Global Offshore Wealth, 2001–2021*

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Abstract

This paper constructs homogeneous time series of global household offshore wealth covering the 2001–2021 period, during which major international efforts were implemented to curb offshore tax evasion. We find that (i) global offshore wealth remained broadly stable a fraction of global GDP, the equivalent of around 10% of world GDP, (ii) the location of offshore wealth changed markedly, with a decline in the share held in Switzerland and rise of Asian havens (iii) a growing fraction comes from developing countries.

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Contents

1 Introduction

In this paper, we extend Zucman's (2013) estimate of global offshore financial wealth, which covered 2001-2008, to 2021. Using the same methodology and updated input tables from more than 20 different data sources, we compute the annual global portfolio assets-liabilities gap from which we derive the total value of financial assets held offshore. We build on the methodology developed by Alstadsæter, Johannesen and Zucman (2018) to estimate the amount of offshore wealth held by each country in each tax haven and analyse changes in the location and origins of offshore financial wealth over two decades.

The results suggest that offshore financial wealth has remained broadly stable in % of GDP since the early 2000s. We find that the share of offshore wealth held in Switzerland has declined significantly since 2006, while the share held in Asian tax havens has clearly increased. The owners of offshore financial wealth are still predominantly located in high-income countries but the share of middle- and low-income countries has increased over the last two decades.

Before the implementation of FATCA and the Common Reporting Standard (CRS), most of offshore financial wealth could be assumed to go untaxed. Available estimates suggest that about 90%-95% of offshore financial wealth went unreported to tax authorities in 2007-08, implying large tax revenue losses for governments. Today, the scope for hiding accounts offshore, seems dramatically reduced. Preliminary estimates from Danish CRS micro data suggest that only 30% of global offshore financial wealth owned by Danish residents are still hidden from the tax authorities while ownership of the remaining 70% is likely to have been revealed through the CRS (Boas, Johannesen, Kreiner et al., 2023). However, the increasing transparency and exchange of information does not seem to have had dramatic effects on the amount of household wealth held offshore, indicating that tax evasion cannot be the primary motive for holding financial assets offshore today.

Our research contributes to a growing body of literature on anomalies in the international investment statistics, offshore financial wealth, and international reforms to tackle cross-border tax evasion. While Lane and Milesi-Ferretti (2007) had first analyzed the systematic assets-liabilities gap in international investment statistics, several researchers have since then used it to derive estimates of global offshore wealth (Zucman, 2013, Pellegrini, Sanelli & Tosti, 2016; Vellutini, Casamatta, Bousquet et al., 2019; ECORYS, 2021). With this paper we provide the most recent estimate for 2021 and a comprehensive update of the Zucman (2013) methodology.

The changing geographical distribution of offshore wealth, with the rise of Asian tax havens and the decline of Switzerland, might stimulate further research about uneven progress to-

wards global transparency (Janský, Palanský, & Wójcik) or non-tax related reasons for holding financial wealth offshore such as circumvention of China's foreign investment restrictions (Florez-Orrego, Maggiori, Schreger et al. 2023) or corruption (Marcolongo & Zambiasi, 2022). Finally, the updated country-by-country estimates will also allow for a comparison with recent country studies of offshore tax invasion informed by tax amnesties or data from the automatic information exchange (Londoño-Vélez & Tortarolo, 2022, Johannesen, Reck, Risch et al., 2023, Boas, Johannesen, Kreiner et al., 2023) and which might serve as benchmarks for evaluating the country-level results produced by the Alstadsæter, Johannesen and Zucman (2018) methodology.

The paper is structured as follows. Section 2 provides our definition of offshore wealth and outlines our methodology. Section 3 presents our preliminary results at the global level (3.1) and the county-by-country estimates (sections 3.2 and 3.3). Section 4 concludes.

2 Definitions and Methodology

This section explains the concept of offshore financial wealth which is not necessarily identical to wealth hidden from tax authorities in times of increasing international financial transparency. We describe the data and methodology used to update estimates of offshore wealth globally and by country.

2.1 What is Offshore Financial Wealth

Household offshore financial wealth refers to financial assets held by individuals outside of their residence country. Financial assets include bank deposits and portfolios of securities (equities, bonds, and mutual fund shares). Offshore bank deposits are deposits held in foreign banks, for example, deposits on a Swiss bank account owned by a French resident. Offshore securities are securities held through a foreign custodian bank. For example, a French resident may own shares of a French or a German company. Both would be considered "offshore" if held through a custodian outside of France, e.g. in Switzerland.

