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

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This paper investigates the link between financial crises in developing countries and variation of bank deposits in offshore financial centers. Using both a two way fixed effects and a stacked difference-in-differences estimator, we find that after three years since the beginning of the crisis bank deposits in tax havens increase by about 20 percent. The effect does not depend on taxation and seems driven by countries with more fragile institutions. We add to the literature on the effects of tax havens: they not only facilitate tax evasion and corruption in "normal times", but also absorb resources during financial crises, when most needed.

Keywords: Sovereign debt crisis, Financial Crisis, Offshore accounts. JEL Classification: D73, F34, G15, H63, P16

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1 Introduction

Capital flight features prominently in contemporary debates about economic development. In developing countries, capital is relatively scarce and the flight of assets which could have been employed productively in the domestic economy is potentially detrimental to development, especially at times of economic crises. Since the great financial liberalization in the 1980s, enormous offshore wealth has developed. According to Gabriel Zucman (2013), about 8 percent of all global financial wealth reached tax havens. Offshore capital is not taxed by anybody, not employed productively, hence it becomes even more problematic, especially at times of crises, when most needed. What is more, given that richest residents are more likely to transfer funds to tax havens, doing that during times of crisis shrinks the tax base, shifting the costs of adjustment on poorer citizens exacerbating 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. Alstad-sæter 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. 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.¹

The literature, however, has neglected the role tax havens play as harbors of capital flows during financial turmoils. An important aspect in order to obtain a more complete picture of the costs imposed by a financial crisis. 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 find causal evidence of the link between the beginning

¹Binder (2023) wonders whether these offshore financial services may even affect the power of the state.

of a financial crisis and an increase in bank deposits in offshore financial centers.

When zooming in around the beginning of the financial crisis, we detect an average increase in deposits by about 20 percent after three years since the beginning of the crisis. In other words, residents in countries facing a financial crisis seem to adopt a strategy of "wait and see" before they decide to move their financial resources abroad. The effect is economically sizeable: the average increase of deposits into tax havens corresponds to about 1 billon USD during the crisis.² We find no evidence of persistence beyond the end of the crisis, and no corresponding capital outflows toward no tax havens.

We find similar results when using incorporation of shell companies in tax havens (Offshore Leaks Database), as the dependent variable. 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 the results are qualitatively similar during banking and debt crises, even though the increase in bank deposits after a sovereign debt default is 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 on capital following the start of a crisis, while we find evidence of an increase in the expropriation risk. We also find that the increase of deposits into tax havens is driven by countries with more fragile institutions, in which tax havens may provide hiding places for the illicit activities of the elites. Furthermore, as emphasized by Alstadsæter et al. (2019), it is important to take into account the role tax heavens play in underestimating inequality.³ Since financial crisis, beside tax evasion, may lead the rich to move financial resources into offshore accounts, we provide additional evidence on the implications of capital outflows to tax havens in terms of underestimating national wealth.

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 literature 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). Moreover, Andersen et al. (2021) and Andersen et al. (2017) 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.

²Which corresponds to slightly less than 1 percent of a developing country's average annual GDP.

 $^{^{3}}$ For example, in 2019, Russian GDP amounted to about 1.7 trillion USD, while the total amount of wealth held offshore by Russian residents was about 1.3 trillion USD (see Aslund 2019). Yet, Russian billionaires and millionaires represented only about 4 and 3 percent of the Forbes' list, respectively.

There is a vast literature, which has investigated the economic costs of both sovereign debt (Asonuma and Trebesch 2016; Asonuma et al. 2021; 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 Mourougane 2016; Furceri and Mourougane 2012; Levieuge et al. 2021; Reinhart and Reinhart 2010; Wilms et al. 2018). A growing body of the literature also focuses on the social and political costs of financial crises (e.g., de Bromhead et al. 2012; Halac and Schmukler 2004; Gokmen and Morin 2019; Mian et al. 2014; Funke et al. 2016; Chwieroth and Walter 2019).⁴ In all these papers, however, redistribution effects are based on wealth within the border, while we argue that a financial crisis may lead the rich to move financial resources into offshore accounts. Offshore wealth must then be included in the account of the costs of financial crises, as it shifts the burden of adjustment onto poorer citizens, as well as subtracting a sizable amount of resources, when most useful.

