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Knockin' on H(e)aven's door. Financial crises and offshore wealth☆

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ABSTRACT

This paper investigates the relationship between financial crises in developing countries and variation of bank deposits in offshore financial centers. Using a stacked difference-in-differences estimator, we find that three years after the onset of the crisis, bank deposits in tax havens increase by almost 30 percent. The effect appears independent of tax rates and is primarily driven by countries with weak institutions. We add to the literature on tax havens as we find that they not only facilitate tax evasion and corruption in "normal times", but also absorb resources during financial crises, when most needed.

1. Introduction

Since the great financial liberalization in the 1980s, wealth has increasingly flowed across borders, often ending up in offshore destinations with near-zero tax rates (Tørsløv et al., 2022). When offshore wealth is concealed from tax authorities in the country of origin, or when regulations – such as bilateral tax agreements – are lacking or not enforced, the originating country is unable to impose taxes on this wealth. This issue is especially concerning for low and middle-income countries, where weaker rule of law and limited state capacity make enforcement significantly more challenging.

According to Zucman (2013), approximately 8 percent of global financial wealth is held in tax havens, resulting in an estimated tax revenue loss of $190 billion.[1] This outflow of resources – whether direct, through capital flight, or indirect, through uncollected taxes – becomes even more concerning during financial crises, when productive use of domestic resources could foster the recovery.

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[1] This estimate considers only the evasion of personal income taxes on offshore investment income, as well as evasion of wealth, inheritance, and estate taxes. Londoño-Vélez and Tortarolo (2022) provides empirical evidence to the tax avoidance motives that lie behind hidden wealth. They document that tax amnesties combined with credible detection risk induce large declarations. Both households and firms make use of tax havens to protect part of their assets and elude taxes. Using Scandinavian data, Alstadsæter et al. (2019) provide empirical evidence on the concentration of the use of tax havens in the very rich segments of the wealth distribution (the top 0.01%) causing a tax evasion rate of about 25%. As for firms, Zucman (2013) argues that about 20 percent of all US corporate profits are booked in tax havens and that about two-thirds of the decline in the effective corporate tax rate of US companies (that is from 30 to 20 per cent over the period 2000–2013) can be attributed to increased profit-shifting to low-tax jurisdictions.

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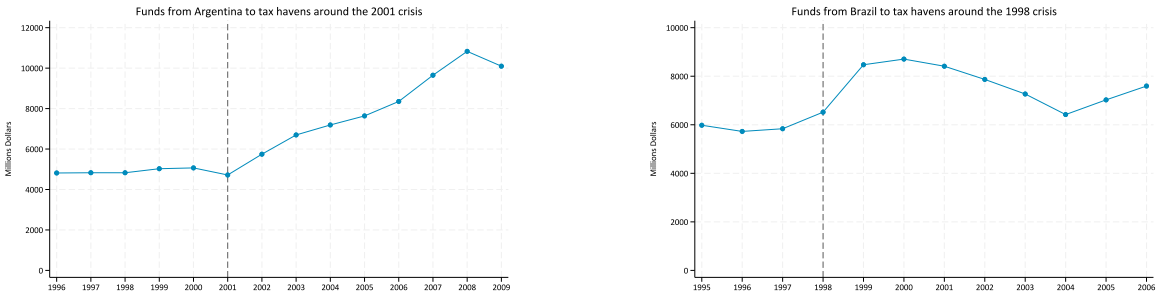


(a) Argentina Sovereign Debt Crisis (b) Brazil Banking Crisis

Fig. 1. Level of funds held in some tax havens by Argentinian and Brazilian residents around the periods of the Argentinian debt crisis of 2001 and the Brazilian banking crisis of 1998. The data are from the Locational Banking Statistics of the Bank of International Settlements. The tax havens considered are: Hong Kong, Macao, Austria, Belgium, Guernsey, the Isle of Man, Jersey, Luxembourg, and Switzerland.

If, to the extreme, capital flight to tax havens accelerates during a financial crisis, two sets of negative consequences follow: a slower recovery, on the one hand, and a heavier burden of the crisis on residents, on the other. As the access to tax havens features typically highest income individuals (Alstadsæter et al., 2019), their use during a financial crisis shrinks the tax base and exacerbates inequality.

The last two decades saw a resurgence of interest in offshore financial centers around the world, thanks to greater data availability and increased urgency for transparency in the policy debate. The literature primarily investigated the role of tax havens as facilitators of tax evasion (e.g., Alstadsæter et al., 2019; Londoño-Vélez and Ávila-Mahecha, 2021, 2023; Londoño-Vélez and Tortarolo, 2022).[2] The role tax havens play as harbors of capital flows during financial turmoils has so far been unexplored. This aspect becomes nonetheless central when trying to draw a complete picture of the costs of a financial crisis and its consequences on inequality.

Fig. 1 provides anecdotal evidence on the phenomenon we aim to document. The two panels show the evolution of capital flows to tax havens following the sovereign debt crisis in Argentina (2001) and the banking crisis in Brazil (1998), using data from the Locational Banking Statistics of the Bank for International Settlements. In both cases, financial turmoil triggered a surge in capital outflows toward tax havens.

In this paper, we take a macro approach and focus on the cross-country relationship between financial (i.e., banking and sovereign debt) crises and the so called “hidden wealth”. We measure hidden wealth by using data on bank deposits in offshore financial centers provided by the Bank of International Settlements (hereafter BIS). Analyzing 144 developing countries, using quarterly data and both a two-way fixed effects (TWFE) and stacked difference-in-differences, we estimate the effect of the financial crisis on bank deposits in tax havens over the 1977–2020 period. We provide empirical evidence of a link between the beginning of a financial crisis and an increase in offshore bank deposits in the same period. We employ a comprehensive definition of financial crisis that incorporates both sovereign debt and banking crises.

Using a stacked event-study approach, we identify a surge in deposits that peaks at approximately 30 percent three years after the onset of the crisis, with no corresponding effect observed for funds directed to non-tax havens. The result is consistent with residents adopting a “wait and see” type of strategy before deciding to move their financial resources abroad. The effect is economically sizeable: the average increase of deposits into tax havens corresponds to about 1.7 billions USD per year of crisis. The effect does not persist beyond the end of the crisis.

Our findings provide evidence on the intensive margin: the dependent variable constructed from the BIS is a measure of funds held in tax havens. In the robustness section, we rely on the Offshore Leaks Database to explore the extensive margin of the relationship between financial crises and tax havens. We use the probability of observing the incorporation of shell companies as dependent variable and find similar results (but less precisely estimated) to the intensive margin. Following the beginning of a financial crisis, the probability of observing the incorporation of shell companies with beneficiaries from hit countries increases, and it fades away as the crisis dissolves. Given the different characteristics between sovereign debt and banking crises, we explore whether the flows of funds to tax havens differ during these two types of shocks. We find that the results are qualitatively similar during banking and debt crises, even though the increase in bank deposits after a sovereign debt default is stronger and more persistent.

We proceed investigating whether the two main drivers of funds to tax havens suggested by the literature – namely, tax evasion and corruption – explain the increase in hidden wealth during financial crises. We document no increase in the effective tax rate on capital following the start of a crisis, while we do find evidence of a corresponding increase in the expropriation risk. We also find that the increase of deposits into tax havens is driven by countries with more fragile institutions, namely countries that rank

[2] More recently, Clayton et al. (2023) document that Chinese firms, over the last twenty years, have increasingly used global tax havens to access foreign capital both in equity and bond markets. Therefore, both tax base erosion and statistical mismeasurement represent a part of the unintended negative consequence of financial globalization. Binder (2023) wonders whether these offshore financial services may even affect the power of the state.

higher in terms of corruption or lack of "law and order". These results are consistent with tax havens providing a safe harbor to shield funds from illicit activities of the elites (Andersen et al., 2017).

Ultimately, as emphasized by Alstadsæter et al. (2019), it is important to take into account the role tax havens play in underestimating inequality.[3] When assessing the impact of a financial crisis on inequality, it is important to consider both the domestic (observed) as well as the offshore (hidden) wealth. In fact, only the sum of the two dimensions allows to construct a reliable measure of the wealth distribution. We provide suggestive evidence of the fact that the larger the amounts of funds a country diverts to tax havens during a financial crisis, the higher the reduction in the observed household wealth of the highest quantiles (top 0.001%) of the distribution.

We add to previous works by investigating the relationship by financial crises and hidden wealth. To the best of our knowledge, it is the first time in this literature that this link is taken into consideration. Previous contributions provided measures of net wealth positions and estimates of offshore tax evasion (Lane and Milesi-Ferretti, 2007; Zucman, 2013; Johannesen, 2014; Johannesen and Zucman, 2014; Alstadsæter et al., 2019; Londoño-Vélez and Ávila-Mahecha, 2021, 2023; Londoño-Vélez and Tortarolo, 2022).[4] Moreover, Andersen et al. (2022, 2017) and Marcolongo and Zambiasi (2024) have documented that tax havens can be facilitators of corruption. With respect to these papers, we show that tax havens not only facilitate tax evasion and corruption in "normal times", they also harbor funds during economic crises, slowing down the recovery.

Furthermore, much of the current research has focused on the roles of tax havens as facilitators of tax evasion or avoidance in advanced economics. This motif is less likely to apply to emerging economies where tax rates are typically very low. We contribute to the literature highlighting how tax havens attract funds from developing economies and, especially, from countries with weak institutions.