It is not illegal to hold financial assets abroad. The income earned on these offshore assets (such as interest, dividends, and capital gains) must simply be reported to domestic authorities, as countries typically tax the worldwide income of their residents, no matter where this income is earned. The wealth itself must be reported in the countries that have a wealth tax. In addition, some countries require the owners of these assets to report offshore holdings on specific forms (for instance in the United States on Foreign Bank Account Reports for holdings above $10,000),

even if no income is earned or no wealth tax exists. For a long time, it was straightforward to evade taxes on offshore income and wealth without being detected. This is because until 2017 most offshore financial institutions did not communicate information to foreign tax authorities, except on an ad-hoc basis when information was requested for specific taxpayers who had aroused suspicion (Johannesen & Zucman, 2014). A large body of economic research shows that whenever there is no automatic third-party reporting of information to tax authorities, tax evasion tends to be widespread (Kleven, Knudsen et al., 2011). This was particularly true for taxes on offshore capital income and wealth, as the industry had developed since the 1920s (first in Switzerland, then in some other financial centers) to facilitate wealth concealment by non-resident individuals (Zucman 2015).

Offshore banks provide a variety of services to their customers, so that even when tax evasion occurs, it is not necessarily the only or even primary motive for having offshore accounts. These banks may offer investment services that are not available in the customers' home country or are only available at a higher cost (such as brokerage services, wealth management, or access to certain investment funds); they may allow customers to circumvent certain regulations (such as foreign exchange controls); they may help people dissimulate assets from spouses (e.g., in the context of a divorce), from business partners (e.g., in the context of bankruptcy), from regulators (e.g., in the context of the illicit financing of a political campaign); they may allow individuals to avoid international sanctions; they may be used to launder the proceeds from illegal activity. When offshore accounts are used for these more questionable purposes, they are typically combined with opaque ownership structures involving shell companies, foundations, trusts, and nominees located in different countries, including territories with a poor track-record of cooperation with foreign authorities.

2.2 Methodology

For a long time, it was difficult to estimate the amount of wealth owned offshore by households, let alone to know who owned that wealth and the motives behind these holdings. This situation started to change in the early 2010s, thanks to an increase in data availability and new research in this area. Zucman (2013) developed a methodology to estimate the global amount of household offshore wealth, exploiting official statistics published by the Swiss central bank, the Bank for International Settlements, and systematic anomalies in the international investment positions of countries. We use the same methodology to update the estimate of global offshore financial wealth, analyse in which countries it is located and where its owners reside.

Anomalies in securities data The basic idea behind the methodology is simple. When individuals own portfolios of financial securities – stocks, bonds, mutual fund shares – offshore, these holdings cause anomalies in global investment statistics. Take the case of a French resident individual who owns US equities on a Swiss account. The French statistical authorities typically do not observe these holdings, because their data are based on surveys of French financial institutions and companies. As a result, no asset would be recorded in France. US statisticians would duly record a liability vis-à-vis the rest of the world: they observe that some US equities are owned in custody in a Swiss bank. Finally Swiss statisticians would record neither any asset nor any liability for Switzerland – and rightly so, as these assets belong to a French resident. As a result, more liabilities are recorded globally than assets, as if Earth was owned in part by another planet. This mismatch has been long noted by the International Monetary Fund and researchers working in this area. By exploiting it, Zucman (2013) estimated the size of portfolio wealth held offshore. We build on the same methodology to update these estimates, originally available for the period 2001-2008, annually all the way to 2021.

Our key data sources for this update are the Coordinated Portfolio Investment Survey (CPIS) of the IMF and the External Wealth of Nations Database (EWN) by Lane and Milesi-Firetti (2018). For the computation of global assets we use data for 2001-2021 from the June 2023 wave of the CPIS which presents bilateral portfolio holdings of 93 jurisdictions and international organizations on 243 debtors. For the computations of global liabilities, we use the December 2022 wave of the EWN dataset (Lane & Milesi-Firetti 2018) which contains aggregate portfolio assets and liabilities of 212 countries.

Not all jurisdictions report all assets held by their residents or public institutions to the CPIS, so we have to make several adjustments to avoid over-estimating the amount of offshore wealth. The most important adjustments are for non-reported assets by China and Middle Eastern oil exporters which are to a large extend held by central banks or sovereign wealth funds. These assets are not hidden from the domestic authorities but just not reported internationally for strategic reasons. In addition, up until 2015, the CPIS numbers for Cayman Islands did not include the hedge funds industry. We estimate these underreported assets based on different additional data sources, most importantly the bilateral foreign liabilities reported by the U.S. in the Treasury International Capital (TIC) System. In addition, we make other smaller adjustments to fill reporting gaps, for example we extrapolate missing years of cpis-reporting countries or obtain assets from the EWN database or from creditor-derived liabilities for non-reporters (see Appendix A.2-A.6 for more details on the country-specific corrections of assets).