The rest of the paper is organized as follows. Section 2 describes the data, section 3 shows the results obtained using TWFE, while section 4 presents the results of a stacked difference-indifferences estimator. Section 5 contains some robustness analysis, while section 6 presents some evidence on the mechanism behind our results. Section 7 describes the implications on wealth of capital outflows to tax havens. The final section 8 concludes.

2 Data

A challenge arises when thinking how to measure capital outflows toward tax havens. We rely on the Locational Banking Statistics from the BIS (Andersen et al. 2017, Andersen et al. 2021, Johannesen and Zucman 2014). Our sample includes 144 developing and emerging market economies. We excluded from the sample all advanced economies (with the exception of Greece), in order to make the sample as homogeneous as possible. 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 2008.⁵

⁴The crucial insight is that financial crises have an enormous domestic cost, mostly transmitted via the banking system (e.g., Gennaioli et al. 2014).

⁵Among 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).

The BIS reports cross-countries bilateral positions on a quarterly frequency since 1977.⁶ For example, we can observe the total amount of liabilities Switzerland banks hold toward Nigerian residents in each quarter. In other words, we are able to observe amount Nigerian residents (i.e., households and firms) hold in Switzerland over time. The statistics include 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 residents' responses to the financial crisis, rather than the movements across banks' balance sheets.

We can observe flows of funds toward 9 major tax havens: Hong Kong, Macao, Austria, Belgium, Guernsey, Isle of Man, Jersey, Luxemborug 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. (2021).

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). Beside 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 did not. Figure 1a, below shows the average value of the offshore deposits countries report in a specific quarter. The representation is a static picture: it is important to notice that our object of interest is the *change* in offshore deposits in response to the start of a financial crisis.

Despite their attractiveness, the data presents two 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

⁶Financial 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. 2021).

a liability position of Switzerland toward Panama, and not toward Nigeria. Second, the data refer to the deposits and debt securities residents place 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 artwork or, more recently, virtual currencies. 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 sovereign default crisis may trigger.

Finally, we consider a broader definition of crisis, including both a banking and a sovereign debt crisis, given both of them can be associated to a variation in offshore deposits and they also may be chained in time.⁷ We call these events financial crisis.⁸ 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 (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. Figure 1b, displays the share of years under a financial crises, during our year sample, where countries in light pink were hit by no crisis. In the next section, we present our baseline results, using a two way fixed effects estimator.

3 Panel analysis

Starting with the data from the BIS, we construct the dependent variable as $log(BIS)_{it}$: the logarithm of the funds country *i* holds in tax havens in quarter *t*. We take the logarithm to take into account 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 at the country-yearlevel, using quarterly data and analyzing 144 developing countries over the 1970-2020 period. We include both country and quarter fixed effects and we cluster the standard errors at the country

 $^{^{7}}$ We define as a new banking, or sovereign debt, crisis a crisis which is not followed by another one within the subsequent five years.

⁸In general, banking crises are significant predictors of debt crises (e.g., see Mitchener and Trebesch 2022).



(a) Total tax haven deposits



(b) Share of years under a financial crisis

Figure 1: Deposits in Tax Havens and Financial Crises across the World.

level. The regression equation then is:

$$d_{i,t} = \beta_h DurationC_{i,t-h} + \theta Z_{i,t-1} + \eta_i + \tau_t + u_{i,t} \quad h = -5, -4, \dots, 1, 8,$$
(1)

where $d_{i,t}$ represents the log bank deposit of country *i*, at time *t*. $DurationC_{i,t-h}$ is a dummy equal to one for every year of the crisis⁹, $Z_{i,t-1}$ is a vector containing the control variables (lagged by one year). η_i and τ_t denote country and quarter fixed effects, respectively, while $u_{i,t}$ is the error term. The average duration of a financial crisis is 6.5 years, while the average duration of a banking crisis is about 3 years and that of a debt crisis is about 8 years.¹⁰

Following Anderesen et al. (2021), the explanatory variables include: capital controls measure de jure capital account openness (Chin and Ito 2006), log of GDP in PPP, domestic credit, measured as domestic credit over GDP, hyperinflation dummy (all from the World Development Indicators 2021). As no quarterly information is available, annual data are taken instead measured the year before to reduce reverse causality concerns.¹¹ Table A1, in the Appendix, presents summary statistics.