Finally, a vast strand of the literature has investigated the economic costs of both sovereign debt (Asonuma and Trebesch, 2016; Asonuma et al., 2024; Borensztein and Panizza, 2009; Cheng et al., 2018; Cruces and Trebesch, 2013; Kuvshinov and Zimmermann, 2019; Marchesi and Masi, 2020, 2021; Marchesi et al., 2023; Meyer et al., 2019; Panizza et al., 2009; Reinhart and Trebesch, 2016; Trebesch and Zabel, 2017) and banking crises (Bordo et al., 2001; Cerra and Saxena, 2017; Devereux and Dwyer, 2016; Furceri and Mourougane, 2012; Levieuge et al., 2021; Reinhart and Reinhart, 2010; Wilms et al., 2018). A growing body of the literature focused on the social and political costs of financial crises (e.g., Halac and Schmukler, 2004; Mian et al., 2014; Funke et al., 2016; Chwieroth and Andrew, 2019; Gokmen and Morin, 2019; Farah-Yacoub et al., 2022).[5] Existing studies typically rely on measurable domestic wealth to estimate the redistributive consequences of financial crises. We contribute to this literature by documenting that financial crises trigger capital outflows to tax havens. As a result, a comprehensive assessment of the redistributive effects of financial crises – and their implications for inequality – must account for offshore and hidden wealth. The remainder of the paper is organized as follows. Section 2 describes the data. Section 3 presents the results based on a two-way fixed effects (TWFE) estimator, while Section 4 reports findings from a stacked difference-in-differences approach. Section 5 explores potential mechanisms underlying our results, and Section 6 provides robustness checks. Section 7 discusses broader policy implications. Finally, Section 8 concludes.

2. Data

A challenge arises when thinking about how to measure capital outflows toward tax havens, as this same wealth is meant to be kept hidden by those who transferred it there. As suggested by the literature (Andersen et al., 2017, 2022; Johannesen and Zucman, 2014), we rely on the Locational Banking Statistics from the BIS to measure the funds countries store in tax havens. Our sample includes 144 developing and emerging market economies. We exclude all advanced economies (with the exception of Greece) from the sample to ensure greater homogeneity in institutional features. Given our focus on financial crises, it is unlikely that advanced economies would make a reliable control for developing countries facing a financial crisis. Moreover, while developing countries have been affected by both banking and sovereign debt crises, advanced countries, in our sample, were exclusively affected by the global financial crisis in 2008.[6]

The BIS reports cross-countries bilateral positions on a quarterly frequency since 1977.[7] For example, we can observe the total amount of liabilities Swiss banks hold toward Nigerian residents in each quarter. In other words, we are able to observe the amount Nigerian residents (i.e., households and firms) hold in Switzerland over time. The statistics include liabilities banks report toward

[3] For example, in 2019, Russian GDP amounted to about 1.7 trillion USD, while, according to Novokmet et al. (2018), Russians held between 800 billion USD and 1 trillion USD in offshore accounts (over three times Russia's official foreign reserves). Yet, Russian billionaires and millionaires represented only about 4% and 3%, respectively, of the Forbes list. Aslund (2019) also emphasizes the pervasive nature of offshore wealth in Russia, discussing the substantial scale of this hidden wealth and its profound implications for both economic inequality and governance in the country.

[4] Among more recent contributions, Alstadsæter et al. (2019) find that the richest citizens are more likely to transfer their funds to tax havens and emphasize the importance of factoring in tax evasion to properly measure inequality. Focusing on micro evidence, Londoño-Vélez and Ávila-Mahecha (2021, 2023) study behavioral responses to personal wealth taxes in Colombia, while Londoño-Vélez and Tortarolo (2022) consider the effectiveness of tax amnesties and their impacts on capital taxation and public spending in Argentina.

[5] A financial crisis is likely to have distributional consequences for many reasons. The main one is that wealthier households can hedge and diversify, while poorer households cannot. The crucial insight is that financial crises have an enormous domestic cost, mostly transmitted via the banking system (e.g., Gennaioli et al., 2014).

[6] Among developing countries, we dropped countries whose debt restructuring took place in the context of wars and state dissolution, such as Iraq, and successor states of the Socialist Republic of Yugoslavia (i.e., Kosovo, Macedonia, Bosnia and Herzegovina and Serbia).

[7] Financial assets and liabilities are categorized into four financial instruments: loans and deposits, debt securities, derivatives and other instruments (BIS, 2019). The dependent variable aggregates different currencies into USD equivalents using contemporaneous exchange rates (Andersen et al., 2022).

both non-bank creditors and other banks. Borrowing from the literature (Andersen et al., 2017, 2022), we focus on non-bank deposits, as our aim is to capture residents' responses to financial crises rather than movements on banks' balance sheets. Data are reported in US dollars, but we lack information on the currency composition of these deposits, which are denominated in major currencies such as the dollar, euro, or Swiss franc. As a result, shifts in exchange rates (e.g., between the USD and the euro) can lead to changes in holdings, even in the absence of actual flows, and vice versa. Nonetheless, we do not consider this a major concern for three reasons. First, it is unlikely that exchange rates between the US dollar, the Euro, and the Swiss franc are significantly affected by financial crises occurring in the developing countries included in our sample. Second, these exchange rates are relatively stable, especially when compared to the domestic currencies of the countries analyzed. Finally, we consider it highly unlikely that, in response to a crisis, depositors would systematically prefer one of these currencies over the others when deciding where to place their funds.

The Bilateral Locational Statistics (BLS) of the BIS allow us to observe the bilateral financial positions that countries hold in nine major tax havens. We adopt the list of tax havens proposed by Andersen et al. (2022), who also rely on this data source. These jurisdictions include Hong Kong, Macao, Austria, Belgium, Guernsey, the Isle of Man, Jersey, Luxembourg, and Switzerland. These countries are classified as tax havens as they implement limited disclosure on asset ownership, they appear in the list of uncooperative countries of the OCED or they have strict bank secrecy rules. The BIS does not disclose publicly bilateral deposits for the remaining tax havens in the world. This nonetheless, our estimate serves as a good proxy of capital outflows toward tax havens as long as the observable flows are correlated to the ones toward the unobserved tax havens. An assumption we deem plausible and corroborated by recent work by Andersen et al. (2022).

The appeal of the data lies on its reliability. The data is driven from the balance sheets of the banks, ensuring their accuracy. This feature is indeed testified by the identity of its frequent users: central banks exploit the Locational Statistics to estimate capital accounts, economists use them to measure net wealth positions, or to provide estimates of offshore tax evasion (Lane and Milesi-Ferretti, 2007; Zucman, 2013; Johannesen, 2014; Johannesen and Zucman, 2014). Besides this, the dataset offers ample worldwide coverage: about 200 countries are reported among the creditors of tax havens. This means we are able to follow the capital flows toward tax havens for all the countries that experience a financial crisis, as well as the ones that do not. Fig. 2(a), below shows the mean value of quarterly offshore deposits as a share of GDP, countries hold in tax havens over the period 1977–2020.[8] Notably, several African and South American countries appear particularly dark on the map, indicating a high proportion of funds relative to their GDP held in tax havens.

Despite their attractiveness, the data present three limitations that are worth mentioning. The statistics report the net position toward the last depositor of the funds, which may not coincide with the ultimate owner. Suppose residents of a country deposit their funds in a tax haven via shell companies located in a different country. The Locational Banking Statistics only refer to the last stretch of this relationship. That is, if Nigerian residents deposit funds in Switzerland, setting up offshore companies in Panama, this would appear in the Locational Banks Statistics as a liability position of Switzerland toward Panama, and not toward Nigeria. Second, the data refer to the deposits and debt securities residents place in banks in tax havens. However, it is worth remembering that residents could transfer their capital via other means: for example, investing in real estate or in other securities, such as investment fund shares or portfolio equity more generally.[9] These investments are not included in the Locational Banking Statistics. However, as long as capital flows to tax havens are correlated with investments in other securities, we could say that our measure provides an underestimate of the capital flows that a financial crisis may trigger. Ultimately, the data series for the various tax havens considered are not always available for the entire period from 1977 to 2020, as some countries begin reporting only at a later date. Additionally, starting in 1989, the BIS included fiduciary deposits in Swiss banks, which had previously been classified as off-balance-sheet items. To address these issues, in Appendix D, we will conduct robustness checks on subsamples of the data where consistency is ensured.