We also make some adjustments on the liability side, among which corrections for Cay-

man Islands and non-EWN countries (see Appendix A.7). Finally, we compute the portfolio assets-liabilities gap by country and globally. We thereby replicate the assets-liabilities gap of Zucman (2013) for the years 2001-2008 with minor discrepancies mainly due to data revisions (see Appendix A.8) and extend it up to 2021.

Direct evidence from Switzerland On top of offshore security wealth derived from the global assets-liability gap, we need to estimate the share of global offshore wealth held in bank deposits. The Swiss National Bank publishes detailed statistics on both security holdings and fiduciary deposits in Swiss bank custody accounts from which Zucman (2015) infers the global ratio of offshore wealth held in deposits versus securities. We use Zucman's (2015) number for end-2013, $1500 billion, which suggests that bank deposits make up 18% of total offshore wealth. This is lower than the 25% observed for 2008 in Zucman (2013) and likely reflects a restructuring of assets in the low-interest phase post 2008. After 2013, we assume that the share of offshore bank deposits increases again slightly and remains constant at 20% after 2016.

The Swiss data also provides a break-down of personal wealth held in Swiss banks' custody by country of the account holder. This allows us to distribute offshore wealth held in Switzerland to the countries of residence of its owners. We find that the share of Swiss fiduciary deposits owned by Middle Eastern households has increased significantly since 2014. As discussed by Alstadsaeter, Johannesen & Zucman (2018) a growing share of the wealth owned by foreigners in Switzerland is wrongly attributed to tax havens due to the use of shell companies. Figure 5 plots the share of Swiss deposits owned by Europeans and the share reported as being owned by tax havens. As in Zucman & Johannesen (2014), the negative correlation is still striking. We thus assume that an important share of Swiss accounts are still owned by Europeans. We redistribute the Swiss deposits owned by tax havens back to non-haven countries by assuming that the assets held through shell companies follow the same ownership distribution as the assets owned by non-haven countries.

Offshore wealth in the countries other than Switzerland A number of offshore financial centers have started disclosing bilateral data on the amount of bank deposits that foreigners own in their banks. These data have been collected for several decades by the Bank for International Settlements (BIS), but until 2016 the BIS only disclosed statistics aggregated at the country level (such as the total amount of foreign-owned bank deposits in Luxembourg) rather than at the bilateral level (such as the amount of bank deposits owned by German residents in Luxembourg). In 2016, several offshore centers authorized the BIS to disseminate bilateral

data. These series are retrospective and go back in most cases to the early 2000s. Alstadsæter, Johannesen, and Zucman (2018) developed a methodology that uses these data to allocate the global amount of offshore financial wealth (as estimated using the approach described above) to the country of their owners. We build on this methodology to update the estimates annually to 2021.

Having subtracted the offshore wealth held in Switzerland from the global total, we allocate the remaining offshore wealth to other tax havens based on the BIS locational banking statistics. To do so, we need to make a few crucial assumptions. As we cannot observe the distribution of security holdings across tax havens, we first assume that it follows the same distribution as bank deposits. Second, the BIS data does not disclose what share of deposits is held by households and what share by firms. Our offshore wealth estimate refers to household wealth and its distribution should thus not be derived from the location of firm accounts as these likely follow a different geographical pattern. For example, in tax havens that host many multinational enterprises, the relatively high overall value of foreign deposits would lead us to overestimate their share of in personal offshore wealth. We thus assume that the share of deposits owned by households varies by tax haven, with a lower household share in jurisdictions such as Cayman Islands and Luxembourg, and a higher share in tax havens more specialized in personal wealth management such as Cyprus or Panama. As we rely on BIS data to allocate the offshore wealth to non-Swiss tax havens, we cannot allocate offshore wealth to tax havens not reporting to the BIS, such as the British Virgin Islands or the United Arab Emirates which are therefore left out of the analysis.