Table 1 presents the results obtained in our baseline specification. In columns 1-2 of Table 1, we only include the duration of the financial crisis (with and without control variables), while in columns 3-4 we use as the dependent variable non tax-haven destinations.

The main result of Table 1 is that, on average, during a financial crisis, offshore deposits increase by 20 percent.¹² The effect is economically sizeable: the average increase of deposits into tax havens corresponds to about 1 billon USD during the crisis. While countries affected by the crisis do transfer their funds abroad even to non tax-haven countries, the effect is proportionally larger for tax-haven destinations.

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 our result with caution as we cannot detect any causal effect but only strong conditional correlations. The next

⁹We run the regression on a quarterly panel. Each coefficient β_h is identified out of event-years. For example, β_1 is identified out of the four quarters after the start of the crisis

¹⁰In 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.

¹¹We 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.

¹²The coefficient is positive and significant at the five percent level.

	Tax Havens		Non Tax	Havens	
	(1)	(2)	(3)	(4)	
Duration Financial Crisis	0.288***	0.253***	0.550***	0.133	
	(0.095)	(0.081)	(0.101)	(0.095)	
N. Obs	29,762	$18,\!409$	30,850	18,409	
Mean DV	4.049	4.696	4.677	5.515	
Controls		\checkmark		\checkmark	
Fixed Effects:					
Quarter	\checkmark	\checkmark	\checkmark	\checkmark	
Country	\checkmark	\checkmark	\checkmark	\checkmark	

Table 1: Change of deposits abroad during a financial crisis. Tax havens vs non tax havens.

Note-The sample includes 144 countries over the period 1977-2020. The dependent variable is the logarithm of the quarterly funds held in tax havens (cols 1 and 2) and in non tax havens (cols 3 and 4). 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.

section presents some evidence of causality between financial crises and bank deposits adopting an alternative specification method.

4 Stacked Difference-in-Differences

Countries experience financial crisis at different points in time in our sample, the analysis presented in the previous section has therefore the flavor of a staggered difference-in-differences. As recent developments in the applied econometrics literature suggest (Goodman-Bacon 2021, De Chaisemartin and D'Haltfœuille 2020, Callaway and Sant'Anna 2021, Borusyak and Jaravel 2021), 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 Cenzig 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, nor they will 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 crisis into 53 cohorts. 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.¹³ 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 made of countries that never experience any financial crisis in the same period (never treated). By repeating this procedure for each *experiment*, we construct a mini dataset with treated and control countries for each cohort. We proceed stacking the different mini datasets on top of each other to estimate the following regression:

$$log(BIS)_{ict} = \sum_{k=-5,\neq-2}^{k=8} \beta_k (Crisis in \, k \, years)_{c,k} + \sum_{k=-5,\neq-2}^{k=8} \delta_k (Crisis in \, k \, years)_{c,k} \times Treat_i$$
(2)
+ $\alpha_i + \tau_t + \gamma Z_{i,t-1} + u_{i,c,t}$

where $log(BIS)_{ict}$ is the logarithm of the deposits country *i*, included in the cohort *c*, holds in tax havens at time *t*. α_i and τ_t are respectively country and quarter fixed effects, while $Z_{i,t-1}$ are the same controls measured the year before as in the two-way fixed effects specification. $Treat_i$ 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 identify the evolution of offshore deposits around the crisis outburst for countries that do not undergo a financial crisis in the same calendar period. To the opposite, the coefficients δ_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).

