1)	Add controls (2)	Control for lags (3)	Control *Trade* sanx. (4)	Alt've measure (5)
Financial Sanction Severity	0.280*** (0.094)	0.284*** (0.099)	0.186*** (0.070)	0.349*** (0.101)	
Alternative Fin. Sanction Severity					0.279*** (0.099)
Total GDP	0.340*** (0.116)	0.374*** (0.129)	0.409*** (0.133)	0.372*** (0.130)	0.367*** (0.128)
Population	0.518*** (0.171)	0.576*** (0.186)	0.557*** (0.183)	0.585*** (0.187)	0.564*** (0.187)
CINC		11.991*** (3.633)	11.622*** (3.555)	12.011*** (3.627)	12.045*** (3.646)
Democracy		0.008 (0.196)	0.046 (0.197)	-0.022 (0.194)	0.009 (0.196)
UN voting similarity with USA		0.581** (0.244)	0.601** (0.249)	0.581** (0.242)	0.557** (0.248)
Ongoing interstate war		0.068 (0.106)	0.024 (0.120)	0.074 (0.101)	0.069 (0.106)
Ongoing civil war		0.061 (0.043)	0.057 (0.044)	0.065 (0.044)	0.059 (0.043)
Fin. Sanction Severity (lagged 1yr)			0.059 (0.051)		
Fin. Sanction Severity (lagged 2yrs)			0.085 (0.063)		
Trade Sanction Severity				-0.150 (0.096)	
N	6315	4987	4823	4987	4987
Country FE	✓	✓	✓	✓	✓
Year FE	✓	✓	✓	✓	✓

Robust standard errors are clustered by country. *p<0.1; **p<0.05.

Dependent variable is "the share of a country's foreign deposits held in tax havens in a given year." Unit of analysis is country-year. Estimator is PPML.

Financial Sanction Severity is "the share of world GDP belonging to countries imposing financial sanctions on a target country in a given year." *Alternative Financial Sanction Severity* is "the share of total foreign deposits held in countries imposing financial sanctions on a target country in a given year."

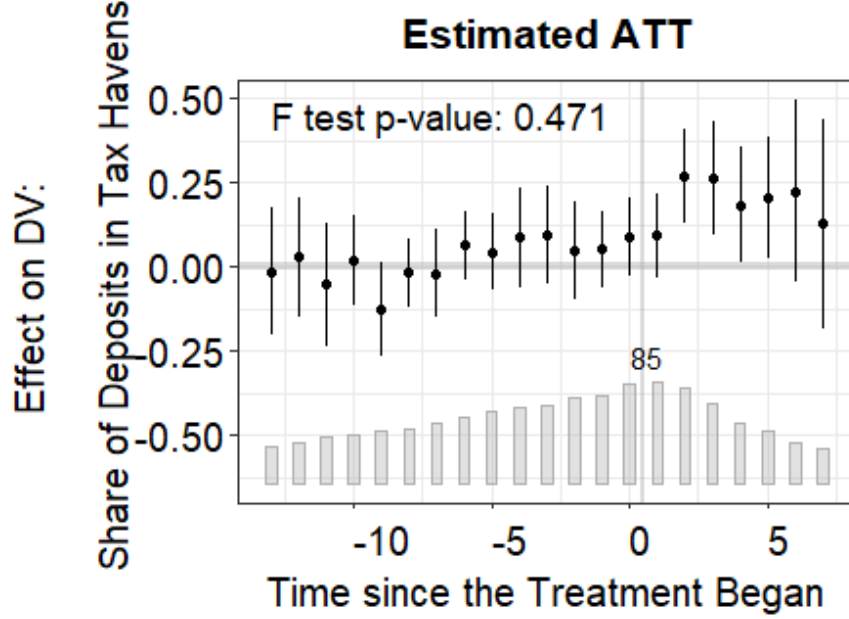All controls are lagged by one year. *Total GDP* and *Population* are logged.

Figure 2: DiD estimate of the effect of financial sanctions on the share of a country's deposits in tax havens. The results are estimated using the *fect* package in R which uses the methodology of Liu, Wang and Xu (2024).

We apply this estimator to a panel of the log share of deposits in tax havens, classifying a country as treated in any year it is sanctioned.[11] We include the same controls used in Model 2 of Table 1. Figure 2 presents the results. Both the event-study plot and the accompanying F test indicate no significant difference between treated and untreated countries prior to sanctions. After sanctions begin, however, the sanctioned countries exhibit a marked increase in their deposits held in tax havens relative to non-sanctioned countries. In particular, estimates suggest that by the second or third year of sanction imposition, the sanctioned country's share of offshore deposits rises by roughly 25%, remaining at a similar level in subsequent years (albeit with widening confidence intervals due to fewer countries experiencing prolonged sanctions).

4.2   Dyadic Analysis

We now move to a dyadic analysis that exploits bilateral financial data from the BIS. This approach helps address a key limitation in the monadic framework: events that trigger sanctions—such

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[11]We take the natural log of the share to address the heavily right-skewed distribution. In Appendix Appendix A.1, we show that our main results hold under a stacked difference-in-differences approach using the log of the share of deposits in tax havens as dependent variable.

as conflicts or political crises—may themselves induce capital flight. By examining deposit flows between pairs of countries, we can disentangle the impact of sanctions from other concurrent shocks affecting the sanctioned state.

Notably, shifting to a dyadic panel data setting also allows us to retain our continuous measure of sanction intensity, reducing the measurement error that arises when lumping small-scale sanctions together with those imposed by a large share of the world's GDP. Specifically, we test whether, when sanctioned by an increasing share of the world's economy, a country increases the deposits it holds in tax havens more than it does in non-haven destinations. This dyadic setup enables us to exploit within–country-year variation, controlling for any shock—be it geopolitical or economic—that occurs in either the sanction-imposing or the sanction-targeted country. By comparing the same state's behavior across different foreign financial centers, we more directly isolate the role of tax havens in sanction evasion.

Two data limitations remain. One, we cannot be certain that the account holders are targeted by sanctions; they could be collateral damage. This is a minor problem because foreign deposits are expensive; Zucman et al estimate that top 0.1% in places like Norway and the US hold their money in tax havens. Therefore, it is unlikely for most of these depositors to be non-elites unrelated to the regime and unconcerned by sanctions. Two, BIS data includes frozen deposits such as the 7 billion USD in Iranian accounts frozen by South Korean banks. BIS does not provide information on the amount of deposits frozen for various reasons but anecdotal evidence suggests that most frozen accounts are in non-tax haven countries. The implication is that tax havens play an even bigger role in sanction evasion than our estimates because we overestimate the funds that sanction targets *could* move to tax havens.

Model specification We use information provided by the BIS on countries' bilateral financial positions (in millions of USD) to check whether countries hit by a financial sanction increase the deposits they hold in tax havens relative to non-havens. We test this hypothesis using the following count data model through PPML:

$$\text{Foreign Deposits}_{ijt} = \exp(\beta \text{Tax Haven Destination}_i \times \text{Financial Sanction Severity}_{jt}$$
$$+ \delta_{jt} + \alpha_{it} + \gamma_{ij}) + \epsilon_{ijt} \tag{1}$$

where Foreign Deposits$_{ijt}$ are the deposits residents from country j hold in country i in year t. *Tax Haven Destination$_j$* is a dummy variable coded 1 if the destination country is a tax haven, and 0 otherwise. Financial Sanction Severity$_{jt}$ is a variable that is equal to the share of the world GDP that is imposing financial sanctions on country j.

We include in all models three types of fixed effects: origin country-by-year fixed effects δ_{jt}, destination country-by-year fixed effects α_{it}, and country pair fixed effects γ_{ij}. These fixed effects allow us to control for a large variety of potential confounders. Origin country-by-year fixed effects (e.g. Italy-2002) control for all origin country characteristics such as the country's wealth, culture, level of democracy, level of political violence, or political institutions. Note that, these origin-country characteristics may vary at the yearly level.

Likewise, destination country-by-year fixed effects (e.g. Switzerland-2002) control for all destination country characteristics (including those that vary over time). These may include laws regarding foreign investment, political culture, or wealth.

Pair fixed effects control for all factors that are specific to the origin-destination pair (e.g. Italy-Switzerland) but not varying over time. These factors could include colonial history, similarity of legal systems, or geographical distance.

In the presence of these three sets of fixed effects, the only remaining variation is at the pair-by-year level. Any possible confounders would have to vary at this level, too.

Note that this model specification does not explicitly include the constituent terms *Tax Haven Destination* or *Financial Sanction Severity* because these are absorbed by destination country-by-year and origin country-by-year fixed effects, respectively.

Results Table 2 presents our dyadic analyses. All models include origin country-by-year, destination country-by-year, and pair fixed effects. Our variable of interest is the interaction term *Tax Haven Destination × Financial Sanction Severity*. It has a positive and significant estimate in all models, which means that countries under heavier financial sanctions deposit more funds in tax

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Table 2: **Dyadic Analysis of Financial Sanctions and Foreign Deposits in Tax Havens**

	Baseline model (1)	Control for lags (2)	Control *Trade* sanx. (3)	Alt've measure (4)
Tax Haven Destination × Financial Sanction Severity	0.549*** (0.159)	0.341*** (0.113)	0.899*** (0.184)	
Tax Haven Destination × Alt've Fin. Sanction Severity				0.735*** (0.205)
Tax Haven Destination × Fin. Sanction Severity (lagged 1yr)		-0.028 (0.085)		
Tax Haven Destination × Fin. Sanction Severity (lagged 2yrs)		0.376*** (0.137)		
Tax Haven Destination × Trade Sanction Severity			-0.574*** (0.207)	
N	80187	66941	80187	80187
(Origin country x Year) FE	✓	✓	✓	✓
(Destination country x Year) FE	✓	✓	✓	✓
Dyad FE	✓	✓	✓	✓

Robust standard errors are clustered by dyad. $^{*}p<0.1$; $^{**}p<0.05$.
Dependent variable is "the amount of origin country's foreign deposits in destination country in a given year." Unit of analysis is dyad-year. Estimator is PPML.
Financial Sanction Severity is "the share of world GDP belonging to countries imposing financial sanctions on a target country in a given year." *Alternative Financial Sanction Severity* is "the share of total foreign deposits held in countries imposing financial sanctions on a target country in a given year."

havens than they do in non-haven countries.