The BIS data also allows us to allocate non-Swiss offshore wealth to the countries where its owners reside. Again we assume that the distribution of ownership of offshore wealth across countries follows the same distribution as tax haven deposits reported in the locational banking statistics. For example, we derive the share of total offshore wealth owned by French residents from their reported bilateral share in each tax haven's bank deposits. As in the Swiss case, part of tax-haven deposits is wrongly attributed to being owned by residents of other tax havens due to shell companies. We redistribute it back to non-haven countries based on the distribution of tax haven deposits owned by non-haven countries. Finally, we use a 5-year moving average to smooth the development of offshore asset ownership over time because BIS deposits can be very volatile and our method is somewhat noisy given the limitations of the raw data.[1]

[1]Despite the smoothing our results remain broadly consistent with the one by Alstadsæter, Johannesen & Zucman (2012). See Appendix Figure XX. Discrepancies between their 2007 estimates and ours are mainly due to (i) data limitations as some BIS reporting countries do not publicly disclose the country breakdown for their deposits (see Online Appendix Section B.4 for a more detailed explanation) and (ii) the fact that for 2007,

3 Results: Offshore Financial Wealth, 2001–2021

This section examines the aggregate and distributional aspects of offshore wealth resulting from our estimation methodology. It discusses the stability of global offshore wealth within our estimation period and highlights recent shifts in both its location and origin. Subsequently, we elucidate the implications for the global economy, particularly in the context of the Common Reporting Standard (CRS) and the automatic exchange of information.

3.1 Aggregate Trends

Our estimates suggest that financial assets worth approximately USD 14 trillion were held offshore in 2021. Offshore financial wealth appears to have evolved at roughly the same pace as global GDP over the last 20 years. It has hovered around the equivalent of 10% of world GDP between 2001 and 2011 and around 11% since 2012, as shown in Figure 1. Year-to-year variation primarily reflects fluctuations in asset prices: in years of strong stock market growth (such as 2020 and 2021), wealth in general – and offshore wealth in particular – tend to grow faster than GDP, and vice versa during episodes of stock market declines. No clear trend appears over the medium run. The increasing transparency and exchange of information does not seem to have had dramatic effects on the amount of household wealth held offshore, indicating that tax evasion cannot be the primary motive for holding financial assets offshore today.

3.2 Changing Location of Offshore Wealth

In contrast to the size of global offshore wealth, both the location and origin of offshore wealth have changed over the last two decades. Figure 2 reports the evolution of the location of offshore wealth. The frontier between the different offshore centers can be fuzzy – for example, wealth that is managed by bankers in Zurich might be recorded in a subsidiary in Singapore – so the results should not be over-interpreted. However, a number of interesting findings emerge. First, a growing fraction of global offshore wealth appears to be managed in Asian offshore financial centers, the most notable being Singapore and Hong Kong. As a result, the share of Asian tax havens has increased from 25% to 40% over the last decade. Second, a smaller fraction is managed in Switzerland, historically the epicenter of offshore wealth management. Prior to the financial crisis of 2008–09, almost half of global offshore wealth was managed in Switzerland. Today this share is down to about 20%. The share of other European tax havens has declined

Alstadsæter, Johannesen & Zucman utilize the average of global offshore wealth between 2006 and 2007 while we use the 2007, which mechanically raises the estimated offshore wealth amounts of all countries.

slightly, while the share of American tax havens is slightly higher than in the early 2000s but lower than at its peak in 2014.

The changing location of offshore wealth may reflect institutional changes towards more financial transparency but also general economic trends. It is plausible to assume that increased transparency has made access to Swiss secrecy more costly for potential clients so that other tax havens might have become relatively more attractive. For example, recent research suggests, that offshore deposits were shifted from CRS-participating tax havens to the U.S. because under FATCA the U.S. do not grant the same level of transparency to other countries as required by the CRS (Casi, Spengel & Stage, 2021). However, the rise of Asian tax havens, might also reflect the growth of Asian economies which might attract foreign investments facilitated by wealth managers in Hong Kong or Singapore. At the same time, wealthy residents of Asian countries moving assets offshore might prefer Asian tax havens due to geographic or cultural proximity. Also the increased share of offshore wealth owned by middle and low income countries (see following section) might have contributed to the rise of Hong Kong, because Hong Kong ranges higher on the top 10 secrecy jurisdictions for lower middle income countries than for example Switzerland (Janský, Meinzer & Palanský, 2021).

3.3 Changing Origin of the Wealth

We first analyze how the distribution of offshore wealth has developed for different income-level groups of countries[2] Figure 3 illustrates the results. We find that the share of offshore wealth owned by middle- and lower-income countries has increased by 8% between 2014 and 2021 while that of high-income countries has declined after a long period of stability. This trend appears to be stabilising at the 2019 level. It seems to correlate with the development of GDP of both income groups (See Appendix Figure XX), which might indicate that the relative increase of offshore financial wealth owned by middle -and lower-income countries can be explained by stronger economic growth. Nonetheless, at the individual country level, this relationship appears to be blurry.