Throughout the analysis, we consider a definition of crisis which encompasses both banking and sovereign debt crises, given that both of them can be associated to a variation in offshore deposits and they also may be chained in time.[10] We call these events financial crises. More specifically, we define as a financial crisis a debt or banking crisis which is not followed by either a banking or a debt crisis within the subsequent five years. In case the interval between the two is less than five years, we chain the two events and consider this as a "twin crisis" in the spirit of Maerean and Mitchener (2016).[11] Figure A1 offers a visual representation of sovereign debt and banking crises, effectively illustrating the clustering of crisis events and providing greater clarity on the timing and frequency of these episodes. In a further refinement of the analysis, we also consider banking and sovereign debt crises separately, adopting the same criterion described above.[12]

The data on banking crises were collected by Laeven and Valencia (2018), who provide information on the beginning and end of a banking crisis. The data on sovereign debt crises (with foreign commercial creditors) are provided by Asonuma and Trebesch

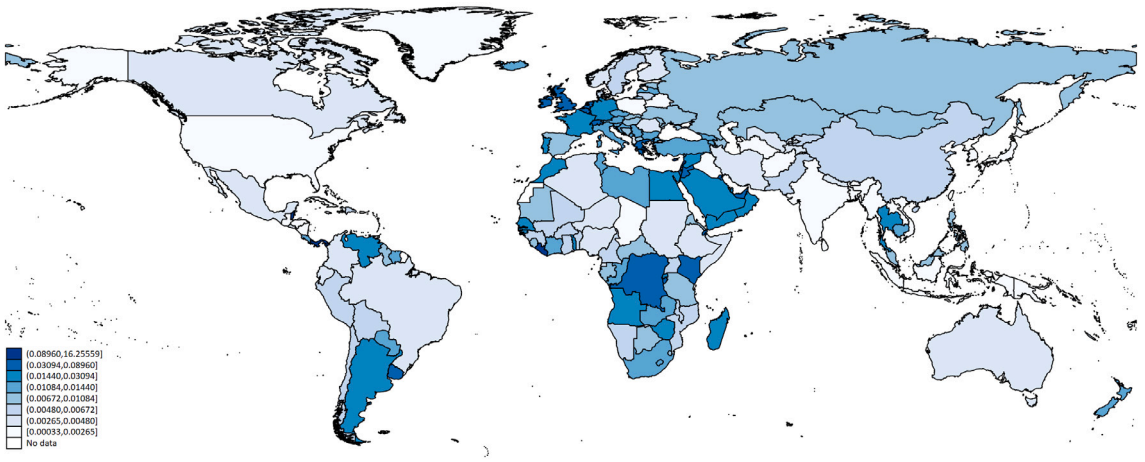
[8] Notice that Fig. 2(a) offers a static representation, while our object of interest throughout the analysis will be the *change* in offshore deposits in response to the start of a financial crisis.

[9] Real estate investments are often structured through financial instruments, such as real estate investment funds. Direct purchases of property are more common in major financial centers (e.g., London) than in smaller tax havens like Guernsey.

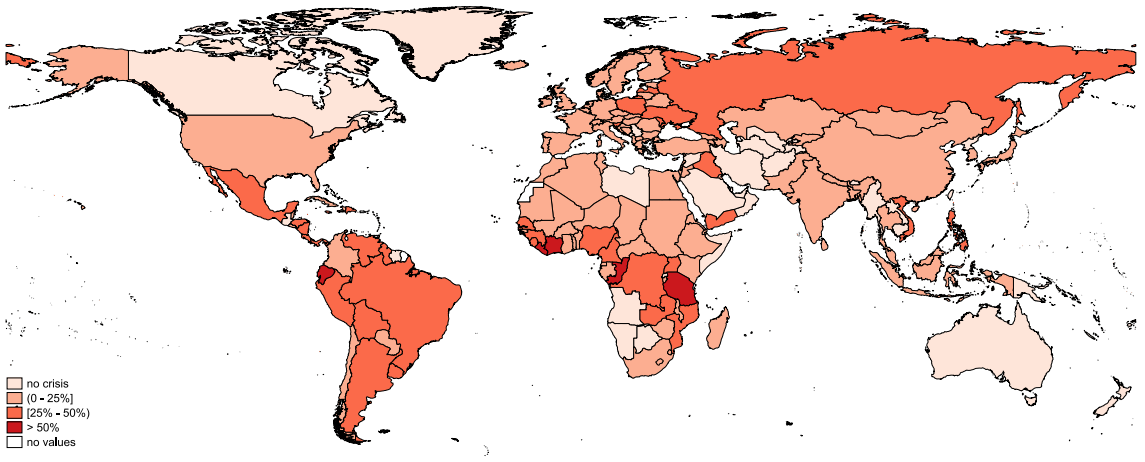
[10] In general, banking crises are significant predictors of debt crises (Reinhart and Rogoff, 2011; Laeven and Valencia, 2018; Mitchener and Trebesch, 2023). What is more, since the nineteenth century more than half of all sovereign defaults were triggered by systemic shocks (González-Rozada and Yeyati, 2008; Kaminsky and Vega-García, 2016; Longstaff et al., 2011). For example, global boom and-bust cycles in commodity prices and the related financial flow reversal have triggered countless debt crises (Reinhart et al., 2016).

[11] Maerean and Mitchener (2016) define a "twin crisis" episode in year t when a banking crisis overlaps with a default either during the previous or the following three years. By their definition, twin crises are thus a maximum of two years apart.

[12] We take a similar approach to Cruces and Trebesch (2013), who define final restructurings as "those that were not followed by another restructuring vis-à-vis private creditors within the subsequent four years".



(a) Total deposits in tax havens as a share of GDP



(b) Share of years experiencing a financial crisis

Fig. 2. Deposits in tax havens and financial crises across the world. (For interpretation of the references to color in this figure legend, the reader is referred to the web version of this article.)

(2016). This dataset contains a list of about 200 distressed sovereign debt restructurings with external banks and bondholders occurring between 1970 and 2020 (based on an update of the original dataset). These data then exclude debt restructurings that mainly affected domestic creditors. Focusing on foreign creditors makes sense for different reasons, one of which being that market access is not heavily influenced by domestic events. Fig. 2(b), displays the share of years a country spends undergoing a financial crisis between 1977–2020. Countries in light pink were hit by no crisis. In addition, Table A1 in Appendix A presents the list of countries experiencing a financial, sovereign debt, or banking crisis in the sample.

3. Panel analysis

We begin providing evidence of the existence of a statistically significant relationship between the timing of financial crises and the funds held in tax havens. Starting with the data from the BIS, we construct the dependent variable as $log(BIS)_{i,r,t}$: the logarithm of the funds country i, in World Bank macroregion r, held in tax havens in quarter t. We take the logarithm to reduce the dispersion of the amount of deposits across different countries. This allows us to estimate the effect of the crisis on the percentage change of deposits the country holds in tax havens.

We estimate an unbalanced panel data regression with OLS fixed effects. The observations are at the country-quarter level. The full sample includes 178 countries; however, controls are available for a subset of them. Our main result then includes 144 developing countries over the 1977–2020 period. We include both country and quarter fixed effects, and we cluster the standard

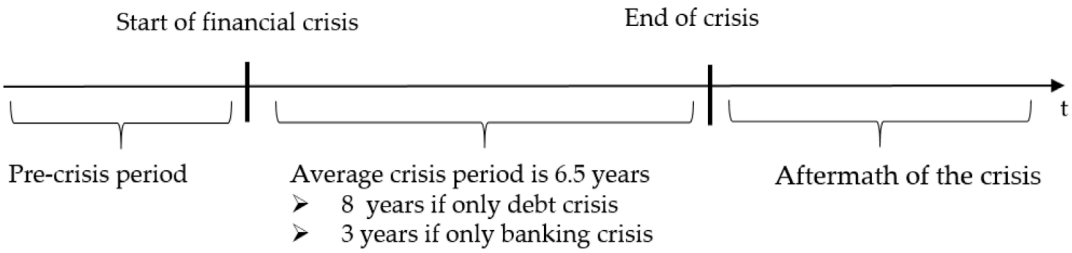


Fig. 3. Timeline of a financial crisis.

Table 1
Change of deposits in tax havens during a financial crisis.

	Tax Havens		
	(1)	(2)	(3)
Duration financial crisis	0.268***	0.272***	0.276***
	(0.096)	(0.088)	(0.088)
N. Obs	29,589	18,409	18,409
Mean DV	4.027	4.696	4.696
Controls		✓	
Fixed effects:			
Quarter	✓	✓	✓
Country	✓	✓	✓
Macroregion × Quarter	✓	✓	✓

Note- The sample includes 144 countries (179 in columns 1) over the period 1977–2020. The dependent variable is the logarithm of the quarterly funds held in tax havens. Duration financial crisis is a dummy equal to one in the quarters of a financial crisis. The controls include a dummy for hyperinflation, the degree of capital openness, the log of real GDP, liquid liabilities to GDP, all measured in the year before. Standard errors are clustered at the country level.

errors at the country level. The regression equation then is:

$$log(BIS)_{i,r,t} = \beta_h DurationC_{i,t} + \gamma Z_{i,t-4} + \alpha_i + \tau_t + \delta_{r,t} + u_{i,r,t}, \quad (1)$$

where $log(BIS)_{i,r,t}$ represents the log bank deposit residents of country i, located in World Bank macroregion r, hold in tax havens in quarter t.[13] $DurationC_{i,t}$ is a dummy equal to one for every quarter of the crisis, $Z_{i,t-4}$ is a vector containing the control variables. Following Andersen et al. (2022), the explanatory variables include: capital controls measure de jure capital account openness (Chinn and Ito, 2006), log of GDP in PPP, domestic credit, measured as domestic liabilities over GDP, (all from the World Bank, 2021), and a hyperinflation dummy for inflation above 40%. As no quarterly information is available, we take annual variables lagged by one year to reduce reverse causality concerns.[14] α_i and τ_t denote country and quarter fixed effects, respectively, $\delta_{r,t}$ are calendar-quarter-by-macroregion fixed effects to control for potential time-varying factors (i.e., institutional settings, technological progress, policy changes) shared by all the countries within the same macroregion. $u_{i,r,t}$ is the error term.

Fig. 3 shows the evolution of a financial crisis and the average duration for the different types of crises in our sample: a financial crisis lasts on average 6.5 years, while a debt crisis 8 years, and a banking crisis 3 years.[15] Table A2 in Appendix A presents the summary statistics.

Table 1 presents the results obtained in the two-way fixed effect specification. The main regressor of interest is a dummy for the duration of the financial crisis. The dependent variable is the logarithm of the funds held in tax havens at a quarterly frequency. In column 1, we include only quarter and country fixed effects; in column 2, we include controls measured in the year before. Given controls are available only for a subset of country/quarters observations, and to exclude that any difference between column 1 and 2 is driven by the selection of observations, in column 3, we replicate the specification with only country and quarter fixed effects on this subset of observations. In the rest of the paper, we will focus on the sample defined in column 2 for which control variables are available.