Model 1 includes only our key independent variable. Model 2 includes its two lags to account for anticipation effects. Model 3 controls for *Trade Sanction Severity*, which is calculated just like its financial sanction counterpart except using countries that are imposing a trade sanction on the origin country in a given year. Model 4 uses an alternative measure of *Financial Sanction Severity*. The original measure calculates the share of world GDP that belongs to the sanctioning coalition. This alternative measure calculates the share of all foreign deposits in a given year that are held in the sanctioning countries. The rationale for this variable is that some destination countries may be small in terms of GDP but attractive for depositing funds. Losing access to these destination countries may be more harmful than their GDP would suggest.

The coefficient on *Tax Haven Destination × Financial Sanction Severity* remains positive and significant in every specification, ranging from 0.341 to 0.899. Interpreting the estimate in Model 1, a shift from zero to one in sanction severity predicts about a 70% larger increase in a country's foreign deposits held in tax havens relative to non-havens. Notably, these results mirror the monadic

estimates. For example, taking a median sanction share of 0.54 among sanctioning countries and applying it to the dyadic coefficients implies roughly a 28% increase in tax haven deposits. The close correspondence between the monadic and dyadic findings provides additional support for the argument that financial sanctions causally drive capital toward secrecy jurisdictions.

5 Counter-measures and mitigation

Having established that countries under financial sanctions increase their deposits in tax havens, we now leverage our dyadic framework to investigate the effectiveness of potential countermeasures aimed at reducing sanction evasion. First, we examine whether a tax haven's participation in sanctioning a target affects its willingness to receive deposits from the sanctioned state. Second, we test whether membership in anti-money laundering bodies such as the FATF or the OECD constrains a haven's role in sheltering sanctioned funds. Finally, we explore the influence of the United States, testing whether sanctions that involve the US face lower rates of evasion via tax havens than those imposed without US involvement.

5.1 Do tax havens enforce the sanctions they participate in?

Here we differentiate between tax havens that are formally in a sanctioning coalition and those that are not. This difference is important because an entity's official cooperation in a sanction regime can potentially improve enforcement. If tax havens better enforce the sanctions they participate in, then the solution is to include more tax havens in a sanctioning coalition. However, if targets treat even tax havens in a sanctioning coalition as a safe location, then policymakers should concentrate on ensuring that tax havens enforce the sanctions they committed to.

To test if participating in a sanction episode changes how destination countries (tax havens and non-havens) behave, we drop from the sample all dyads in which the origin country is under financial sanctions but the destination country is not a member of the sanctioning coalition. In other words, in this subsample if an origin country is under financial sanctions then the destination country is in the sanctioning coalition. We analyze this subsample as in our baseline model including the full set of fixed effects.

Appendix Table A.2 demonstrates that our results remain consistent within this subsample.

Several entities in our dataset—namely Guernsey, Hong Kong, Isle of Man, Jersey, and Macao—are classified as dependencies. To account for this, we consider two alternative assumptions regarding their sanctioning behavior. First, we assume that dependencies follow the sanctioning stance of their parent country; under this approach, we exclude dyads where the parent country is part of the sanctioning coalition. Second, we test the alternative assumption that treats dependencies as autonomous actors, excluding them only if they *themselves* do not participate in the coalition. Under both approaches, the coefficient for *Tax Haven Destination × Financial Sanction Severity* remains positive, statistically significant, and closely aligned in magnitude with our baseline estimate from Model 1 in Table 2.

Based on this analysis we conclude that tax havens fail to enforce the economic sanctions that they commit to on paper. In subsequent analyses we will not differentiate between "sanction coalition member" and "non-member" destination countries.

5.2 Do international organizations reduce financial sanction evasion?

Sanctions face an enforcement problem because implementing them is economically costly. These costs can create incentives to free-ride; each sanctioning state may prefer that its partners enforce the sanctions more strictly while its own banks and firms continue to do business with the target. Scholars have argued that intergovernmental organizations (IGOs) can ameliorate this problem by monitoring a state's compliance with financial rules (Drury, 1998; Bapat and Morgan, 2009). However, so far there is no empirical analysis of their effect on compliance with financial sanctions and, more specifically, the behavior of tax havens.

The two leading IGOs that have the institutional capacity and mandate to combat financial wrongdoings are the FATF and the OECD. FATF is the leading international organization in the area of illicit finance (Nance, 2018). It was established in 1989 and aims to tackle money laundering, terrorist and proliferation financing.[12] The OECD is a club of mostly high-income democracies. It has specialized departments (e.g. the Task Force on Tax Crimes and Other Crimes) tasked with fighting financial crimes such as tax evasion, corruption, and money laundering. Its expertise in combatting tax evasion using tax havens can help it enforce sanctions as well.

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[12]Although 200 countries and jurisdictions have committed to implementing its standards, the FATF itself has 39 members. We focus on these members' activities.

Table 3: **Tax Haven Behavior and the Role of IGO (FATF / OECD) Membership**

	FATF		OECD	
	Only FATF members (1)	Only tax havens (2)	Only OECD members (3)	Only tax havens (4)
Tax Haven Dest. × Fin. Sanction Severity	0.589*** (0.166)		0.583*** (0.171)	
IGO Member Dest. × Fin. Sanction Severity		-0.012 (0.251)		0.050 (0.243)
N	57828	24377	67026	24377
(Origin country x Year) FE	✓	✓	✓	✓
(Destination country x Year) FE	✓	✓	✓	✓
Dyad FE	✓	✓	✓	✓

Robust standard errors are clustered by dyad. *p<0.1; **p<0.05; ***p<0.01.
Dependent variable is "the amount of origin country's foreign deposits in destination country in a given year." Unit of analysis is dyad-year. Estimator is PPML.
Financial Sanction Severity is "the share of world GDP belonging to countries imposing financial sanctions on a target country in a given year."
In M1 and M2, *IGO Member* is coded 1 for dyads in which the destination country is a FATF member, 0 otherwise. In M3 and M4, it is coded 1 for dyads in which the destination country is an OECD member, 0 otherwise.

If the OECD and the FATF strengthen enforcement, sanctioned countries should hold less funds in member states. Concentrating on tax havens, if IGO membership disciplines tax havens sufficiently, then we should not find a significant difference between tax havens and non-havens within IGO membership.[13] Additionally, we should find that, among tax havens, those that are IGO members should receive significantly less funds from sanctioned countries than non-members do.

To answer these questions, we present two sets of analyses. First, we take all the dyads in our sample in which the destination country is a FATF member and rerun our main model in this subsample. We then repeat this for the subsample of OECD members. These analyses tell us whether, among IGO members, tax havens and non-havens receive different amounts of deposits from sanctioned countries. Next, we take all the dyads in which the destination country is a tax haven and test if there is a difference in the amount of funds held in tax havens that are FATF members and those that are not.[14]. We then repeat this analysis using OECD membership.

Table 3 presents the results. Models 1 and 3 concentrate on the subsample of IGO member

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[13]There is a large overlap in FATF and OECD membership among the tax havens in our dataset. FATF-member tax havens are Hong Kong, Ireland (since 1991), Luxembourg (since 1990), and Switzerland (since 1990). OECD-member tax havens are Ireland, Luxembourg and Switzerland, all of them since OECD's founding in 1961.

[14]We regress foreign deposits on *FATF Member × Financial Sanction Severity*, controlling for all the fixed effects.

countries and test for differences between tax havens and non-havens. They show that, within both IGOs, tax havens receive significantly greater deposits from targets of financial sanctions. The size of the effect is very similar to the effect in our baseline model (M1) in Table 2.

Models 2 and 4 concentrate on tax havens and test if membership makes a difference. In both models the estimate of *IGO Member Destination × Financial Sanction Severity* is statistically and substantively insignificant, meaning that there is no evidence that tax havens in IGOs behave differently than other tax havens.

To summarize, Table 3 does not provide any evidence that FATF or OECD membership mitigates tax havens' tendency to provide a safe harbor to countries under financial sanctions. Within both organizations, tax haven members receive significantly more funds from sanction targets than non-havens do. In addition, among tax havens, there is not a significant difference between IGO members and others in terms of attracting funds from sanction targets. We now turn to another potential solution for enforcement problems and its effect on tax havens' behavior.

5.3   Are Tax Havens More Responsive to US Sanctions?

Experts have observed that the US, besides its economic size, has a privileged position in global financial networks, which gives the US additional enforcement powers (Zarate, 2013; Farrell and Newman, 2019). The US dollar's position as the dominant international currency gives the US government the ability to monitor a wide range of economic transactions and severely punish actors who violate US's economic sanctions (by cutting them off from the global financial system). The US government's ability to use its financial power increased substantially after the 9/11 attacks. The Patriot Act gave the US government the legal authority to use this power to fight terrorism. Over time, the government began to use these powers for other foreign policy purposes including sanction enforcement.

However, the US does not enforce all sanctions equally stringently. For example, Early and Preble (2020, 15-16) show that the US has prioritized enforcing sanctions against some target countries (e.g. Iran or Cuba) more than others. If tax havens and other actors are aware of the US's priorities and the resulting variation in enforcement, then we should see stronger effects for sanctions that the US enforces more strongly.

Based on these ideas, our first prediction is that sanction coalitions that include the US should be

more effective in enforcing sanctions. All countries, including tax havens, should receive less funds from countries targeted by US sanctions. Furthermore, target countries that the US prioritizes should show a stronger effect and they should deposit even less funds abroad, especially in tax havens. Lastly, the effect of US sanctions should be greater after 2001.