At the country level, we observe few notable changes in the ownership of offshore wealth. Figure 4 plots offshore wealth owned by each country in 2007 and in 2021 in % of their GDP. We focus on large economies with GDP exceeding $200 billion in 2007. As in Alstadsæter, Johannesen & Zucman (2018), the United Arab Emirates and Venezuela are still leading the ranking with their offshore wealth reaching more than 100% of GDP today. The third position

[2]Countries are assigned following the 2022 World Bank classification, with some adjustments (see notes below Figure 3)

has been taken over by Taiwan, for which our estimation approach produces surprisingly high offshore wealth in % of GDP for 2021. The strong increase for the UK, Greece, Thailand, and Denmark is also somewhat puzzling and requires further investigation. For most large economies, the share of offshore wealth has increased slightly compared to 2007, in line with global offshore wealth, or remained broadly stable. Notable exceptions are Argentina and Germany for which it seems to have decreased significantly, and Turkey, Belgium, Colombia, the United States and Brazil for which it has decreased very slightly. Due to the aforementioned high volatility of BIS deposits, the annual country results are sensitive to the smoothing process adopted and should thus not be over-interpreted. As discussed earlier, the average increase in offshore wealth in % of GDP between 2007 and 2021 might be explained by the global stock market boom in times of sluggish GDP growth which distinguishes the year 2021 from 2007.

4 Conclusion

We replicate and extend Zucman's (2013) estimate of global offshore financial wealth to 2021 and analyse its changing location and origin over two decades. We find that the global offshore financial wealth has remained broadly stable in % of GDP. A remarkable result is the decreasing share of global offshore wealth held in Switzerland, while the relative importance of Asian tax havens has increased. Ownership of offshore wealth is still concentrated in high-income countries but the share owned by low- and middle-income countries has increased since 2014. There are several possible explanations for these developments which we need to investigate further, among which Switzerland becoming less attractive due to increased financial transparency or more generally stronger economic growth in Asian countries which might advantage Hong Kong and Singapore compared to European tax havens.