[13] Macroregions are defined according to the World Bank country classification: East Asia and Pacific, Europe and Central Asia, Latin America and Caribbean, Middle East and North Africa, North America, South Asia, Sub-Saharan Africa.

[14] We tried to use quarterly data on GDP covering our country-year sample. Unfortunately, we could find quarterly data on nominal GDP (IMF WEO) covering an unbalanced panel of only 90 countries from our sample, from 1970 Q1 to 2013Q4. Most importantly, most of the observations are in the 2000s, implying that we cannot consider most of the default episodes occurring in the '80s–'90s.

[15] In a recent paper (Meyer et al., 2020) show that default episodes take, on average, seven years to resolve and that they typically involve multiple restructurings.

Table 1 implies that, on average, during a financial crisis, offshore deposits increase by about 27 percent.[16] The effect is economically sizeable: the average increase in deposits into tax havens corresponds to about 1.7 billion USD per year of crises.

Taken together, we find evidence of a significant relationship between the duration of a financial crisis and an increase in offshore bank deposits. Nevertheless, we should interpret this result with caution, as we cannot detect any causal effect but only strong conditional correlations. The next section presents some evidence of causality between financial crises and offshore bank deposits, adopting an alternative specification method.

4. Stacked difference-in-differences

Countries experience financial crises at different points in time in our sample; the analysis presented in the previous section, therefore, has the flavor of a staggered difference-in-differences. As recent developments in the applied econometrics literature suggest (Goodman-Bacon, 2021; de Chaisemartin and D'Haultfoeuille, 2020; Callaway and Sant'Anna, 2021; Borusyak et al., 2024), two-way fixed effects estimates may produce inconsistent estimates in this setting. One of the reasons why this could happen is that countries treated at the beginning of the sample may enter in the control group for countries that experience a crisis toward the end of the sample. To address this potential concern, we carry out an alternative estimation strategy based on a stacked difference-in-differences similar in spirit to Cengiz et al. (2019) and Deshpande and Li (2019). The objective of the procedure is to ensure that every country experiencing a financial crisis (*treated*) is compared only to *clean* controls, countries that did not experience a crisis in the same period, nor will they ever experience it in our sample (*never treated*).

Each crisis defines an *experiment*. We call a *treated cohort* a group of countries that experience the start of a crisis in the same quarter. We therefore group 73 crises into 53 cohorts based on their quarter of start. For each cohort, we consider the observations over thirteen years around the crisis: five years leading to the start of the crisis and up to eight years after the beginning.[17] Since we use quarterly data, we assigned the start of the crisis to the last quarter of the first lead at $(t-1)$. For each treated cohort, we construct a control group of contemporaneous observations sourced from countries that never experience any financial crisis (never treated). Therefore, we attribute the same "crisis date" as the treated to the control countries, that is, we compute the time dummies over the same calendar quarters. By repeating this procedure for each *experiment*, we construct a mini dataset with treated and control countries for each cohort. We proceed by stacking the different mini datasets on top of each other to estimate the following regression:

$$log(BIS)_{i,c,r,t} = \sum_{k=-5,\neq -2}^{k=8} \beta_k (Crisis\ in\ k\ \text{years})_{c,k} + \sum_{k=-5,\neq -2}^{k=8} \theta_k (Crisis\ in\ k\ \text{years})_{c,k} \times Treat_i + \alpha_i + \tau_t + \gamma Z_{i,t-4} + \delta_{r,t} + u_{i,c,r,t} \tag{2}$$

where $log(BIS)_{ict}$ is the logarithm of the deposits that country i included in the cohort c and in macroregion r holds in tax havens at time t. α_i and τ_t are respectively country and quarter fixed effects, while $Z_{i,t-4}$ are the same controls measured the year before as in the two-way fixed effects specification. $\delta_{r,t}$ are calendar-quarter-by-macroregion fixed effects to control for potential time-varying factors (i.e., institutional settings, technological progress, policy changes) shared by all the countries within the same macroregion.[18] $u_{i,c,r,t}$ is the error term.

$Treat_i$ is an indicator that identifies treated countries within the cohort crisis c. $(Crisis\ in\ \ k\ years)_{ck}$ are indicator dummies that identify the event years since the crisis c took place. We take β_{-2} as baseline, given that β_{-1} identifies the year whose last quarter coincides with the start of the crisis, and its estimate may therefore be confounded by the beginning of the treatment. In this analysis, the coefficients β_k capture the evolution of offshore deposits around the onset of the crisis for countries that do not experience a financial crisis during the same calendar period. To the opposite, the coefficients θ_k identify the differential evolution of offshore deposits for countries that undergo the crisis. Given that never treated countries may appear multiple times in the control group for different cohorts c, we weight the observations for the average size of the dependent variable $log(BIS)_{ict}$ in the years preceding the start of the crisis (Deshpande and Li, 2019). As Roth et al. (2023) point out, the estimator is a weighted average of the estimates from each individual experiment, with weights proportional to the number of treated countries within each cohort. To address the potential concern that the weights derived from this procedure may not accurately reflect the economic significance of the observations, we will test alternative estimators in the robustness section of the paper, as detailed in Appendix B.

Fig. 4 shows the results of this specification. The Figure displays a significant increase in deposits held in tax havens following the start of the crisis, while there is no evidence of a statistically significant change of the same variable in the five years leading to the crisis. The effect increases over time and reaches its peak at 30 percent four years after the crisis starts. In other words, residents in financially distressed countries seem to adopt a strategy of "wait and see" before they decide to move their financial resources abroad. As we would expect, countries that do not experience a crisis, do not show a similar increase (red markers) over the same period.

In Fig. 5 we plot the estimates from Eq. (2) using the funds held in non-havens as the dependent variable. We find no evidence of a corresponding increase in deposits in non-havens following the start of the financial crisis. A potential explanation for this difference lies in the lack of provision of secrecy by non-havens. This likely undermines the attractiveness of these destinations, especially when the risk of expropriation is higher. These results thus reassure us on the causal interpretation of major crises causing a capital drain mainly directed toward tax-haven destinations.

[16] The coefficient is positive and significant at the one percent level.

[17] Specifically, since the average duration of a debt crisis, in our sample, is about eight years, we include up to eight years after the beginning of each crisis.

[18] As above, macroregion are defined according to the World Bank country classification.

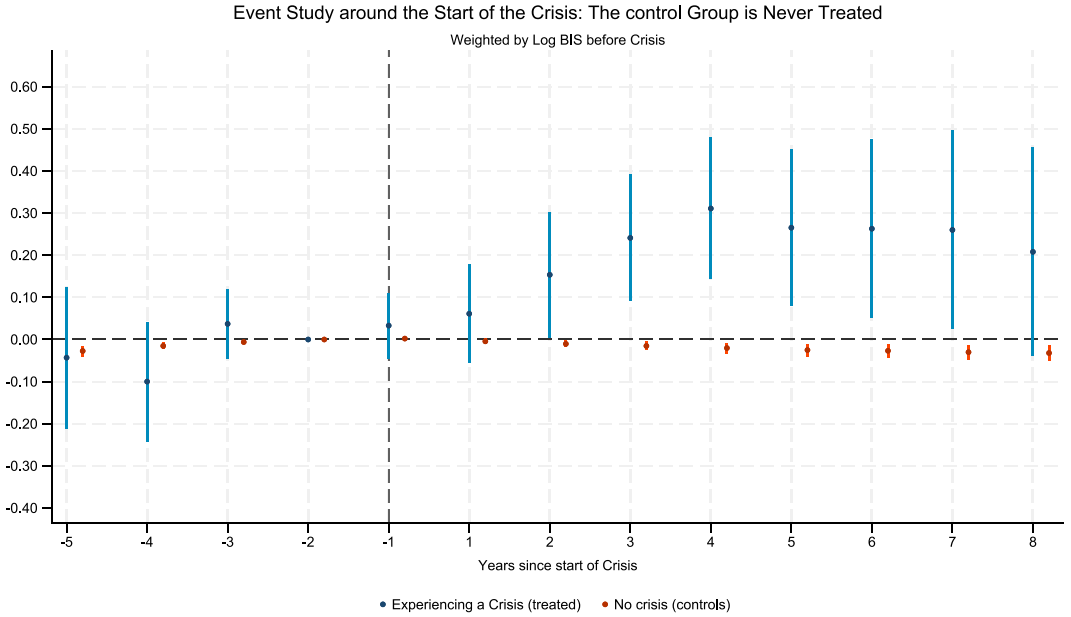


Fig. 4. Stacked difference-in-differences. Estimates from Eq. (2) for funds flowing to tax havens around a financial crisis. Markers represent 90% confidence intervals.