To test if US sanctions are treated differently, we modify our model specification to include a triple interaction (and its constituent terms) between *Tax Haven Destination*, *Financial Sanction Severity* and a dummy variable *Financial Sanctions Involve US*, which is coded 1 if in a given year a coalition of states including the US impose financial sanction the origin country, and 0 otherwise.

Financial Sanctions Involve US treats all US sanctions equally. To test if the US more strongly enforces some sanctions, we use another dummy variable, *Financial Sanctions Led By US*, that is coded 1 only if a country is under financial sanctions and the sanction episode is initiated or organized by the US. We expect US-led sanctions to be more strongly enforced by the US and have a stronger effect on tax haven behavior than sanctions that were not led by the US. This variable comes from (Kavaklı and Chatagnier, 2023), who extended the "initiator" variable coding in the TIES dataset (Morgan, Bapat and Kobayashi, 2014). This variable is available only until 2015, which means that models that use this variable are run on a smaller sample.[15]

Table 4 presents the results. Model 1 includes the US involvement variable (and its interactions) and the estimates for this variable are neither statistically nor substantively significant. The estimate for *Tax Haven Destination × Financial Sanction Severity* is very similar to its baseline estimate in Table 2 Model 2. Tax havens do not seem to treat sanctions that involve the US any differently than non-US involved sanctions.

Models 2 and 3 include the US leadership variable, which indicates a stronger commitment by the US, and it seems to have an important effect on tax haven behavior. Once we include this variable, the estimate for *Tax Haven Destination × Financial Sanction Severity* almost doubles in size, which indicates that tax havens receive even more funds from targets of non-US led sanctions than we estimated before, especially for more severe sanctions.

The interesting thing is that for US-led sanctions, sanction severity has the opposite effect. The coefficient for *Tax Haven Destination × Financial Sanctions Led by US × Financial Sanction*

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[15]In the future, we will try to use the US government's penalties for violations of specific sanctions programs as an alternative measure of enforcement stringency.

Table 4: **Tax Haven Behavior in US-Led Sanctions**

	All years			Pre-2001	Post-2001
	(1)	(2)	(3)	(4)	(5)
Tax haven dest. × Financial sanction severity	0.548***	1.040***	0.779***	-0.142	0.669***
	(0.180)	(0.157)	(0.184)	(0.157)	(0.178)
Tax haven dest. × Fin. sanctions involve US	-0.012		-0.032		
	(0.086)		(0.092)		
Tax haven dest. × Fin. sanc. involve US × Fin. sanc. sev.	0.011		0.284		
	(0.216)		(0.221)		
Tax haven dest. × Fin. sanctions led by US		0.298**	0.306**	-0.055	0.187
		(0.139)	(0.145)	(0.085)	(0.130)
Tax haven dest. × Fin. sanc. led by US × Fin. sanc. sev.		-1.379***	-1.377***	0.109	-0.771**
		(0.335)	(0.332)	(0.251)	(0.325)
N	80187	62367	62367	25800	36253
(Origin country x Year) FE	✓	✓	✓	✓	✓
(Destination country x Year) FE	✓	✓	✓	✓	✓
Dyad FE	✓	✓	✓	✓	✓

Robust standard errors are clustered by dyad. *p<0.1; **p<0.05; ***p<0.01.
Dependent variable is "the amount of origin country's foreign deposits in destination country in a given year." Unit of analysis is dyad-year. Estimator is PPML.
Financial Sanction Severity is "the share of world GDP belonging to countries imposing financial sanctions on a target country in a given year."
Financial Sanctions Involve US is a dummy variable coded 1 if, in a given year, a target country is under financial sanctions imposed by a coalition that includes (but is not necessarily led by) the US.
Financial Sanctions Led By US is a dummy variable coded 1 if, in a given year, a target country is under financial sanctions imposed by a coalition led by the US. This variable is only available until 2015.
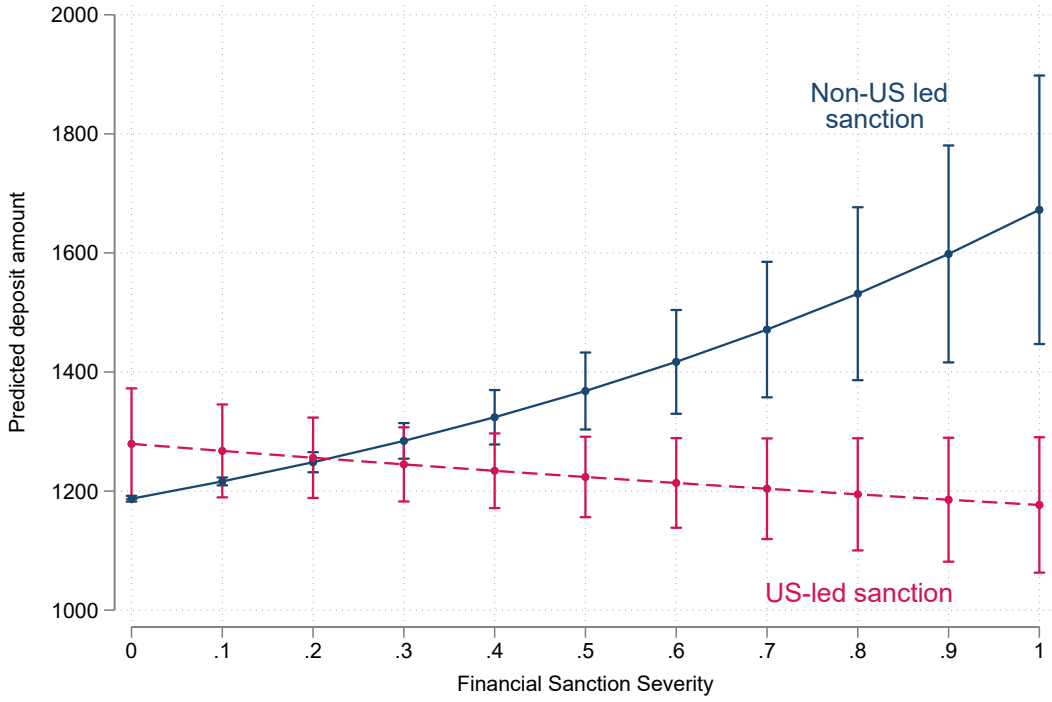
Figure 3: **Deposits in Tax Havens vs Non-Havens, US Leadership, and Sanction Severity**

Notes: This figure shows the predicted increase in foreign deposits in a tax haven (relative to a non-haven) as the origin country comes under more severe financial sanctions. The predictions for US-led sanctions and non-US led sanctions are shown separately. The estimates are based on Model 2 in Table 4.

Severity is negative and larger in magnitude than *Tax Haven × Financial Sanction Severity*. In other words, as US-led sanctions become more severe, target states' funds in tax havens decrease. However, we must also consider the coefficient of *Tax Haven Destination × Financial Sanction Led by US*, which is positive and significant. To better understand the effect of interaction terms, we now turn to graphical methods.

Figure 3 shows how the predicted amount of funds from a sanctioned country in a tax haven changes as we vary sanction severity. It shows that the effects are different for US-led sanctions (orange) and non-US led sanctions (blue). For non-US led sanctions, as severity goes from 0 to 1 (maximum) increases, there is about a 30% increase in the predicted amount of funds. In contrast, for US-led sanctions, varying sanction severity does not change the predicted amount of funds. In other words, unlike in other sanction episodes, stronger US-led sanctions do not trigger a transfer

of funds to tax havens.

Are these patterns more pronounced after the 2001 Patriot Act gave the US government new powers? To answer this question we split the sample into pre-2001 and post-2001 periods and rerun the model in column 2 separately in each subsample.

Models 4 and 5 show that the patterns we have discussed so far are only visible in the post-2001 period. None of the three variables are significant in the pre-2001 sample. However, in the post-2001 sample tax havens receive more funds from heavily sanctioned states but this effect disappears when sanctions are led by the US. Model 1 in Appendix Table A.3 shows that the differences between Models 4 and 5 are statistically significant by including a quadruple interaction between a *Post-2001* dummy and the three variables in Models 4 and 5.

To conclude, these results suggest that the US's privileged position in global finance helps it discipline tax havens and prevent targeted countries from finding refuge in those offshore centers. Interestingly, this effect does not apply to all US sanctions but only to those led by the US. We interpret this difference as evidence that the US uses its power to enforce sanctions selectively. The likeliest reason for its selective use is that there are bureaucratic and economic costs to monitoring and punishing violations and the US prefers to pay these costs only for sanction goals that it prioritizes.

6   Robustness Checks

We conduct five robustness checks to ensure our results are not driven by design choices, data limitations, or measurement assumptions. Each check alters a key aspect of the research design, either by restricting the sample, re-specifying the outcome, or using alternative data sources.

Restricting BIS data to post-1992:   The coverage of BIS data expands significantly in 1992, when more countries began reporting foreign deposits. This results in a sudden jump in reported deposits, both in tax havens and non-havens (Appendix Figure A.3). To confirm that our results are not driven by this shift, we re-run the analysis using only data from the post-1992 period. Our findings remain robust (Appendix Tables A.4–A.6; Model 2 in A.3).

Aggregating tax haven destinations: Our main specification treats each depositor–destination pair separately. However, owners of offshore accounts often do not distinguish between individual havens and may spread assets across multiple jurisdictions or use nested ownership structures. This raises concerns that dyadic analysis might misrepresent actual behavior.

To address this, we aggregate each country's deposits into two categories: total deposits in tax havens and in non-havens. This results in a dataset where the unit of analysis is origin country–destination type (haven or non-haven)–year. We retain origin-by-year and origin-by-destination-type fixed effects. However, However, because we have grouped destinations into just two categories, we drop destination-by-year effects by construction.

Regression results confirm our core findings (Appendix Tables A.7–A.9). Sanctioned countries increase deposits in tax havens (Table A.7), with no significant difference between FATF and non-FATF havens (Table A.8). US-led sanctions suppress this effect (Table A.9), and sanctioned countries appear to favor non-OECD over OECD havens (Table A.8).