Figure 2a shows the results of this specification. The Figure displays a significant increase in deposit held in tax havens following the start of the crisis. The effect increases over time and reaches its peak at 20 percent four years after the crisis starts. In other words, residents in defaulting 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 (orange markers) over the same period.

In Figure 2b, we repeat the estimation of Equation (2) using non tax-havens deposits as the depen-

 $^{^{13}}$ 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.



(a) Financial Crisis: Funds to Tax Havens

(b) Financial Crisis: Funds to non Tax Havens

Figure 2: Stacked difference-in-differences: panel a and b show estimates from equation (2) for funds flowing to tax havens and non tax havens around a financial crisis. Markers represent 90% confidence intervals.

dent variable. Once again, foreign deposits in non tax-havens destinations do not show a similar pattern as tax-havens destinations. Despite a light increasing trend, this is never statistically different from zero at conventional levels. These results thus reassure us on the causal interpretation of major crises causing a capital drain mainly directed toward tax-havens destinations.

Since the definition of financial crisis adopted in Figure 2a 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, each experiment is now constructed considering shorter interval, that is three years before and five years after each crisis.¹⁴ As can be seen, Figure 3a and Figure 3b present a different pattern. While during 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 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 to larger economic and social costs. The next section contains some robustness tests.

¹⁴Given 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.



(a) Sovereign Debt Crisis

(b) Banking Crisis

Figure 3: Stacked difference-in-differences: panel a funds to tax havens during a sovereign debt crisis, panel b: funds to tax havens during a banking crisis. Markers represent 90% confidence intervals.

5 Robustness

We performed a number of robustness checks on our basic empirical analysis, the main three will be discussed in this section. First, we exploit the data from the Offshore Leaks Database as an alternative proxy to measure funds transferred to tax-havens accounts. Second, we control for currency crises which are typically correlated with banking or debt crises (e.g. Eijffinger and Karatas 2013). Third, we explore alternative definitions of tax havens.

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.¹⁵ We construct a dummy which equals one for at least one incorporation with beneficiary from a specific country in a given quarter, and take it as a proxy of the offshore activity of a country. 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 major crisis. Since the dataset offers a reliable picture between 1990 and 2015, we are forced to exclude many crisis events from our analysis. To preserve power, we then extend our sample to advanced economies. Finally, since the Offshore Leaks Database sources information from leaks involving law firms predominantly based in the Caribbeans, countries closer to the Caribbeans 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 estimating Equation (2) using

 $^{^{15}}$ 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.

the dummy on shell companies incorporation as dependent variable. Figure A1 provides graphical evidence, which is in line with the results displayed in Figure 3.

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).¹⁶ We therefore replicate the specification of Equation (1) controlling for the occurrence of a currency crises. 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. As shown in Table A2, the relationship between financial crises and bank deposits is robust to the inclusion of a dummy for currency crisis among the control variables.

Finally, Table A3 shows that the results are robust to dropping from the sample countries which could be defined as tax havens, according to alternative definitions (see Andersen et al. 2021; EU 2022 and OECD 2022) In the next section, we will explore some possible mechanisms to explain our results.

6 Discussion of results

In this section, we provide some evidence on the reasons why residents in a country may decide to move their capital into tax havens at times of crises. As we previously mentioned, according to the literature, deposits into tax havens may facilitate tax evasion and corruption. For this reason we focus on these two possible channels. 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 before and after the beginning of a financial crisis. 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 1977-2018.¹⁷ As shown in Figure A2a, the effective tax rate on capital does not change significantly during the crisis. If anything it increases significantly before the crisis starts. Hence, unless expectations are completely unrealistic, the fear of higher taxation during the financial crises does not represent a convincing explanation for our results.

Similarly to tax evasion, the risk of expropriation could also induce residents to bring their wealth to tax havens.¹⁸ Hence, we explore the dynamic of expropriation risk before and after the start of a

 $^{^{16}}$ Changes in exchange rates can cause changes in the deposits because they aggregate different currencies into USD equivalents using contemporaneous exchange rates.

¹⁷Specifically, an effective tax rate on capital income measures the bite that taxes take out of the return earned by an investment.