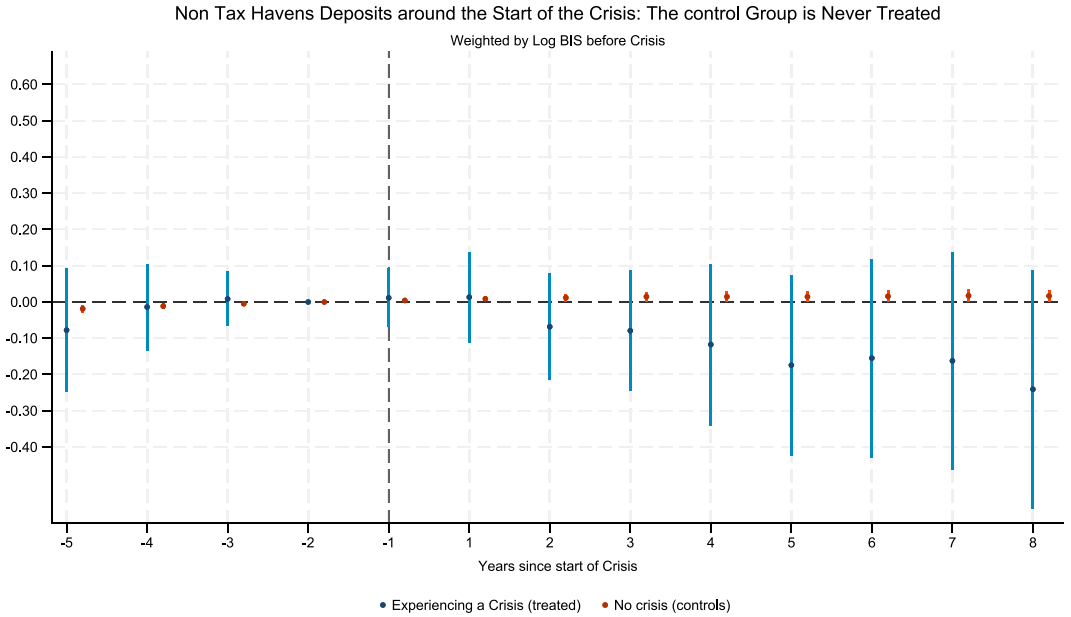
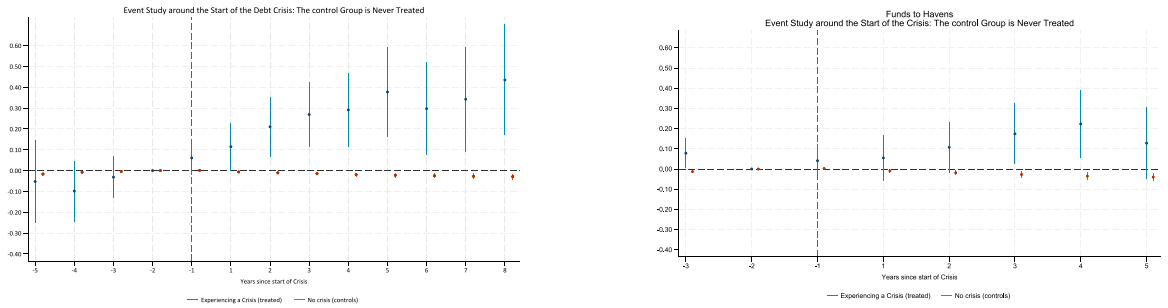


Fig. 5. Stacked difference-in-differences. Estimates from Eq. (2) for funds flowing to non-havens around a financial crisis. Markers represent 90% confidence intervals. (For interpretation of the references to color in this figure legend, the reader is referred to the web version of this article.)



(a) Sovereign debt crisis (b) Banking crisis

Fig. 6. Stacked difference-in-differences. Panel a shows funds to tax havens during a sovereign debt crisis, panel b shows funds to tax havens during a banking crisis. Markers represent 90% confidence intervals.

Since the definition of financial crisis adopted in Fig. 4 brings together sovereign and banking crises, we explore whether the role tax havens play differs between the two types of events. Hence, we replicate the analysis by distinguishing between sovereign debt and banking crises, respectively. Since the average duration of a banking crisis is three years, the experiments are constructed considering a shorter interval for this type of crisis: three years before and five years after each crisis.[19] As Figs. 6(a) and 6(b) show, the two patterns differ based on the type of crisis. While during a banking crisis, the initial increase in deposits is followed by a reduction soon after the end of the crisis, in the case of sovereign debt crises, the effect is more pronounced and persistent. Banking crises are more exogenous and volatile, and are generally less disruptive in real terms. On the other hand, sovereign debt crises typically last for longer and are associated with larger economic and social costs. In the next section, we will explore some possible mechanisms to explain our results.

5. Discussion of results

In this section, we provide some evidence on the reasons why residents in a country may decide to move their capital to tax havens during times of crisis. As we previously mentioned, according to the literature, deposits into tax havens may facilitate tax evasion (Lane and Milesi-Ferretti, 2007; Zucman, 2013; Johannesen, 2014; Johannesen and Zucman, 2014) and hiding proceeds from corruption (Andersen et al., 2022, 2017; Marcolongo and Zambiasi, 2024). For this reason, we focus initially on these two possible channels and explore their determinants.

A tax increase will most likely affect the decision of the rich to move their financial resources into offshore accounts. We then consider the pattern of capital taxation for countries that are affected by a financial crisis as opposed to those that are not. To find information on taxation for non-advanced economies, we exploit the new Globalization and Taxation dataset on the effective tax rate on capital (Bachas et al., 2022), for the period 1977–2018.[20] We do acknowledge, however, the limitations of our data in capturing these variations, as taxation on capital holdings differs significantly across various types of capital (e.g., bank deposits, stocks, real estate, or capital investments in firms) and countries. We estimate Eq. (2) using the effective tax rate on capital as the dependent variable. As shown in Fig. 7(a), the tax rate on capital keeps decreasing after the crisis starts. On the other hand, the effective tax rate on capital does not change significantly for countries that do not experience a financial crisis (red markers). Hence, unless expectations are completely unrealistic, the fear of higher taxation during the financial crisis does not represent a convincing explanation for our results.

Tax havens can also be facilitators of corruption. We explore this channel by splitting the sample into countries with high vs. low levels of corruption. We borrow the indicator for corruption from ICRG (2013).[21] On the full sample, we interact an indicator for the different event-years of the crisis for countries above the median level of corruption. As Fig. 8 shows, the increase of deposits into tax havens, after the beginning of a financial crisis, is indeed typical of countries which are more corrupt consistently with the related literature (e.g., Andersen et al., 2017, 2022; Marcolongo and Zambiasi, 2024).[22] In more corrupt countries, the economic and political elites, fearing a change in regime after the crisis – or the possibility of increased oversight from official lenders or donors – may decide to bring their resources abroad (especially when illegal or from the shadow economy).[23]

[19] Given their shorter average duration, considering a longer interval, as before, would imply the possibility of capturing the beginning of a second crisis, while looking at the aftermath of the first one.

[20] Specifically, an effective tax rate on capital income measures the bite that taxes take out of the return earned by an investment.

[21] The ICRG aggregates 12 indicators, among which is corruption, to compute a country's political risk.

[22] The same result holds for countries with higher level of clientelism as reported in Figure C2. We use an indicator for clientelism in the society, defined as "distribution of resources"in exchange for political support, provided by Coppedge et al. (2022).

[23] As recently shown by Funke et al. (2016), recent events in Europe provide ample evidence that the political after shocks of financial crises can be severe. More specifically, they find that political uncertainty rises strongly after financial crises as government majorities shrink and polarization rises.

Importantly, corruption is directly related to lack of "law and order": countries with stronger law enforcement capabilities are more likely to enforce stricter monitoring of capital outflows, especially those directed toward tax havens (further details on the role of monitoring institutions are discussed in the policy section below). Conversely, weaker law enforcement increases the risk of expropriation, as countries with lower adherence to the rule of law are more susceptible to expropriative actions. Figure C3 illustrates that the increase in deposits into tax havens following the onset of a financial crisis is more pronounced in countries with weaker law enforcement (or lower scores of "law and order" from ICRG (2013)).

During periods of financial distress, the risk of expropriation may increase and, thus, induce also non-corrupt individual to direct their funds toward tax havens. Focusing on the same sample of developing countries, we explore the dynamic of expropriation risk for countries that are affected by a financial crisis as opposed to the control group, by using information on news reports on expropriations and property confiscations from the GDELT Project, for the period 1990–2020.[24] The underlying idea is that these news reports may induce private individuals and organizations to update their beliefs about the expropriation risk by the government. We code a dummy equal to one when information on news reports on expropriations and property confiscations is released. As displayed in Fig. 7(b), there is indeed a peak of expropriation risk after three years since the beginning of the crisis, which is consistent with the pattern of deposits into tax havens displayed in Fig. 4. Conversely, we observe no corresponding variation in the expropriation risk for countries that do not experience a financial crisis (red markers). Therefore, private agents, anticipating some economic turmoils, may fear expropriation or financial seizure and shift part of their funds to tax havens where secrecy can protect them.

Lastly, higher levels of corruption and weaker law enforcement are strongly associated with reduced levels of trust. In such contexts, wealthier individuals may transfer their assets abroad to avoid the costs of economic adjustments, which are often precipitated by financial crises. This behavior is particularly prevalent in environments with lower institutional quality, marked by weak trust in the state, low social capital, and a diminished sense of belonging.[25] To sum up, greater institutional fragility – characterized by higher corruption, lower law enforcement, and lower trust – exacerbates this effect. However, more fragile institutions do not directly cause crises, as they are slow-moving and are likely captured by country fixed effects.[26] We also tested for differences between democracies vs. autocracies, or left-wing governments vs. right-wing ones, finding no significant results.

Another possible reason explaining the decision of the richer households and firms to move their capital into offshore deposits may be their willingness to avoid the costs of financial sanctions. Sanctions are likely to hit a country after a financial crisis and they typically consist in limitations to capital openness. To test for this possible effect, we estimate the relationship between capital openness and capital flight to tax havens. To measure capital openness we use a de jure measure of financial openness as developed by Chinn and Ito (2006) (and updated to 2019).[27] We interact this index with the variable denoting a financial crisis. As reported in Table C2, panel A and panel B, we do find that during the crisis, de jure financial openness is reduced, and that both the duration of a financial crisis and financial liberalization contribute to increasing capital outflows to tax havens. Nonetheless, the coefficient for the interaction term between these two variables is never significant. Capital openness per se induces more capital flight to tax havens; nevertheless, since during the crisis financial openness is typically restricted (either by the government itself or as a consequence of some financial sanctions), the flight to tax havens driven by the crisis is limited by the restrictions to financial openness.