Re-coding dependencies in sanctions data: Some jurisdictions in the BIS data such as Macao or the Isle of Man are dependencies with limited sovereignty. Although the GSDB includes all sanctions imposed by actors with an ISO country code (including dependencies), their semi-sovereign status and limited role in global affairs may hinder accurate coding. For instance, while the GSDB never codes the Isle of Man (a UK dependency) as a sanctioning country, the Isle of Man Government implemented all EU sanctions prior to Brexit and continues to implement all UK sanctions.[16]

To test whether this affects our results, we re-code dependencies as adopting their parent country's sanctions policies. For example, the Isle of Man is assumed to follow UK sanctions. The results remain consistent with the main analysis [ADD TABLES].

Alternative dependent variable from the Offshore Leaks Database: As an alternative to the BIS dataset, we use the Offshore Leaks Database from the International Consortium of Investigative Journalists (ICIJ), which compiles data from four major leaks: the Portcullis Trustnet and Commonwealth Trust (2013), the Panama Papers (2016), the Paradise Papers (2017), and

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[16]Personal communication with the Isle of Man Government's Financial Intelligence Unit. See also its webpage on *Sanctions and Export Control* at `https://www.gov.im/categories/tax-vat-and-your-money/customs-and-excise/sanctions-and-export-control/#accordion`.

the Pandora Papers (2021).[17] Each leak involves law firms, such as Mossack Fonseca, Appleby, and others, that served clients worldwide and operated across multiple offshore financial centers. The database includes approximately 740,000 entities with information on incorporation dates and associated officers, allowing us to construct a measure of offshore entity creation by country-month. Further information on the database is in Appendix Section A.2.

For each entity listed in the Offshore Leaks Database, we observe the beneficiaries (legal or natural persons) and the date of incorporation.[18] If the beneficiary's country is reported, we use it to assign nationality to the entity. If not, we rely on the beneficiary's address (if available). For 121,000 observations, however, both fields are missing, so we exclude them. This exclusion does not bias our results as long as missingness is not systematically different between sanctioned and non-sanctioned countries, or across sanction and non-sanction years within a country. We believe this is a reasonable assumption; if anything, sanctioned beneficiaries have stronger incentives to conceal their identity, which may lead us to undercount transfers from sanctioned countries to tax havens. This will make it harder to find support for our hypotheses.

Following Alstadsæter, Johannesen and Zucman (2019), we exclude beneficiaries linked to more than ten addresses or more than ten entities, as both patterns suggest intermediary or middleman status and may not reflect the nationality of the ultimate beneficiary.[19] We also exclude beneficiaries who report a tax haven as their location, as they are likely nominees. If a beneficiary is linked to multiple countries, we impute the entity to each country separately. After these steps, we can assign a nationality to approximately 124,000 entities.

Our dependent variable is the number of entities incorporated in a given month by a country (e.g., Russia), divided by that country's population (in millions). This population standardization accounts for the fact that, all else equal, more populous countries are more likely to establish shell companies. Results are similar if we instead normalize by the establishing country's GDP.

We regress this variable on *Financial Sanction Severity*, controlling for origin-country fixed effects, year fixed effects, origin-country time trends, and origin-country lagged GDP. We do not

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[17]https://offshoreleaks.icij.org/

[18]The database uses the term "officers" to refer to individuals or entities managing a company. An officer may act on behalf of the ultimate beneficiary. Since we cannot distinguish between managers and beneficiaries, we assume that an officer shares the same origin as the beneficiary—for example, an Italian beneficiary appoints an Italian manager.

[19]The median number of entities per officer is 2; the 75th percentile is 130.

include an interaction between *Tax Haven Destination* and *Financial Sanction Severity* because this dataset lacks information on non-haven destinations.

The estimates in Appendix Table A.10 confirm our main finding: all else equal, states targeted by financial sanctions increase their funds in tax havens and establish more shell companies.

[**DIEGO**] In the future we will analyze if US involvement in sanctions reduces the number of shell companies established in tax havens. [ADD TABLES]

Alternative definition of tax havens: So far we have used the widely-used list of tax havens created by (Hines Jr, 2010). Our results are robust to using two alternative lists of tax havens compiled respectively by (Tørsløv, Wier and Zucman, 2022) and by (Andersen, Johannesen and Rijkers, 2022). Table A.12 replicates the main results of Table 2 using the two alternative definitions respectively in Panel A and Panel B.

7 Conclusion

In this paper we investigate whether financial sanctions can be undermined by shifting wealth to tax havens. To this end, we compare financial movements by members of sanctioned and non-sanctioned countries and uncover several new results. We find strong evidence that financial sanctions cause sanctioned countries' foreign assets to be relocated but not put out of their owners' reach. More specifically, when a country is sanctioned, we see a reduction in that country's deposits in the sanctioning countries. However, at the same time, we observe a rise in its deposits and new entities in tax havens. This effect is stronger for more severe sanctions, and robust to flexible controls, alternative measures of the key variables, and different estimation strategies including modern difference-in-difference estimators. It is not weakened by destination countries' participation in sanctioning coalitions or the relevant IGOs. The only robust mitigating factor is US leadership in sanctions, which highlights that enforcement capability is necessary but not sufficient; effectiveness also requires the political will to apply this capability.

Although our analysis focuses on sanctions targeting foreign state policies, the findings should generalize to sanctions imposed on non-state actors such as drug cartels and individuals involved in corruption. For example, Dan Gertler, a mining industrialist in the Democratic Republic of

Congo, was sanctioned for corruption by the US in December 2017 under the Global Magnitsky Act. Gertler sought to evade these restrictions by transferring assets to his wife (Global Witness, 2020, 7) and creating a network of offshore companies (Wilson, Hume and Politi, 2021). Similar to state-linked actors, Gertler exploited the global financial system and tax havens to circumvent sanctions.

Our research has important implications for researchers and policymakers. Academically, we contribute to literatures on illicit finance and economic sanctions by demonstrating how to employ novel data and explore difficult-to-observe phenomena. We provide the first systematic analysis on how the global financial system is used to evade financial sanctions and the effectiveness of counter-measures.

Policy-wise, our results provide novel evidence on the role that tax havens play in sanction evasion. Although the debate on financial secrecy mostly focuses on tax evasion, corruption and criminality, our research suggests that there are also geopolitical reasons to reduce such secrecy and regulate offshore financial centers. The war in Ukraine has highlighted the importance of these issues. For instance, the United Kingdom's Joint Money Laundering Intelligence Taskforce (JMLIT) recently issued a red alert where it suggests tips for identifying sanction evaders, including the sale of assets previously belonging to targeted individuals that are then distributed offshore through secrecy jurisdictions or transferring ownership to companies based in offshore jurisdictions (JMLIT, 2022, 10). Although these issues have entered policymakers' radar, our findings suggest that more careful and broader reforms are needed to close this gap in sanction enforcement.

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Online Appendix

In this appendix we present the figures and robustness checks that were mentioned in the main text.

- Figure A.1 shows the geographical coverage of the BIS dataset.

- Figure A.2 shows the amount of deposits reported in the BIS dataset over time.

- Figure A.3 shows the number of reporting (destination) countries (both tax haven and non-haven) in the BIS dataset.

- Figure A.4 shows the increase in the number of financial sanctions over time.

- Figure A.5 shows the patterns of missingness and treatment levels of *Financial Sanction Severity*

- Table A.1 shows that the results of our monadic analysis are similar if we switch our DV to *Logged Share of Deposits in Tax Havens* and our estimator to OLS.

- Table A.2 shows that our main results do not change if we exclude dyads in which the origin country is under financial sanctions but the destination country is not in the sanctioning coalition.

- Table A.3 shows that the differences we found in our split sample comparison of pre- vs post-2001 periods are statistically significant.

- Tables A.4-A.6 rerun our analyses restricting the sample to post-1992 observations.

- Tables A.7-A.9 rerun our analyses on the aggregated dataset where the unit of analysis is origin country- destination type- year.

- Table A.10 uses the Offshore Leaks Database to show that countries under heavier financial sanctions establish more shell companies in tax havens.
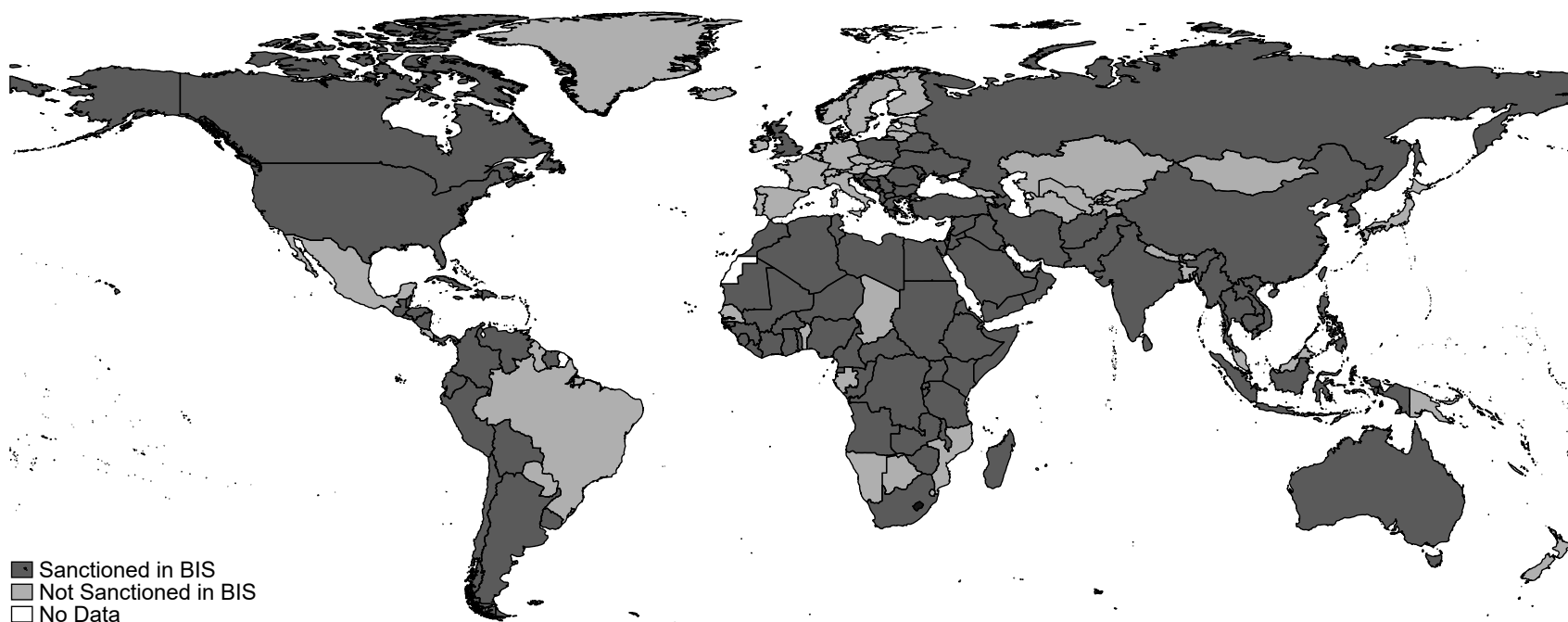
Sanctioned in BIS
Not Sanctioned in BIS
No Data

Figure A.1: Countries in the BIS dataset that were targeted by a financial sanction.