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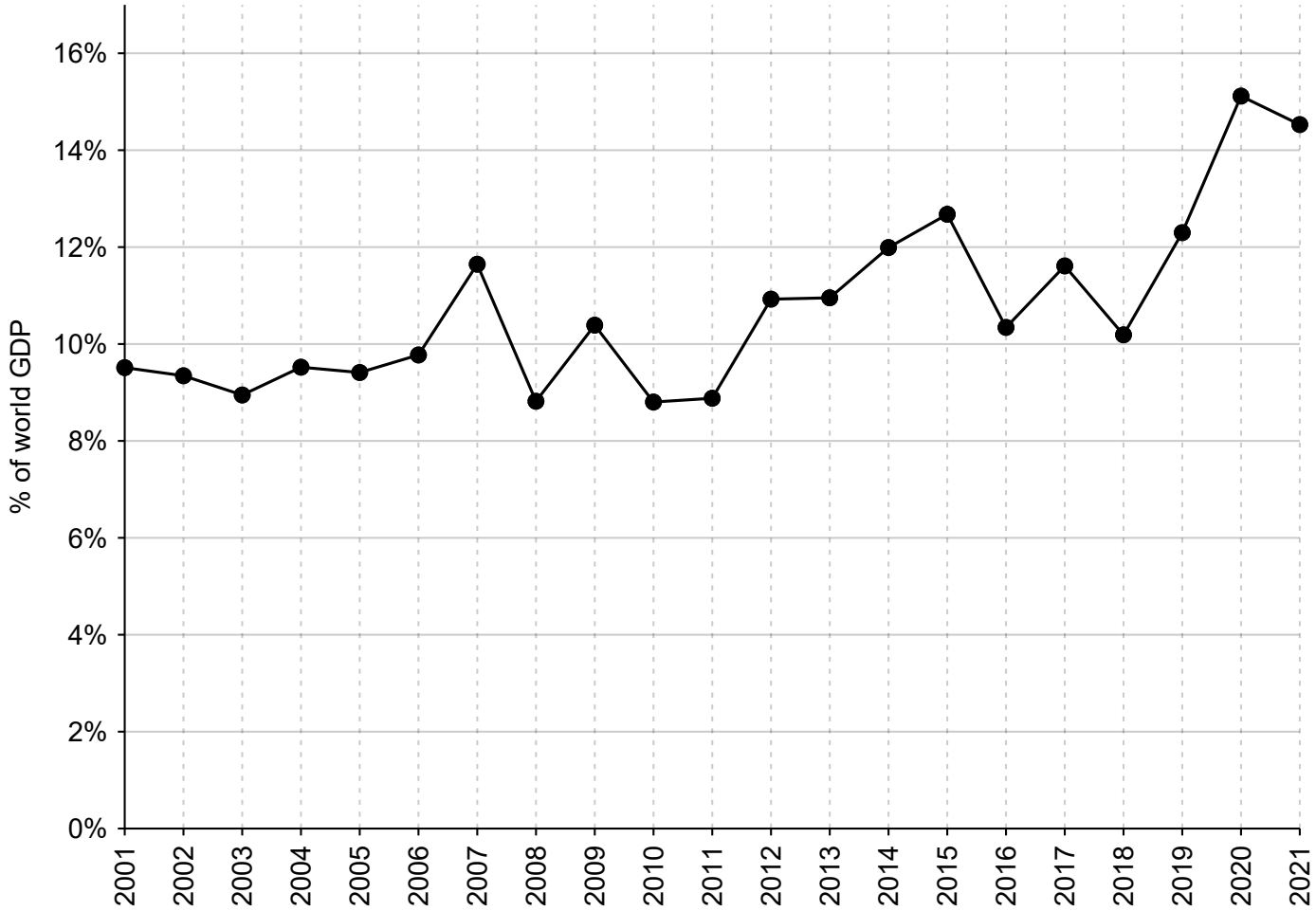
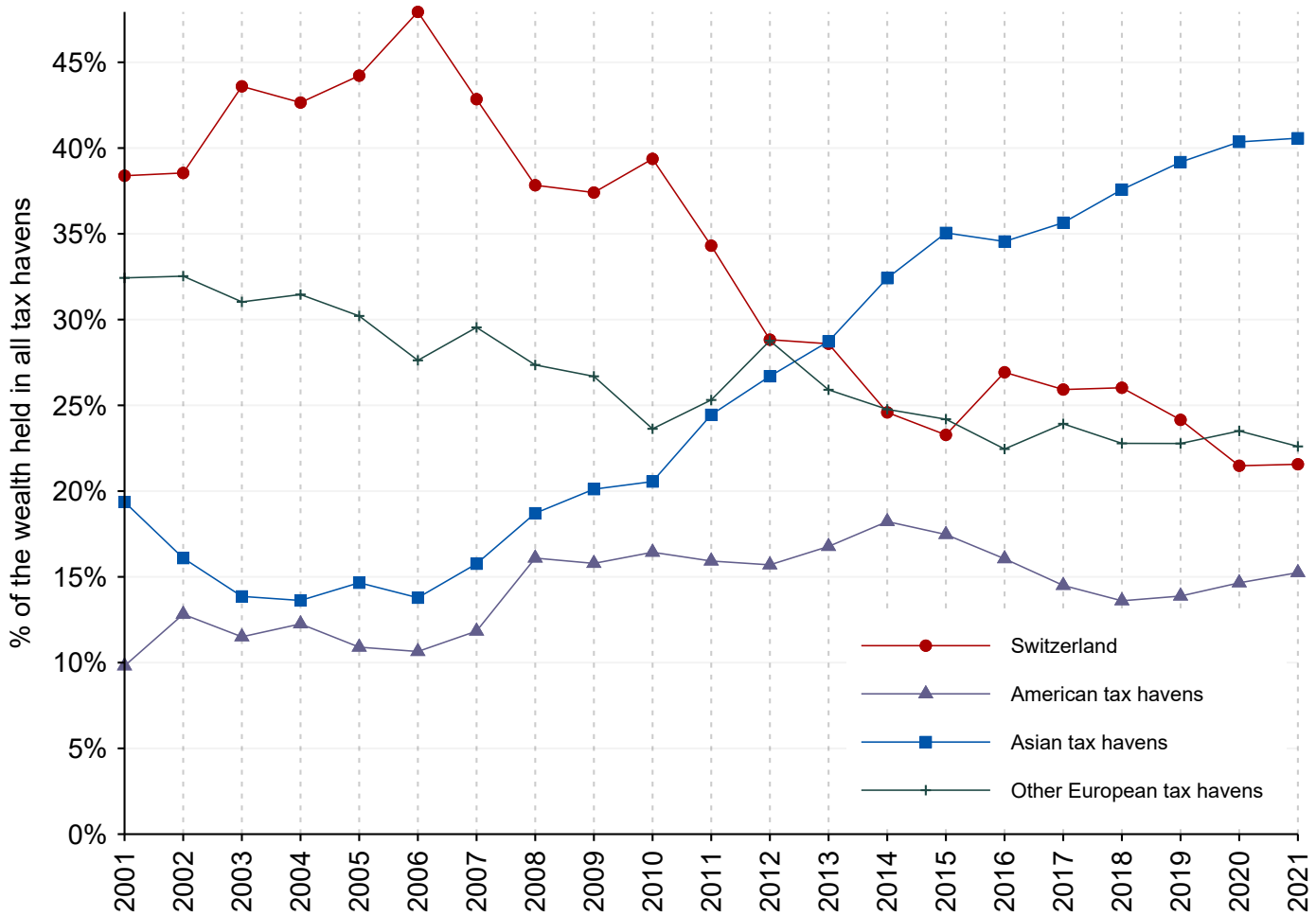
Figure 1: Evolution of Global Offshore Wealth (as a % of world GDP), 2001–2021