In summary, the increase in offshore wealth does not seem to depend on taxation, but is more closely associated with heightened risks of expropriation and driven by countries with more fragile institutions, characterized by higher levels of corruption, reduced law enforcement capacity, and lower levels of trust. We also document that after a financial crisis hits a country, and some restrictions of financial openness operate, the incentives to move resources to tax havens counteract the capital restrictions and may explain the non-significant interactions with the index of financial openness. The next section contains some robustness tests.

6. Robustness

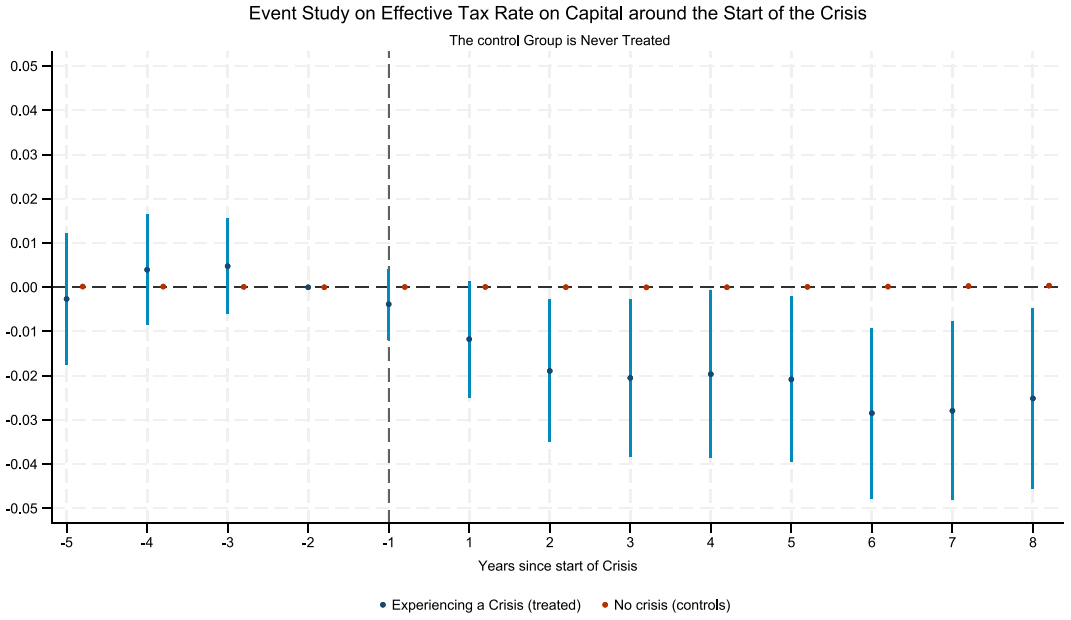
This section contains a robustness analysis for our main results, and the related Tables and Figures are presented in the online Appendices B-D. We begin with issues regarding the identification strategy, in particular to address the chosen estimation method, to then turn to a series of alternative specifications for our main models. In particular, we exploit the data from the Offshore Leaks Database as an alternative proxy to measure funds transferred to tax-haven accounts. Finally, we discuss issues related to sample dependence.

[24] As demonstrated by Bayer et al. (2020), individuals and firms at risk of expropriation tend to establish more shell companies. Following Bayer et al. (2020), we include all the events categorized under the CAMEO category "1711: Confiscate Property."

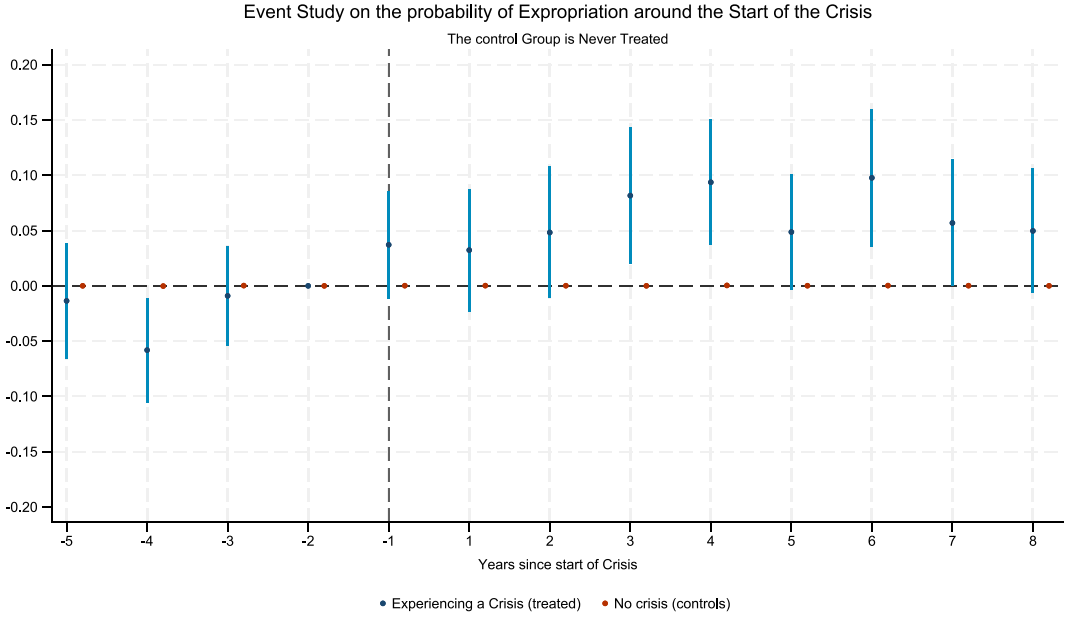
[25] Our results (available upon request) confirm that capital flight predominantly originates from countries characterized by lower levels of trust.

[26] Indeed, we find that more corrupt countries, or those with lower Law and Order scores, do not experience more crises on average. These results are available upon request.

[27] The Chinn-Ito index (KAOPEN) is an index measuring a country's degree of capital account openness. The index was initially introduced in Chinn and Ito (2006). KAOPEN is based on the binary dummy variables that codify the tabulation of restrictions on cross-border financial transactions reported in the IMF's Annual Report on Exchange Arrangements and Exchange Restrictions (AREAER 2021).



(a) Taxation



(b) Expropriation

Fig. 7. Stacked diff-in-diffs on the effective taxation on capital and probability of news of expropriation around the start of a financial crisis. Markers represent 90% confidence intervals. (For interpretation of the references to color in this figure legend, the reader is referred to the web version of this article.)

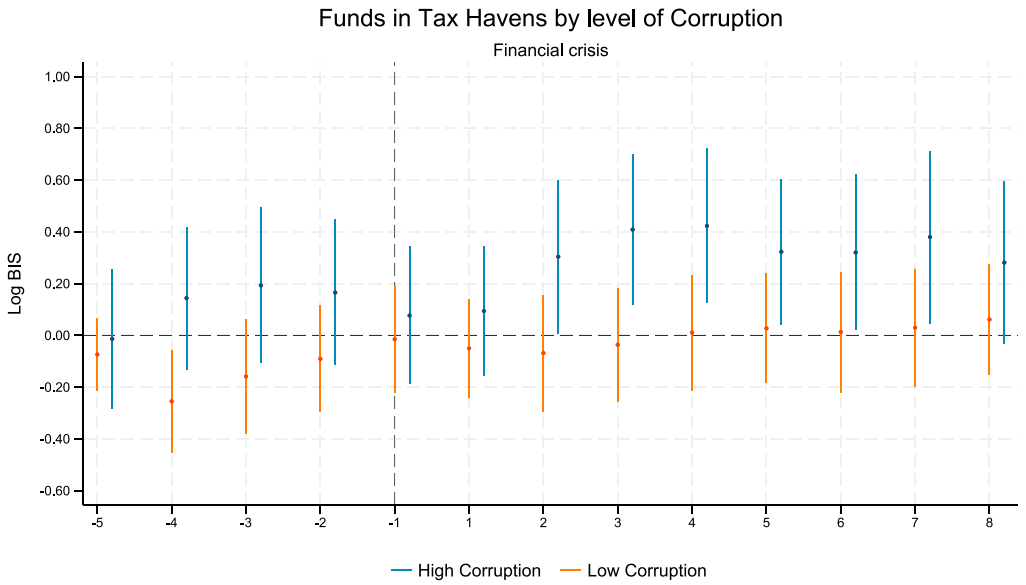


Fig. 8. Funds to tax havens: event study for funds in tax havens in countries with corruption and, above median, vs. countries with corruption and below median.