¹⁸As shown by Bayer et al. (2020), individuals and firms facing the risk of expropriation incorporate more shell

financial crisis, by using information on news reports on expropriations and property confiscations from the GDELT Project, for the period 1990-2016.¹⁹ The underlying idea is that such news reports 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 Figure A2b, 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 Figure 2a. Not only do firms prefer not to invest in the country, anticipating some economic turmoils, but, together with the households, they may also fear expropriation or financial seizure. Furthermore, opting for offshore destinations seems more preferable in order to avoid paying taxes on their capital outflows.

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 (or clientelism). We use respectively: an indicator for corruption from ICRG-PRS Group (2013) and an indicator for clientelism in the society (defined as "distribution of resources" in exchange for political support) provided by Coppedge et al. (2022). As Figure A3 shows, the increase of deposits into tax havens, after the beginning of a financial crisis, is indeed typical of countries which are more corrupt²⁰, or with higher level of clientelism²¹, consistently with the related literature (e.g., Andersen et al. 2021; Andersen et al. 2017). In more corrupt countries – besides a general lower compliance with the rule and sense of civil community– the economic and political elites, fearing a change in regime after the crisis, may decide to bring their resources abroad (especially when illegal or from the shadow economy).²² We also tested for differences between democracies vs. autocracies, or left wing governments vs right wing ones, finding no significant results.

Finally, 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).²³ We interact

companies.

¹⁹As in Bayer et al. (2020), we use all events from the CAMEO category "1711: Confiscate Property."

 $^{^{20}\}mathrm{The}$ mean level of corruption over the sample is above the median.

 $^{^{21}\}mathrm{The}$ mean level of clientelism over the sample is in the top tercile

 $^{^{22}}$ As recently shown by Funke et al. (2016), evidence in the aftermath of the global financial crisis, in Europe, document that the political costs can be severe. Exploiting data from the last 140 years, they do not observe similar political dynamics in normal recessions, or after severe macroeconomic shocks that are not financial in nature.

 $^{^{23}}$ 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

this index with the variable denoting a financial crisis. As reported in Table A4, 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 increase capital outflows to tax-havens. However, the coefficient of the interaction 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.

To sum up, the increase in offshore wealth does not seem to depend on taxation, but seems correlated to an increase in the risk of expropriation and driven by countries with more fragile institutions. We also find 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 explain the non significant interactions with the index of financial openness. In the next section, we provide some descriptive evidence on the implications of capital outflows to tax havens in terms of wealth.

7 Implications on wealth

This section focuses on the consequences that deposits to tax havens may have on obtaining a proper measure for wealth, and wealth inequality. As financial crises may lead the rich to move financial resources abroad, in particular into offshore accounts, in turn this could lead to a downward bias in measuring wealth inequality. The data from the World Inequality Database (2022) allow us to track how the different segments of the wealth distribution react to a financial crisis over time.

More specifically, Figure 4 provides some descriptive evidence on the relationship between the evolution of financial crises and average wealth by different percentiles of the population. Countries are weighted by their pre-crisis GDP. Since the use of tax havens is highly concentrated among the rich (Alstadsæter et al. 2019, Londoño-Vélez and Ávila-Mahecha 2021), we focus on the evolution of the average wealth of the richest percentiles of the population (i.e., top 0.001, 0.01 and 0.1).²⁴

Understanding the implications of the financial crisis on the country's inequality requires to un-

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).

 $^{^{24}}$ For example, Alstadsæter et al. (2019) find that, in Scandinavia, the 0.01 percent richest households evade about 25 percent of their taxes. By contrast, tax evasion detected in stratified random tax audits is less than 5 percent throughout the distribution.