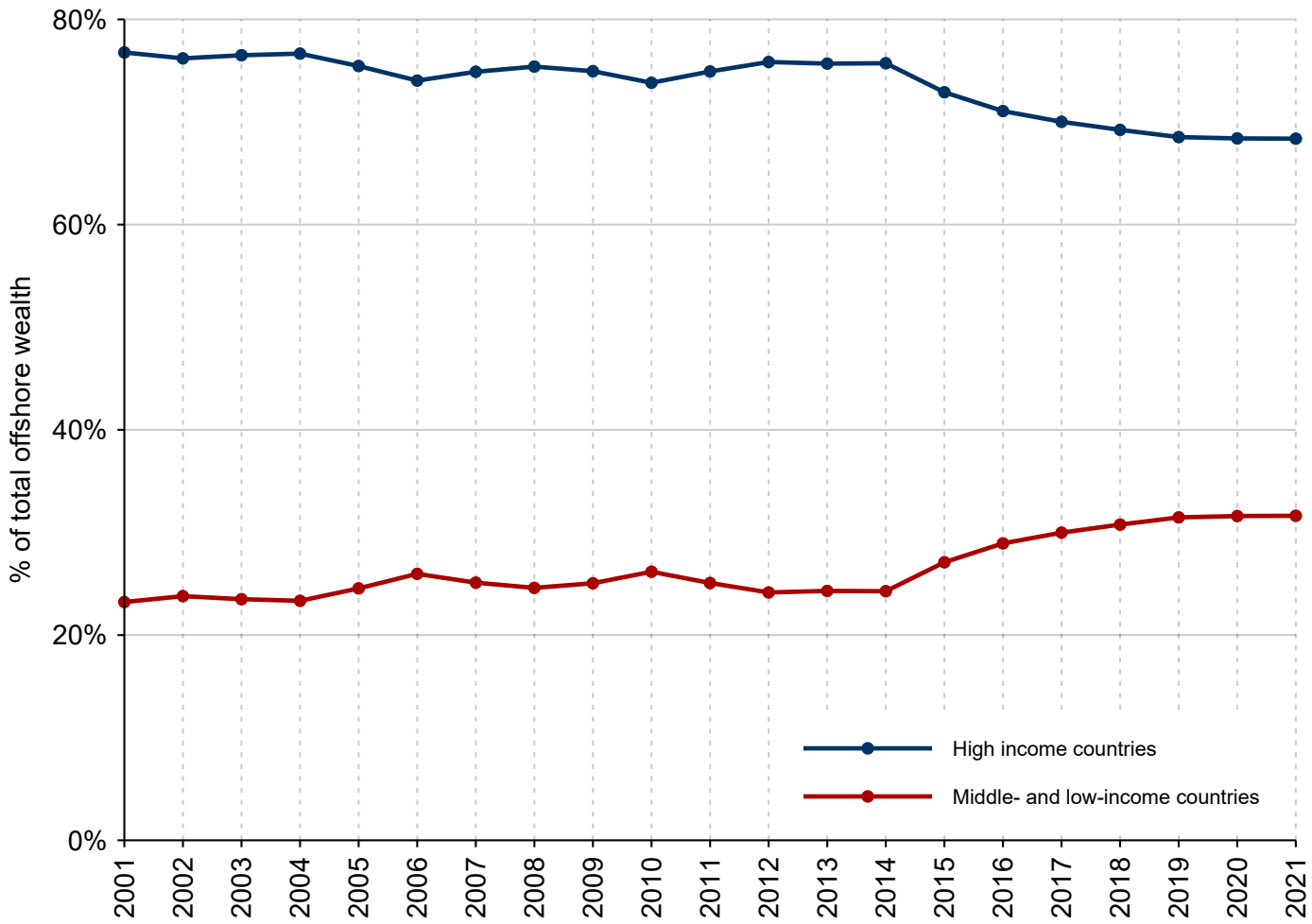
Notes: This figure depicts the evolution of year-end global offshore wealth held in all tax havens, for the period 2001 to 2021, as a fraction of world GDP. We obtain our estimates by employing and updating the approach in Zucman (2013). Source: Appendix Table A.1.