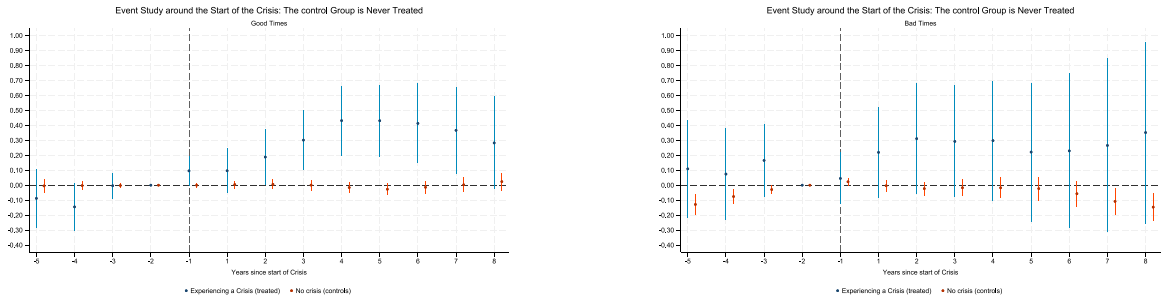
6.1. Identification

A potential threat to identification is that the increase in foreign deposits is driven by factors determining the financial crisis rather than by the crisis itself. In order to address this concern, it is important to notice that financial crises respond to *global* business-cycles and financial shocks (e.g., González-Rozada and Yeyati, 2008; Kaminsky and Vega-García, 2016; Longstaff et al., 2011). For example, Obstfeld and Zhou (2022) provide empirical evidence that both financial shocks associated with dollar appreciation and US monetary policy shocks are particularly pernicious and impact emerging and developing economies. According to Rey (2015), financial markets follow a global cycle over which little to no control is left to the domestic policy.

To further corroborate the relationship between financial crises and hidden wealth and to exclude that other omitted variables causing the crises are responsible for the capital outflows to tax havens, we split the sample into crises that were anticipated by times of bad or good economic performance. If deteriorating economic conditions predict an increase in foreign deposits, we should observe the increase in offshore capital deposits to be concentrated in countries that face negative economic conditions in the years leading to the burst of the financial crisis. Borrowing from Kuvshinov and Zimmermann (2019), we define "good times" as periods when GDP growth is on average above trend during the three years preceding default. As shown in Fig. 9, the effect is driven by "good times", which means it is not caused by recessions. On the other hand, the effect is less precisely estimated in the case of "bad times" as individuals may start carrying funds abroad already in the periods leading to the official start of the crisis.

In Figure B1 we run a falsification exercise. We construct placebo events of financial crises in each country. We make sure that the total number of events by country is the same as in the sample of analysis. We repeat this procedure one thousand times, estimating Eq. (1) in each of these replications. In Figure B1, we plot the t-statistics of the coefficients for duration obtained from these estimates and compare them with the t-statistics of our sample of analysis (red dashed line). Only very few repetitions allow us to achieve a t-statistic above the one that we observe in our sample. We can therefore be confident that our results on the relationship between financial crisis and capital flows to tax havens are not driven by chance.

Recent developments in the econometrics literature highlight the risk of negative weighting in difference-in-differences designs characterized by staggered treatments (Goodman-Bacon, 2021). The stacked difference-in-differences design proposed by Cengiz et al. (2019) and Deshpande and Li (2019) provides unbiased estimates, while being a weighted average of the estimator from each individual experiment, where the weights and variance depend on the number of observations in each sub-experiment (Roth et al., 2023). Countries may enter and exit crises (treatment reversal) as well as they may face multiple crises (multiple treatments) throughout the sample period. By comparing treated units to clean, untreated units in the same calendar periods, the stacked difference-in-differences design allows for taking these features into consideration. To test the robustness of our results to alternative estimation methods proposed in the literature, we replicate the analysis on a yearly panel using the estimator proposed by de Chaisemartin and D'Haultfœuille (2024), which is also robust to treatment reversals (i.e., units switching in and out of treatment)



(a) Good times (b) Bad times

Fig. 9. Comparison of capital flows to tax havens for crises happening in "good times" (i.e., crises not preceeded by a recession) vs. "bad times" (i.e., crises preceeded by a recession).

as well as to multiple treatments over time. The estimates, presented in Figure B2, in Appendix B, while smaller in magnitude compared to our baseline specifications, still confirm our findings of a causal effect of financial crises on capital outflows.[28]

6.2. Alternative specifications

We then exploit the data from the Offshore Leaks Database as an alternative proxy to measure the extensive margin of funds transferred to tax-haven accounts. The Offshore Leaks Database provides information from major investigative leaks, occurring between 2013 and 2018, which revealed the names of the beneficiaries behind offshore shell companies.[29] We construct a dummy at quarterly frequency, which equals one if there was at least one incorporation with beneficiaries from a country facing a financial crisis. The dummy is a proxy for the offshore activity of a country.[30] This measure captures the extensive margin of the phenomenon: by how much countries' residents are more likely to engage in offshore activity around the burst of a financial crisis. Finally, since the Offshore Leaks Database sources information from leaks involving law firms predominantly based in the Caribbean, countries closer to the Caribbean are more likely to appear in the dataset. To take this aspect into account, we weight observations for the total number of incorporations per capita before the start of the crisis. We proceed to estimate Eq. (2) using a dummy for shell companies incorporation as the dependent variable. We experimented using the actual number of shell companies incorporated as the dependent variable. The results, available upon request, do confirm the findings, even though with less precision.

As Figure C1 shows, we observe an increase in the incorporation of offshore companies in the years following the onset of a financial crisis. This effect is less precisely estimated compared to Fig. 4. The different dynamic with respect to Fig. 4 is driven by the different nature of the dependent variable. While Figure C1 captures the opening of a new shell company, Fig. 4 captures the amount of funds flowing to tax havens. The lack of an effect following year 5 in Figure C1 could be due to the fact that funds are likely flowing toward tax havens to shell companies that have already been opened in the preceding five years.

Currency crises could simultaneously affect the value of the bank deposits and the occurrence of a financial crisis (due to the mismatch between bank assets and liabilities after a currency unexpected depreciation).[31] We therefore replicate the specification of Eq. (1), controlling for the occurrence of a currency crisis. The data on currency crises are sourced from Laeven and Valencia (2018), who provide information on the year in which a currency crisis occurred within the 1970–2018 time period Figure A2 displays the countries and years in which currency crises occurred. As shown in Table C1, the relationship between financial crises and bank deposits is robust to the inclusion of a dummy for currency crisis among the control variables.

6.3. Sample dependence

Since bilateral data on cross-border deposits become available for different tax havens at varying dates, and given that before 1989 the Locational Banking Statistics do not include fiduciary deposits in Swiss banks, we follow Andersen et al. (2022) and construct a more homogeneous dataset by limiting the sample to the period 1990–2020. As shown in Table D1 and Figure D1, the results remain robust when the sample starts in 1990, both under TWFE estimation and in the stacked difference-in-differences

[28] The estimator proposed by de Chaisemartin and D'Haultfœuille (2024), however, requires using a panel at yearly frequency. To ensure a fair comparison with our baseline specification, we re-estimated the stacked event study using annual data and find that it remains robust under this alternative specification (results available upon request).

[29] Unfortunately, it does not include information on the amount of deposited funds, and it allows us to identify the country of the beneficiary only for about 1/3 of the entities in the database.

[30] In the sample considered, the median number of entities incorporated in a month in which incorporation occurs is 5.

[31] Changes in exchange rates can cause changes in the deposits because they aggregate different currencies into USD equivalents using contemporaneous exchange rates.

framework. Additionally, given that Belgium, Luxembourg, and Switzerland are the only countries with complete data for the full period from 1977 to 2020, we replicate the analysis of Table 1 on this reduced sample—restricting by countries in Panel A, and by both countries and years (i.e.,1990–2020) in Panel B. As shown in Table D2, the results remain consistent.

Finally, Table D3 shows that the results are robust to dropping tax havens from the sample of treated countries. In each column we drop for the robustness of the results to the implementation of different definition of tax havens (see Andersen et al., 2022; Council of the European Union, 2022; OECD, 2022).[32] Finally, in Figure D2 we exclude tax havens as defined in Andersen et al. (2022) from both treated and control units and replicate the stacked diff–in–diffs estimates of Eq. (2). The results are confirmed in this subsample. The following section considers policy implications and presents suggestive evidence on the impact of capital outflows to tax havens on wealth distribution.

7. Policy implications

In this section, we explore how the current institutions and regulatory framework designed to fight hidden wealth serve developing economies and the relevance of considering hidden wealth when estimating a country's inequality.

Much of the current policy development in this area takes place at the international level, through institutions such as the OECD/Global Forum and the Financial Action Task Force (FATF).[33] However, emerging economies are not always active participants in these discussions, raising questions about the extent to which the existing international framework aligns with their specific needs. At the same time, as this paper demonstrates, citizens from developing countries also make use of tax havens. Although these countries are typically characterized by relatively low tax rates, tax evasion may be viewed as a less pressing concern in this context. Nonetheless, it is important to recognize that there are other factors of risk that can make tax havens an obstacle to growth and development. In particular, when the use of offshore wealth couples with higher inequality, increased corruption, and weaker law and order institutions, it is likely to undermine state capacity and hinder sustainable progress.

A series of policy initiatives prompted by the OECD over the years has attempted to constrain the role of tax havens. Such measures include black lists to discourage capital flows toward opaque destinations and the implementation of cross-border exchanges of information. In turn, the effective implementation of these measures requires: (i) international cooperation to facilitate enforcement and punish the tax havens that elude them, but also (ii) adequate state capacity to match domestic bank information and citizens' tax files with foreign bank accounts. Unfortunately, developing countries face higher challenges on both respects. If they can consider joining international forums and organizations on the first point, much needs to be done to build adequate infrastructures to track the capital flows that domestic households, as well as local or international corporations, transfer away.[34] This challenge becomes even more problematic when attempting to implement bilateral exchanges of information for which symmetry is the essential building block. If a developing country struggles to track and share information on the personal accounts of foreign citizens within its own borders, it is unlikely that foreign partners will be willing to disclose details of the accounts held abroad by that country's citizens.