Figure 4: Standardized wealth of countries experiencing a financial crisis by different quantiles of average wealth over time

derstand whether a country's evolution of wealth, after a crisis, captures a faithful picture of the actual wealth distribution. If, for example, the richest moved their capitals toward tax havens during or immediately after the financial crisis, then we would miss part of a country's wealth and of its dynamics. Figure 4 shows that while the wealth of the richest citizens grew at a higher rate until the financial shock, their wealth stopped growing at the fastest speed after the crisis. To the opposite, the speed of recovery was faster for the lower segment (the bottom 99%), while the richest never caught up. To the extent that capital flows to tax havens eventually lead to a downward bias in inequality estimates, this evidence may provide some insights for the debate on the distributional consequences of a financial 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 differencein-differences method to estimate the effect of financial crises on hidden wealth. We find that they generate a sizeable increase in bank deposits in offshore financial centers after three years since their beginning. The effect is economically sizeable: the average increase of deposits into tax havens corresponds to about 1 billion USD during the crisis. 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 as a dependent variable the number of newly incorporated offshore entities 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.

We finally bring some evidence on the implications of capital outflows to tax havens in terms of a proper measure of wealth, and wealth inequality. In particular, we find that the average wealth of the richest percentile is the most hit by the crisis and remains slow without catching up after the crisis is over. On the other hand, the impact of the financial crisis on the population's average wealth decreases gradually as we move away from the richest segments of the population.

To sum up, to the best of our knowledge, this is the first paper documenting the effect of financial crises on hidden wealth. We show that tax havens, besides allowing tax and sanction evasion and harboring proceeds of criminal activities, absorb resources under difficult times and may lead to a downward bias when measuring a country's inequality. International Institutions that are committed to break the opacity of corporate structures should account for this additional dimensions, among the costs of tax havens. Future research might want to improve our understanding of the mechanisms behind our results and, most importantly, of the implications in terms of a country's inequality.

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Online Appendix - for online publication

Tables

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	N.Obs	Mean	Min	Median	Max	S.Dev
Funds in Tax Havens (Millions Doll.)	18409	1569.38	0.03	107.00	203018.67	7354.19
Funds in Non Havens (Millions Doll.)	18409	2021.12	0.13	276.00	99865.26	5803.64
Share of Quarters in Financial Crisis	18409	0.13	0.00	0.00	1.00	0.34
Share of Quarters in Debt Crisis	18409	0.09	0.00	0.00	1.00	0.29
Share of Quarters in Banking Crisis	18409	0.06	0.00	0.00	1.00	0.23
Share of Quarters in Currency Crisis	18409	0.03	0.00	0.00	1.00	0.17
Real GDP (trillion)	18397	141.18	0.17	16.60	14625.05	642.73
Capital Openness	18392	-0.15	-1.93	-0.85	2.31	1.44
Liquid Liabilities (over GDP)	18305	47.50	3.06	37.98	454.65	37.26
Quarters in Hyperinflation	18281	0.04	0.00	0.00	1.00	0.20
Average HH wealth of top 0.01 percent	11904	38.67	0.00	1.30	3078.42	192.87
Average HH wealth of top 0.1 percent	11904	7.78	0.00	0.27	667.23	41.39
Average HH wealth of top 1 percent	11904	1.61	0.00	0.06	142.31	8.83
Average HH wealth of bottom 99 percent	11904	0.01	0.00	0.00	0.81	0.04

Table A1: Summary Statistics

Table A2: Change of deposits abroad during a financial crisis, controlling for the years in which a currency crisis occurs.

	Tax Havens		Non Tax	Havens	
	(1)	(2)	(3)	(4)	
Duration Financial Crisis	0.248***	0.205***	0.508***	0.111	
	(0.086)	(0.073)	(0.095)	(0.085)	
Currency Crisis	0.050	0.010	0.126^{**}	0.070	
	(0.046)	(0.044)	(0.062)	(0.048)	
N. Obs	26,898	16,365	27,986	$16,\!365$	
Mean DV	3.892	4.542	4.513	5.388	
Controls		\checkmark		\checkmark	
Fixed Effects:					
Quarter	\checkmark	\checkmark	\checkmark	\checkmark	
Country	\checkmark	\checkmark	\checkmark	\checkmark	

Note-The sample includes 144 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. Currency crisis is a dummy equal to one for the year during which a currency crisis occurs within a country. The controls include a dummy for hyperinflation, the degree of capital openness, the log of real gdp, liquid liabilites to GDP, all measured in the year before. Standard errors are clustered at the country level.