Notes: The map distinguishes between countries on the basis of their inclusion in the Locational Banking Statistics database (BIS) and whether they were targeted by financial sanctions.
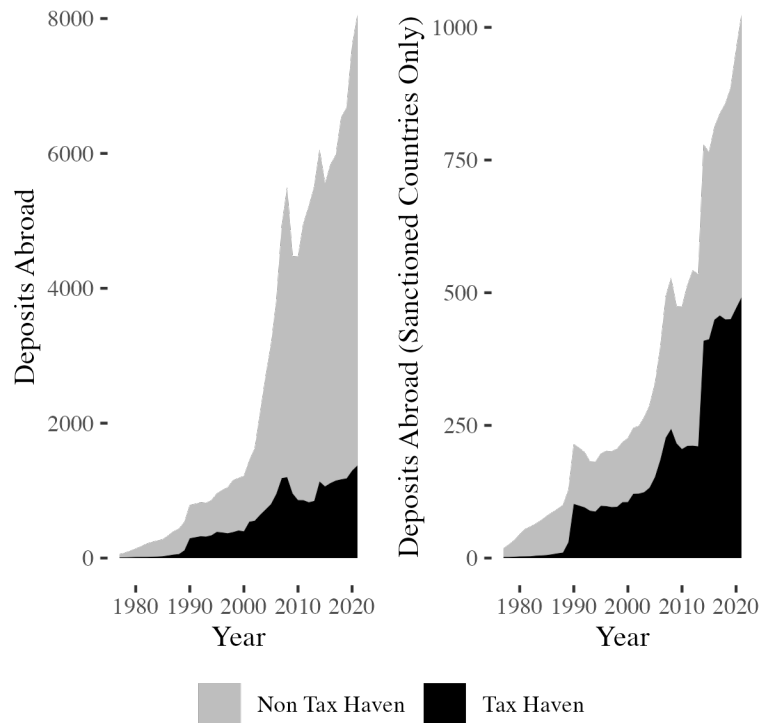
Figure A.2: Total Foreign Deposits Over Time in BIS

Notes: This figure plots the total amount of deposits in foreign countries. Deposits in tax havens are depicted in black and deposits in non tax havens are depicted in grey. The left panel reports foreign deposits for all countries in our dataset, whereas the right panel reports deposits for countries that experienced at least one 'severe' financial sanction over the sample period. A 'severe' sanction is one in which at least 50% of the world economy has joined those sanctions.
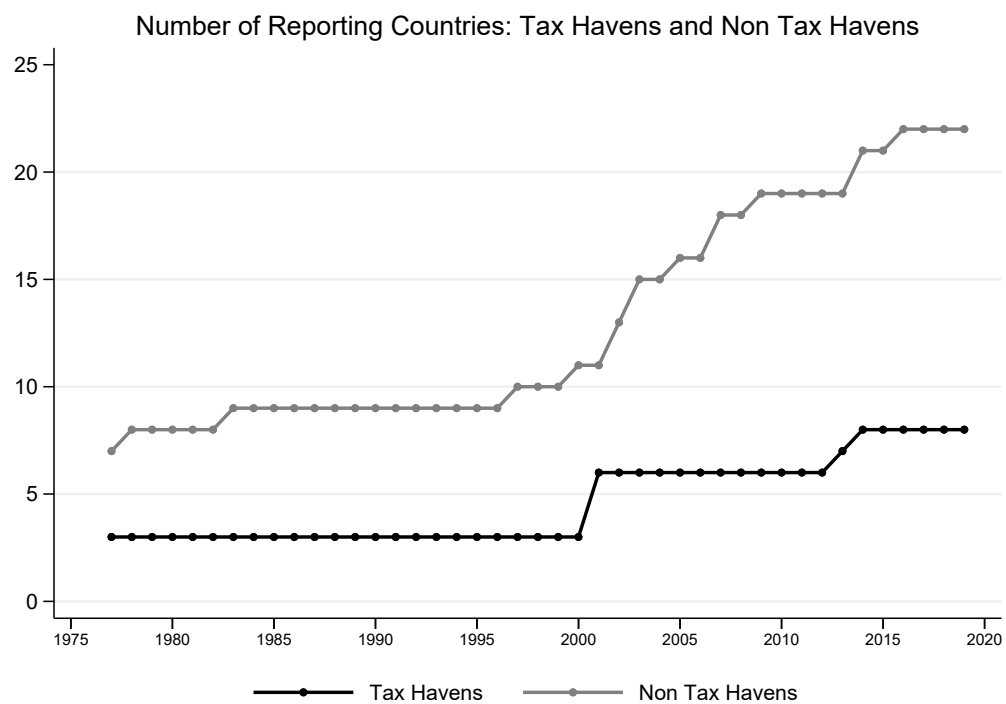
Figure A.3: Number of Reporter Countries in the Bank of International Settlements Database over Time

Figure A.4: Increasing Use of Financial Sanctions

Notes: This figure plots the total number of new financial sanctions (top panel) and the proportion of new financial sanctions among all types of sanctions (bottom panel) by decade. The data source is the GSDB.
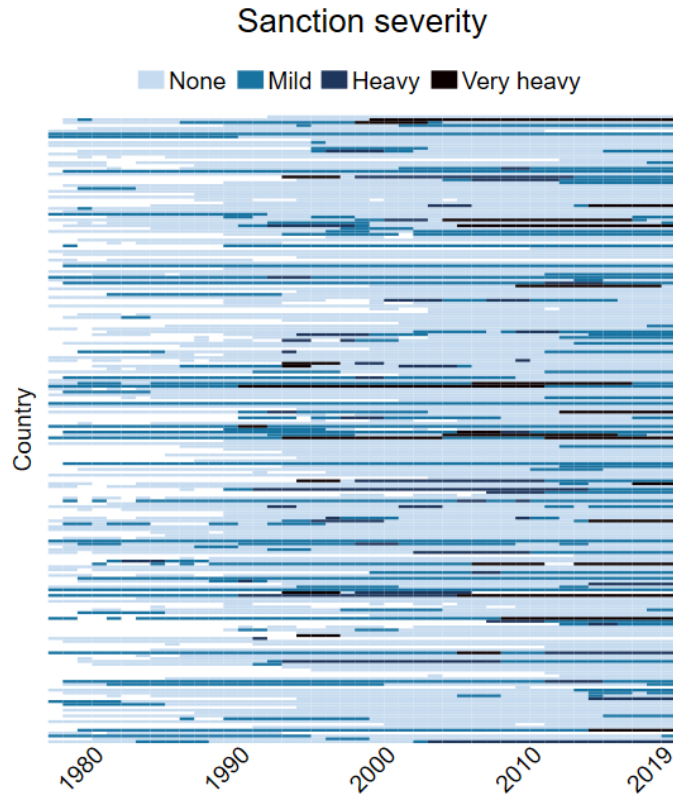
Figure A.5: Distribution of *Financial Sanction Severity*