International organizations are potentially powerful institutions to fight against opacity and financial secrecy. For example, the forty recommendations of the FATF are aimed at combating money laundering and terrorism financing. The OECD periodically reviews the black list of countries characterized by high opacity, and it discourages its member countries from maintaining financial transactions with them. As Fig. 8 documented, tax havens are more likely to host the funds originating from more corrupt countries, a fact that could raise concerns of money laundering. We then explore whether membership in international organizations, whose primary objectives include the fight against money laundering and the promotion of transparency, curbs capital flows toward tax havens. Specifically, we estimate Eq. (1), adding an interaction term respectively for OECD or FATF membership. We check whether countries entering the OECD or the FATF reduce their capital outflows. Table 2, column 2, shows that while countries increase the funds they hold in tax havens during financial crises, the effect becomes zero, if not negative, when they enter the OECD. Column 3 shows a similar result for FATF membership.

In addition to the role of international organizations, international regulatory frameworks can also contribute to curbing the harmful use of tax havens. The Great Financial Crisis has spurred tightening of regulations and increased scrutiny on tax havens (Switzerland, Dodd-Frank Act). This regulation has been a first crack in the untouched secrecy that had been protecting tax havens up to that moment. We provide suggestive evidence that this regulation has been effective in reducing the incentives to harbor capital in tax havens, even for developing countries. In Table D4 in Appendix D, we split the sample into two groups: before 2010 (column 2) and after 2010 (column 3). In column 4, we test both periods jointly by adding an interaction term for observations after 2010. As shown in columns 3 and 4, the abandonment of tight secrecy rules reduced the incentives to divert funds to tax havens during times of financial distress.

We then explore further how the incentives to move funds toward tax havens in periods of financial turmoil evolved through time, by leveraging the long time span available in the sample. Table D5 in Appendix D reports the analysis for each decade separately.

[32] More specifically, in columns 1 and 2 we exclude: The Bahamas, Bahrain, Hong Kong, Panama and Singapore; in columns 3 and 4 we eclude: Armenia, The Bahamas, Barbados, Botswana, Costa Rica, Dominica, Eswatini, Fiji, Greece, Hong Kong, Israel, Jamaica, Jordan, Malaysia, Qatar, Russia, Samoa, Seychelles, Thailand, Trinidad and Tobago, Turkey, Uruguay, Vanuatu, Vietnam; in columns 5 and 6 we exclude: Liberia and Vanuatu.

[33] The Financial Action Task Force (FATF) founded in 1989 has the objective of promoting regulatory and operational measures to combat money laundering and terrorist financing.

[34] This point was highlighted during the keynote lecture held by Niels Johannesen at the UNU Wider Conference "Revving up revenue for development — the role of domestic resource mobilization" in Oslo, September 2023.

Table 2
Change of deposits abroad during a financial crisis. FATF and OECD members.

	All	OECD	FATF
	(1)	(2)	(3)
Duration financial crisis	0.272***	0.308***	0.299***
	(0.088)	(0.088)	(0.085)
OECD Member		0.281*	
		(0.168)	
OECD Member × Duration financial crisis		−0.502*	
		(0.265)	
FATF Member			0.223
			(0.296)
FATF Member × Duration financial crisis			−0.940**
			(0.438)
N. Obs	18,409	18,409	18,409
Mean DV	4.696	4.696	4.696
Controls	✓	✓	✓
Fixed effects:			
Quarter	✓	✓	✓
Country	✓	✓	✓
Macroregion × Quarter	✓	✓	✓

Note- The sample includes 143 countries over the period 1977–2020. The dependent variable is the logarithm of the quarterly funds held in tax havens. Duration financial crisis is a dummy equal to one in the quarters of a financial crisis. OECD and FATF are two time-varying dummies equal to one for the years in which a country is part of the OECD or the FATF respectively. The controls include a dummy for hyperinflation, the degree of capital openness, the log of real GDP, liquid liabilities to GDP, all measured in the year before. Standard errors are clustered at the country level.

As shown, the bulk of the effect is concentrated in the '90s and the early 2000s. These periods coincide with the growing popularity of tax havens and increasing global financial access. The lack of effect in the post-2010 years further confirms the effectiveness of tightening regulatory controls in the aftermath of the Great Financial Crisis.

In sum, the evidence presented shows that international organizations and regulatory cooperation can be effective in combating opacity and hidden wealth. However, the fight against tax havens can only succeed if it facilitates the repatriation of foreign capital to the home countries. In this regard, measures such as tax incentives linked to economic returns (Londoño-Vélez and Ávila-Mahecha, 2021), simplified bureaucratic procedures and state-backed insurance could make a valuable contribution.

Finally, we explore the importance of accounting for hidden wealth when assessing a country's inequality. The evidence so far provided documents an increase in capital flight to tax havens during periods of financial crisis. The literature extensively documents that the wealthiest segments of the population are more likely to engage in transferring funds to these tax havens (e.g., Alstadsæter et al., 2019; Londoño-Vélez and Ávila-Mahecha, 2021). An accurate assessment of the redistributive impact of the financial crisis therefore, requires measuring not only the *observable* domestic wealth within a country's borders, but also offshore wealth.

We use data from the World Inequality Database (2022) for 81 countries and employ a stacked difference-in-differences estimation strategy over the period 1995–2018 to assess the impact of financial crises on the *observed* quantiles of the wealth distribution.[35] Secondly, we correlate the results with the amount of deposits held offshore to demonstrate that countries experiencing a crisis and holding a higher share of GDP in tax havens exhibit lower, if not negative, wealth growth, but only in the top quantiles of the wealth distribution.

In Table D6, Panel A, we regress the average household wealth across different percentiles on a dummy variable indicating the duration of the financial crisis – active during the quarters of the crisis for both the treated and control groups within the same cohort – and the interaction between this duration and a treatment dummy, which is active only for countries facing a crisis in a specific experiment. While the control groups do not react to the financial crisis, among the treated cohorts, only the quantiles from 0 to 99 exhibit a positive and statistically significant increase. In Panels B and C, we further refine our results by splitting the sample into two groups: treated countries with a share of funds in tax havens during a crisis above the median for treated countries, and those with a share below the median. We compare the evolution of wealth quantiles relative to the control group separately for these two groups. Interestingly, we observe a significant and negative change in the wealth of the top quantiles only for countries where the share of funds held in tax havens exceeds the median (Panel B). Moreover, this negative change becomes less pronounced as we move from the first to the fourth column, becoming not statistically significant for the bottom 99 percent of the wealth distribution. For countries with a share of funds in tax havens below the median, we observe a positive trend in wealth growth, which is both positive and significant for the lowest quantiles of the distribution. The results align with the descriptive evidence presented in Figure

[35] The database provides comprehensive information on the average wealth owned by different quantiles of the wealth distribution, with data available for various time periods depending on the country. However, it is important to acknowledge the limitations of this wealth data, as it is derived primarily from countries with higher levels of corruption and related indicators. As a result, the quality of detailed income distribution data – particularly over long time series – is likely to be relatively low for these countries.

D3 in Appendix C, which illustrates the average evolution of household wealth across different percentiles during a financial crisis. The drop in *observed* wealth is inversely proportional to the ranking in the wealth distribution and persists in the years following the crisis.

8. Conclusions

This paper studies the relationship between financial crises and a country's hidden wealth, measured by financial deposits held in offshore financial centers. Analyzing 144 countries over the 1977–2020 period, we use quarterly data and both a two-way fixed effects and a stacked difference-in-differences method to estimate the effect of financial crises on hidden wealth. We find that financial crises generate a sizeable increase in bank deposits in offshore financial centers that reaches its peak after three years since their onset. The effect is economically sizeable: the average increase of deposits into tax havens corresponds to about 1.7 billion USD per crisis year. We find no evidence of persistence beyond the end of the crisis and no corresponding capital outflows toward no tax havens.

The results are robust to using the number of newly incorporated offshore entities as a dependent variable and to controlling for currency crises, and alternative classifications of tax havens. As possible mechanisms are concerned, the effect does not depend on the pattern of effective tax rate on capital but seems driven by an increase in expropriation risk and by countries with more fragile institutions.

International institutions committed to addressing the opacity of corporate structures should consider this additional dimension among the costs associated with tax havens. As the analysis suggests, the use of tax havens by developing economies is concentrated in countries with higher levels of corruption. International creditors should therefore link the distribution of loans to reforms (loan conditionality) aimed at enhancing state capacity and institutional quality. Ultimately, (i) the lack of adequate domestic infrastructure in developing countries and (ii) the continuous technological advancements enabling rapid and undetected international money transfers highlight that only a coordinated international effort can effectively address the risks posed by tax havens in facilitating corrupt practices.

To the best of our knowledge, this is the first paper documenting the effect of financial crises on hidden wealth. Moreover, while much of the current research has focused on the roles tax havens play in advanced economies, we contribute to this literature by highlighting how tax havens attract funds from developing economies as well, especially from countries with weak institutions. In particular, we show that tax havens, besides allowing tax and sanction evasion and harboring proceeds of criminal activities, absorb resources during difficult times and may lead to a downward bias when measuring a country's inequality. Future research could further explore the mechanisms underlying our results and, more importantly, examine their implications for a country's measured inequality.

Declaration of competing interest

The authors declare that they have no relevant or material financial interests that relate to the research described in this paper. Moreover, no IRB approval was needed for this project as it does not involve live humans.

Appendix A. Supplementary data

Supplementary material related to this article can be found online at https://doi.org/10.1016/j.jinteco.2025.104175.

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