Table A3: Change of deposits abroad during a financial crisis. Robustness: alternative definitions of tax havens.

	Tax Havens	Non Tax Havens				
	(1)	(2)	(3)	(4)		
Panel A. Exclude T	ax Havens as in Ander	en et al., JPE 2022				
Duration Financial Crisis	0.249***	0.230***	0.526^{***}	0.124		
	(0.095)	(0.082)	(0.101)	(0.097)		
N. Obs	28,205	$17,\!631$	29,293	$17,\!631$		
Mean DV	3.886	4.546	4.501	5.371		
height Panel B. Exclude	Tax Havens as EU list					
Duration Financial Crisis	0.300***	0.205**	0.574^{***}	0.093		
	(0.096)	(0.079)	(0.108)	(0.097)		
N. Obs	25,392	15,081	26,352	15,081		
Mean DV	3.950	4.626	4.562	5.416		
height Panel C. Exclude Tax Havens as OECD list						
Duration Financial Crisis	0.282***	0.252***	0.539^{***}	0.120		
	(0.094)	(0.081)	(0.101)	(0.095)		
N. Obs	28,724	18,277	29,812	18,277		
Mean DV	4.027	4.686	4.676	5.513		
Controls		\checkmark		\checkmark		
Fixed Effects:						
Quarter	\checkmark	\checkmark	\checkmark	\checkmark		
Country	\checkmark	\checkmark	\checkmark	✓		

Note-The sample includes the countries over the period 1977-2020. The dependent variable is the logarithm of the quarterly funds held in tax havens (cols 1 and 2) and in non tax havens (cols 3 and 4). 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 liabilites to GDP, all measured in the year before. In Panel A we exclude from the sample the countries that are classified as tax havens from Andersen et al. (JPE, 2022); in Panel B we exclude from the sample countries that were in the EU black and gray list in 2022; in Panel C we exclude from the sample countries that were classified as uncooperative countries by the OECD in 2022. Standard errors are clustered at the country level.

Type of crisis:	Financial	Debt	Banking		
	(1)	(2)	(3)		
Panel A. Dep Var: Capital Openness					
Duration Crisis	-0.294***	-0.363***	-0.172*		
	(0.102)	(0.130)	(0.102)		
N. Obs	18,513	18,513	18,513		
Mean DV	-0.153	-0.153	-0.153		
height Panel B. Dep Var: Change of de	eposits in tax havens				
Duration Crisis	0.247^{***}	0.342^{***}	0.130		
	(0.087)	(0.104)	(0.088)		
Capital Openness	0.106^{**}	0.102^{**}	0.102^{**}		
	(0.047)	(0.047)	(0.046)		
Duration Crisis * Capital Openness	-0.003	0.059	-0.066		
	(0.055)	(0.057)	(0.071)		
N. Obs	18,513	18,513	18,513		
Mean DV	4.679	4.679	4.679		
Controls	\checkmark	\checkmark	\checkmark		
Fixed Effects:					
Quarter	\checkmark	\checkmark	\checkmark		
Country	\checkmark	\checkmark	\checkmark		

Table A4: Change of deposits abroad during a financial crisis. Robustness: capital openness.

Note- The sample includes the countries over the period 1977-2020. In Panel A, the dependent variable is the measure of financial openness developed by Chinn-Ito (2006). In Panel B, the dependent variable is the logarithm of the quarterly deposits 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 log of real gdp, liquid liabilities to GDP, all measured in the year before. Standard errors are clustered at the country level.

Figures



Figure A1: Incorporation of New Offshore Entities around the start of a Financial Crisis



Figure A2: Dynamic of effective taxation on capital and of probability of news of expropriation around the start of a financial crisis



Figure A3: Funds to tax havens: event study for funds in tax havens in countries with corruption (ICRG) and clientelism (VDEV) above median, vs countries with corruption and clientelism below median.