Notes: This figure shows the distribution of *Financial Sanction Severity* across countries and years. White areas mean missing data. *Financial Sanction Severity* is grouped into four categories: "None" means that the country is not under any (financial) sanctions. "Mild" means that the sanction coalition makes up less than 25% of the world economy. "Heavy" means that the sanction coalition constitutes between 25-50% of the world economy. "Very heavy" means that more than 75% of the world economy is imposing sanctions.
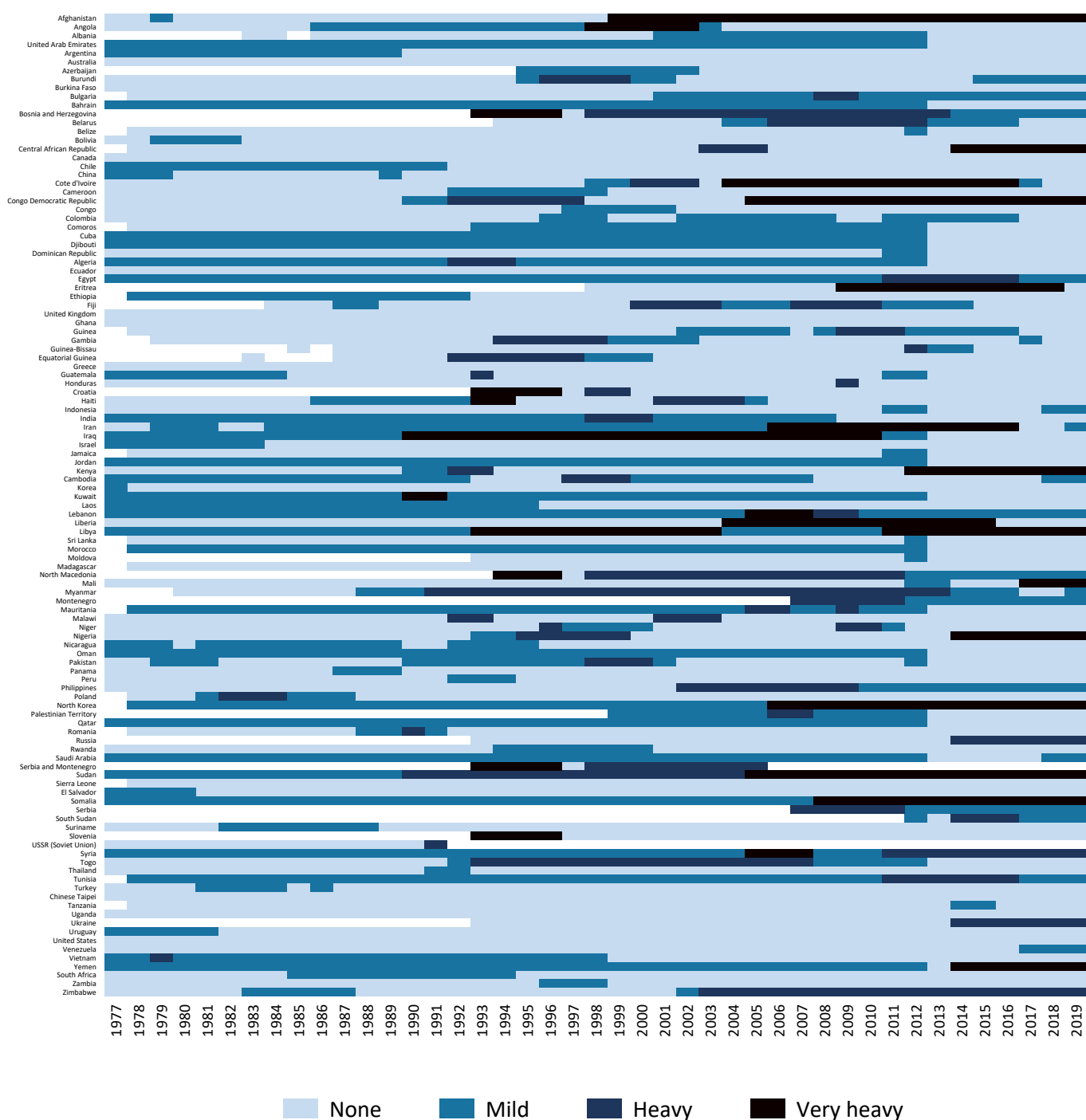
Figure A.6: Distribution of *Financial Sanction Severity*

Notes: This figure shows the distribution of *Financial Sanction Severity* across countries and years among the sole countries hit by sanctions. White areas mean missing data. *Financial Sanction Severity* is grouped into four categories: "None" means that the country is not under any (financial) sanctions. "Mild" means that the sanction coalition makes up less than 25% of the world economy. "Heavy" means that the sanction coalition constitutes between 25-50% of the world economy. "Very heavy" means that more than 75% of the world economy is imposing sanctions.

Table A.1: **Financial Sanctions and Share of Deposits Held in Tax Havens - OLS Estimates**

	(1)	(2)	(3)
Financial Sanction Severity	0.375***		
	(0.138)		
Any Financial Sanction Dummy		0.187***	
		(0.069)	
Heavy Financial Sanction Dummy			0.170*
			(0.095)
Total GDP	0.624***	0.608***	0.587***
	(0.161)	(0.158)	(0.159)
Population	0.679***	0.703***	0.697***
	(0.252)	(0.254)	(0.255)
CINC	1.760	2.429	2.025
	(3.818)	(3.866)	(3.842)
Democracy	0.068	0.075	0.024
	(0.236)	(0.238)	(0.232)
UN voting similarity with USA	0.731**	0.701*	0.734**
	(0.361)	(0.360)	(0.361)
Ongoing interstate war	0.181**	0.180**	0.170**
	(0.080)	(0.085)	(0.084)
Ongoing civil war	0.036	0.037	0.041
	(0.061)	(0.061)	(0.062)
N	4987	4987	4987
Country FE	✓	✓	✓
Year FE	✓	✓	✓

Robust standard errors are clustered by country. *p<0.1; **p<0.05.
Dependent variable is "(logged) the share of a country's foreign deposits held in tax havens in a given year." Unit of analysis is country-year. Estimator is OLS.
Financial Sanction Severity is "the share of world GDP belonging to countries imposing financial sanctions on a target country in a given year."
Any Financial Sanction Dummy is coded 1 if *Financial Sancition Severity* is greater than 0, and 0 otherwise.
Heavy Financial Sanction Dummy is coded 1 if *Financial Sancition Severity* is greater than 0.5, and 0 otherwise.
All controls are lagged by one year. *Total GDP* and *Population* are logged.

Table A.2: **Exclude Sanctions Imposed By "Other" Countries**

	(1)	(2)
Tax Haven Destination × Financial Sanction Severity	0.553**	0.544**
	(0.011)	(0.022)
N	65,741	64,813
(Origin country x Year) FE	✓	✓
(Destination country x Year) FE	✓	✓
Dyad FE	✓	✓

 The sample excludes dyads where the origin country is under financial sanctions but the destination country (tax haven or not) is not a member of the sanction coalition. Column (1) and (2) differ in the way we treat depenendencies. In (1), if a mother country participated in the sanctioning coalition, we keep the observation. In (2) we only consider the behavior of the dependency as separate form the mothercountry. We therefore exclude dependencies if they did not participate in the sanctioning coalition.
Robust standard errors are clustered by dyad. *p<0.1; **p<0.05; ***p<0.01.
Dependent variable is "the amount of origin country's foreign deposits in destination country in a given year." Unit of analysis is dyad-year. Estimator is PPML.
Financial Sanction Severity is "the share of world GDP belonging to countries imposing financial sanctions on a target country in a given year."

Table A.3: **Formal Comparison of Pre- vs Post-2001 Periods**

	Full sample (1)	Post-1992 sample (2)	Aggregated data (3)
Tax Haven Dest. × Financial Sanction Severity	-0.075	0.455	-0.247
	(0.345)	(0.393)	(0.354)
Tax Haven Dest. × Sanc. led by US	-0.576***	-0.441**	-0.680***
	(0.145)	(0.172)	(0.207)
Tax Haven Dest. × Sanc. led by US × Fin. Sanction Sev.	0.379	0.073	0.852
	(0.511)	(0.567)	(0.608)
Tax Haven Dest. × Post-2001 × Financial Sanction Severity	1.282***	0.697	1.485***
	(0.462)	(0.471)	(0.456)
Tax Haven Dest. × Sanc. led by US × Post-2001	1.048***	0.836***	1.022***
	(0.184)	(0.193)	(0.238)
Tax Haven Dest. × Sanc. led by US × Post-2001 × Fin. Sanc. Sev.	-1.745***	-1.252**	-2.409***
	(0.598)	(0.634)	(0.706)
N	62367	48446	13106
(Origin country x Year) FE	✓	✓	✓
(Destination country x Year) FE	✓	✓	
(Destination type x Year) FE			✓
Dyad FE	✓	✓	✓

Robust standard errors are clustered by dyad. *p<0.1; **p<0.05; ***p<0.01.

Dependent variable is "the amount of origin country's foreign deposits in destination country in a given year." Unit of analysis is dyad-year. Estimator is PPML.

Financial Sanction Severity is "the share of world GDP belonging to countries imposing financial sanctions on a target country in a given year."

M1 tests if the coefficients in Table 4 M4 and M5 are significantly different from each other.

M2 tests if the coefficients in Table A.6 M4 and M5 are significantly different from each other.

M3 tests if the coefficients in Table A.9 M4 and M5 are significantly different from each other.

Table A.4: **Restricting Sample to Post-1992: Rerun Main Analysis in Table 2**

	Baseline model (1)	Control for lags (2)	Control *Trade* sanx. (3)	Alt've measure (4)
Tax Haven Dest. × Fin. Sanct. Severity	0.567***	0.241*	0.718***	
	(0.161)	(0.127)	(0.180)	
Tax Haven Dest. × Fin. Sanction Severity (lagged 1yr)		-0.009		
		(0.103)		
Tax Haven Dest. × Fin. Sanction Severity (lagged 2yrs)		0.480***		
		(0.124)		
Tax Haven Dest. × Trade Sanction Severity			-0.264	
			(0.223)	
Tax Haven Dest. × Alt've Fin. Sanction Severity				0.645***
				(0.207)
N	66267	54054	66267	66267
(Origin country x Year) FE	✓	✓	✓	✓
(Destination country x Year) FE	✓	✓	✓	✓
Dyad FE	✓	✓	✓	✓

The sample is restricted to post-1992 observations.

Robust standard errors are clustered by dyad. *p<0.1; **p<0.05.

Dependent variable is "the amount of origin country's foreign deposits in destination country in a given year." Unit of analysis is dyad-year. Estimator is PPML.

Financial Sanction Severity is "the share of world GDP belonging to countries imposing financial sanctions on a target country in a given year." *Alternative Fin. Sanction Severity* is "the share of total foreign deposits held in countries imposing financial sanctions on a target country in a given year."

Table A.5: **Restricting Sample to Post-1992: Re-Analysis of the Role of IGO Membership**

	FATF		OECD	
	Only FATF members (1)	Only tax havens (2)	Only OECD members (3)	Only tax havens (4)
Tax Haven Dest. × Fin. Sanction Severity	0.568*** (0.175)		0.609*** (0.178)	
IGO Member Dest. × Fin. Sanction Severity		-0.010 (0.251)		0.050 (0.242)
N	54472	21083	53106	21083
(Origin country x Year) FE	✓	✓	✓	✓
(Destination country x Year) FE	✓	✓	✓	✓
Dyad FE	✓	✓	✓	✓

The sample is restricted to post-1992 observations.

Robust standard errors are clustered by dyad. *p<0.1; **p<0.05.

Dependent variable is "the amount of origin country's foreign deposits in destination country in a given year." Unit of analysis is dyad-year. Estimator is PPML.

Financial Sanction Severity is "the share of world GDP belonging to countries imposing financial sanctions on a target country in a given year." *Alternative Fin. Sanction Severity* is "the share of total foreign deposits held in countries imposing financial sanctions on a target country in a given year."

Table A.6: **Restricting Sample to Post-1992: Re-Analysis of the Role of US-led Sanctions**

	All years			Pre-2001	Post-2001
	(1)	(2)	(3)	(4)	(5)
Tax Haven Dest. × Financial Sanction Severity	0.505***	1.161***	0.884***	0.602***	0.669***
	(0.172)	(0.143)	(0.179)	(0.229)	(0.178)
Tax Haven Dest. × Sanc. involve USA	0.016		0.022		
	(0.089)		(0.095)		
Tax Haven Dest. × Sanc. involve USA × Fin. Sanc. Sev.	0.051		0.274		
	(0.202)		(0.200)		
Tax Haven Dest. × Sanc. led by USA		0.319**	0.315**	0.046	0.187
		(0.132)	(0.135)	(0.077)	(0.130)
Tax Haven Dest. × Sanc. led by USA × Fin. Sanc. Sev.		-1.199***	-1.213***	-0.526**	-0.771**
		(0.312)	(0.312)	(0.237)	(0.325)
N	66267	48446	48446	11888	36253
(Origin country x Year) FE	✓	✓	✓	✓	✓
(Destination country x Year) FE	✓	✓	✓	✓	✓
Dyad FE	✓	✓	✓	✓	✓

The sample is restricted to post-1992 observations.

Robust standard errors are clustered by dyad. *p<0.1; **p<0.05; ***p<0.01.

Dependent variable is "the amount of origin country's foreign deposits in destination country in a given year." Unit of analysis is dyad-year. Estimator is PPML.

Financial Sanction Severity is "the share of world GDP belonging to countries imposing financial sanctions on a target country in a given year."

Financial Sanctions Involve US is a dummy variable coded 1 if, in a given year, a target country is under financial sanctions imposed by a coalition that includes (but not necessarily led by) the US.

Financial Sanctions Led By US is a dummy variable coded 1 if, in a given year, a target country is under financial sanctions imposed by a coalition led by the US. This variable is only available until 2015.

Table A.7: **Deposits Aggregated to Tax Haven vs Non-Haven: Re-Analyze Main Model**

	(1)	(2)	(3)	(4)
Tax Haven Destination	-1.341***	-1.343***	-1.301***	-1.317***
	(0.000)	(0.000)	(0.000)	(0.000)
Tax Haven Dest. $\times$ Fin. Sanct. Severity	2.858***	2.336*	3.370***	
	(0.000)	(0.071)	(0.000)	
Tax Haven Dest. $\times$ Fin. Sanct. Severity (lagged 1yr)		0.102		
		(0.315)		
Tax Haven Dest. $\times$ Fin. Sanct. Severity (lagged 2yrs)		0.538		
		(0.600)		
Tax Haven Dest. $\times$ Trade Sanction Severity			-1.235	
			(0.335)	
Tax Haven Dest. $\times$ Alt've Fin. Sanction Severity				2.534***
				(0.000)
N	14804	13664	14804	14804
(Origin country x Year) FE	✓	✓	✓	✓
(Origin country x Dest. Type) FE	✓	✓	✓	✓

Robust standard errors are clustered by origin country-destination type. *p<0.1; **p<0.05.
Dependent variable is "the amount of origin country's foreign deposits in a type of destination (tax haven or non-haven) in a given year." Unit of analysis is origin country-destination type-year. Estimator is PPML.
Financial Sanction Severity is "the share of world GDP belonging to countries imposing financial sanctions on a target country in a given year."

Table A.8: **Deposits Aggregated to Tax Haven vs Non-Haven: Re-Analysis of the Role of IGO Membership**

	FATF		OECD	
	Only FATF members (1)	Only tax havens (2)	Only OECD members (3)	Only tax havens (4)
Tax Haven Dest. × Fin. Sanction Severity	0.608** (0.247)		0.150 (0.220)	
IGO Member Dest. × Fin. Sanction Severity		0.425*** (0.141)		-1.848* (1.026)
N	11622	6932	14708	6844
(Origin country x Year) FE	✓	✓	✓	✓
(Destination country x Year) FE	✓	✓	✓	✓
Dyad FE	✓	✓	✓	✓

NOTES

Table A.9: **Deposits Aggregated to Tax Haven vs Non-Haven: Re-Analysis of The Effect of US-Led Sanctions**

	(1)	(2)	(3)
Tax haven dest. × Fin. Sanction Severity	0.285	0.951***	0.312
	(0.484)	(0.214)	(0.490)
Tax haven dest. × Sanctions involve USA	0.383***		0.381***
	(0.090)		(0.095)
Tax haven dest. × Sanctions involve USA × Fin. Sanction Severity	0.031		0.281
	(0.515)		(0.512)
Tax haven dest. × Sanctions led by USA		0.318**	0.035
		(0.136)	(0.164)
Tax haven dest. × Sanctions led by USA × Fin. Sanction Severity		-1.134**	-0.778
		(0.518)	(0.534)
N	14802	14802	14802
(Origin country x Year) FE	✓	✓	✓
(Origin country x Dest. Type) FE	✓	✓	✓

Robust standard errors are clustered by origin country-destination type. *p<0.1; **p<0.05.
Dependent variable is "the amount of origin country's foreign deposits in a type of destination (tax haven or non-haven) in a given year." Unit of analysis is origin country-destination type-year. Estimator is PPML.
Financial Sanction Severity is "the share of world GDP belonging to countries imposing financial sanctions on a target country in a given year."

Table A.10: New Entities Established By Sanction Target States in Tax Havens

	(1)	(2)	(3)
Financial Sanction Severity	0.9318**	0.9212**	1.221***
	(0.3764)	(0.4288)	(0.2720)
N	3,608	3,608	3,608
Origin Country FE	✓	✓	✓
Year FE		✓	✓
Country Time Trends			✓
Lag GDP	✓	✓	✓

Note: Data comes from the Offshore Leaks Database. Standard errors are clustered at the country level. *p<0.1; **p<0.05; ***p<0.01. Unit of analysis is origin country-year. Estimator is PPML.
Financial Sanction Severity is "the share of world GDP belonging to countries imposing financial sanctions on a target country in a given year."

Table A.11: Effect of U.S. Role in Sanction Coalitions on Entity Incorporation in Tax Havens

	(1)	(2)	(3)	(4)	(5)	(6)
Sanction Share	0.7572·	0.7973·	1.664***	1.395***	1.533***	1.806***
	(0.4037)	(0.4568)	(0.4757)	(0.2260)	(0.2659)	(0.4629)
U.S.-Led Sanction Target	0.0199	−0.0082	0.0661	0.0216	−0.0072	0.0683
	(0.0808)	(0.0887)	(0.0699)	(0.0821)	(0.0901)	(0.0706)
U.S. Among Sanctioning Countries				−0.6211***	−0.7127***	−0.2154
				(0.1863)	(0.2025)	(0.2234)
Sanction Share × U.S.-Led Target	0.2117	0.1667	−0.6824*	0.0567	−0.0193	−0.6999*
	(0.2210)	(0.2349)	(0.3764)	(0.2051)	(0.2170)	(0.3812)
N	3,608	3,608	3,608	3,608	3,608	3,608
Origin Country FE	✓	✓	✓	✓	✓	✓
Year FE		✓	✓		✓	✓
Country Time Trends			✓			✓

Note: All models are estimated using Poisson pseudo-maximum likelihood (PPML) with country-level clustered standard errors in parentheses. *p<0.1; **p<0.05; ***p<0.01.
Columns (1)–(3) exclude the variable *U.S. Among Sanctioning Countries*, while columns (4)–(6) include it.
Sanction Share is the global GDP share of sanctioning countries. *U.S.-Led Sanction Target* is a dummy equal to 1 if the U.S. leads the coalition imposing sanctions. *U.S. Among Sanctioning Countries* is a dummy equal to 1 if the U.S. is part of the sanctioning coalition, irrespective of leadership.
Interaction terms capture heterogeneous effects of sanctions depending on U.S. leadership.

Table A.12: **Dyadic Analysis of Financial Sanctions and Foreign Deposits in Tax Havens. Robustness by alternative definition of Tax Havens.**

	Baseline model (1)	Control for lags (2)	Control *Trade* sanx. (3)	Alt've measure (4)
A. Tax Havens as per Tørsløv et al. (2023)				
Tax Haven Destination=1 × Financial Sanction Severity	0.557*** (0.160)	0.350*** (0.113)	0.907*** (0.201)	
Tax Haven Destination=1 × Alt've Fin. Sanction Severity				0.771*** (0.208)
Tax Haven Destination × Fin. Sanction Severity (lagged 1yr)		-0.005 (0.086)		
Tax Haven Destination × Fin. Sanction Severity (lagged 2yrs)		0.348** (0.139)		
Tax Haven Destination × Trade Sanction Severity			-0.570** (0.244)	
B. Tax Havens as per Andersen et al. (2022)				
Tax Haven Destination=1 × Financial Sanction Severity	0.575*** (0.161)	0.363*** (0.115)	1.061*** (0.191)	
Tax Haven Destination=1 × Alt've Fin. Sanction Severity				0.781*** (0.210)
Tax Haven Destination × Fin. Sanction Severity (lagged 1yr)		-0.019 (0.086)		
Tax Haven Destination × Fin. Sanction Severity (lagged 2yrs)		0.374*** (0.138)		
Tax Haven Destination × Trade Sanction Severity			-0.793*** (0.232)	
N	80187	66941	80187	80187
(Origin country x Year) FE	✓	✓	✓	✓
(Destination country x Year) FE	✓	✓	✓	✓
Dyad FE	✓	✓	✓	✓

Robust standard errors are clustered by dyad. *p<0.1; **p<0.05.

Dependent variable is "the amount of origin country's foreign deposits in destination country in a given year." Unit of analysis is dyad-year. Estimator is PPML.

In Panel A the definition of tax havens is based on (Tørsløv, Wier and Zucman, 2022), while in Panel B the definition is based on (Andersen, Johannesen and Rijkers, 2022).

Financial Sanction Severity is "the share of world GDP belonging to countries imposing financial sanctions on a target country in a given year." *Alternative Financial Sanction Severity* is "the share of total foreign deposits held in countries imposing financial sanctions on a target country in a given year."

A.1 Stacked Difference in Differences

To address the issue of staggered treatment, which can introduce negative weights in difference-in-differences estimation, we re-estimate the impact of sanctions on the logarithm of the share of funds in tax havens using a stacked difference-in-differences approach, following the methodology of Cengiz et al. (2019) and Deshpande and Li (2019).

We classify countries into cohorts based on the year their financial sanctions begin. The year of sanction imposition defines the treatment cohort—that is, the moment when the treatment (i.e., the sanction) is applied. For each cohort, we retain observations from five years before to five years after the sanction's onset. To construct a control group, we include countries that, during the same calendar years, are not subject to any sanctions ("pure controls").

We then compare the evolution of the logarithm of the share of funds in tax havens for sanctioned countries (treated) with that of non-sanctioned countries (controls) over the same calendar years. In essence, the trajectory of funds held in tax havens by non-sanctioned countries serves as a counterfactual for what would have happened to sanctioned countries in the absence of sanctions. To validate this assumption, we examine pre-trends by testing for differences in the evolution of the dependent variable in the five years leading up to the sanction, ensuring the parallel trends assumption holds.

More specifically, we estimate:

$$
\begin{aligned}
y_{ict} = \sum_{k=-5}^{k=5} \beta_k D(k \, years \, since \, sanction)_{ct} \times Treat_{ic} + \sum_{k=-5}^{k=5} \delta_k D(k \, years \, since \, election)_{ct} + \\
+ \theta Treat_{ic} + \alpha_i + year_t + \gamma Z_{it-1} + \epsilon_{it}
\end{aligned}
\tag{1}
$$

where y_{ict} represents the logarithm of the share of funds held in tax havens by country i, which belongs to the cohort identified by sanction c and is observed in year t. The terms α_i and $year_t$ correspond to country and year fixed effects, respectively, while Z_{it-1} includes the logarithm of GDP and the logarithm of population for country i, measured in year $t-1$.

The variable $Treat_{ic}$ is a treatment indicator that identifies countries within a cohort subject to a sanction imposed in year c. Meanwhile, $D(k \, years \, since \, sanction)_{ct}$ represents a set of indicators

capturing the number of years elapsed since the sanction was introduced.

In this specification, the coefficients β_k measure the differential evolution of the logarithm of the share of funds in tax havens for sanctioned countries compared to those not affected by a sanction in the same calendar years. Standard errors are clustered at the country level.

Figure A.7 presents the estimation results. We observe a significant increase in the logarithm of the share of funds held in tax havens by sanctioned countries following the imposition of the sanction. This increase peaks one year after the sanction's implementation, corresponding to a 13% rise in the share of funds held offshore. The absence of significant effects in the years preceding the sanction supports the assumption of parallel trends between treated and cohort countries.

In Table A.13, we present the average treatment effects from the stacked difference-in-differences estimation. Columns (1) and (2) report results from TWFE estimations, while the remaining columns show estimates from Poisson maximum likelihood models. Across all specifications, the interaction term between the treatment and post indicators confirms the findings from Table 1. The estimated coefficients are smaller in magnitude, as the treatment indicator is time-invariant within each treatment group (or "mini-experiment"). For example, if a country is subject to a sanction lasting three years, the treatment variable remains set to 1 for the entire cohort, even after the sanction period ends. We prefer this specification because it ensures that no treated unit is mistakenly used as a control within its treatment group, thereby mitigating concerns related to negative weighting.

Table A.13: **Financial Sanctions and Share of Deposits Held in Tax Havens. Stacked difference in differences estimates.**

Dep. Var.	TWFE		Poisson	
	Log of Share of funds in TH		Share of funds in TH	
	(1)	(2)	(3)	(4)
Treat	0.070	0.070	0.034	0.034
	(0.057)	(0.058)	(0.049)	(0.049)
Post	0.001	0.002	0.000	0.001
	(0.001)	(0.002)	(0.001)	(0.001)
Treat × Post	0.102**	0.102**	0.075**	0.075**
	(0.040)	(0.040)	(0.033)	(0.033)
Log_Real GDP at t-1	0.543***	0.543***	0.427***	0.427***
	(0.165)	(0.165)	(0.136)	(0.136)
Log_Population at t-1	0.473	0.473	0.509**	0.509**
	(0.328)	(0.328)	(0.252)	(0.251)
N	44,412	44,412	44,412	44,412
Country FE	✓	✓	✓	✓
Year FE	✓	✓	✓	✓
Treatment Group FE		✓		✓

Robust standard errors are clustered by country. *p<0.1; **p<0.05.
Dependent variable is Log of the "the share of a country's foreign deposits held in tax havens in a given year" in columns 1 and 2, and "the share of a country's foreign deposits held in tax havens in a given year" in columns 3 and 4. Unit of analysis is country-year. Estimator is TWFE in columns 1 and 2 and Poisson Maximum Likelihood in columns 3 and 4.
Financial Sanction Severity is "the share of world GDP belonging to countries imposing financial sanctions on a target country in a given year."
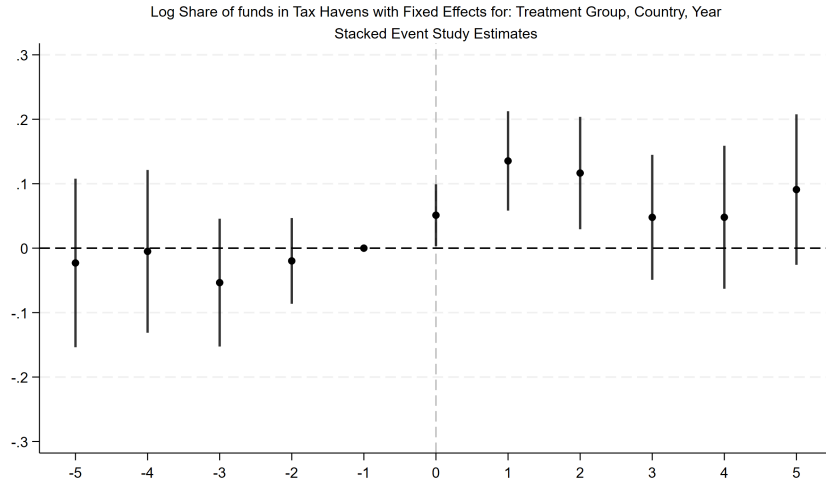
Figure A.7: Stacked difference-in-differences estimates for the evolution of the logarithm of the share of funds in tax havens in countries that are hit by a financial sanction in year 0.
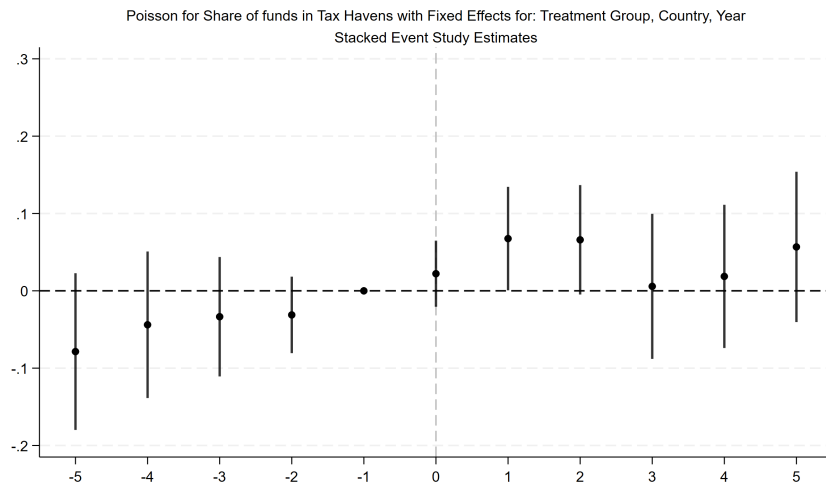

Figure A.8: Stacked difference-in-differences estimates with a poisson specification for the evolution of the share of funds in tax havens in countries that are hit by a financial sanction in year 0.

A.2 Further Information on the Offshore Leaks Database

The Offshore Leaks Database is provided by the International Consortium of Investigative Journalist (ICIJ).[20] This database combines several leaks and provides information about the ownership of offshore shell companies. It allows us to test our findings with a related but different dependent variable from the BIS.

In 2013, the ICIJ began to publish information on over 100,000 offshore entities incorporated by Portcullis Trustnet and Commonwealth Trust Limited, two law firms based in Singapore and the British Virgin Islands (BVI), respectively. In 2016 the ICIJ published data on over 200,000 entities set up by Mossack Fonseca, a law firm based in Panama and specializing in offshore entity incorporation. According to the *Economist*,[21], Mossack Fonseca covered between 5 and 10 percent of the global shell company market in 2016 and, had clients worldwide. In 2017, the ICIJ expanded the database with information on Appleby, a Bermuda-based law firm serving an international market through 700 employees across 19 tax havens. In October 2021, ICIJ published "Pandora Papers," covering 20,000 entities incorporated by firms in the BVI, Monaco, Panama, Singapore, and Switzerland. Together, these four leaks (Portcullis, Mossack Fonseca, Appleby, and the Pandora Papers) make up the Offshore Leaks Database, which includes data on approximately 740,000 entities.

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[20]https://offshoreleaks.icij.org/
[21]The Economist, April 2016