Figure 2: Where is the World's Offshore Household Wealth Located?



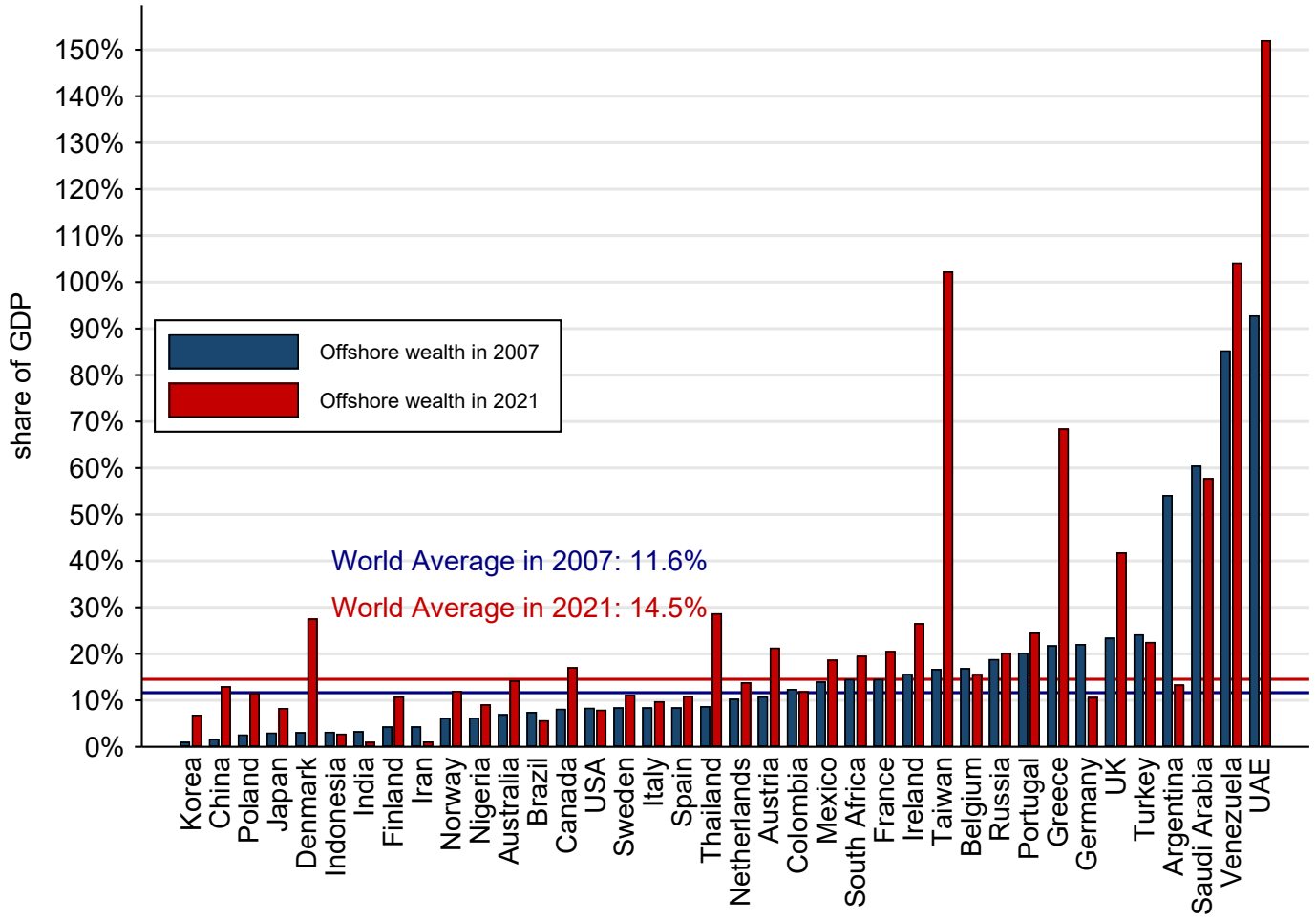
Notes: This figure plots the share, in the period from 2001 to 2001, of the world's offshore wealth managed in offshore centers, namely Switzerland, American tax havens (Cayman Islands, Panama, and the United States), Asian tax havens (Bahamas, Bahrein, Bermuda, Curaçao, Hong Kong, Macao, Malaysia, Netherlands Antilles, and Singapore), and other Europeans havens (Austria, Belgium, Cyprus, Guernsey, Isle of Man, Jersey, Luxembourg, and the United Kingdom). Source: Appendix Table A.2

Figure 3: Offshore wealth owned by high-income vs. middle- and lower-income countries (% of total offshore wealth)



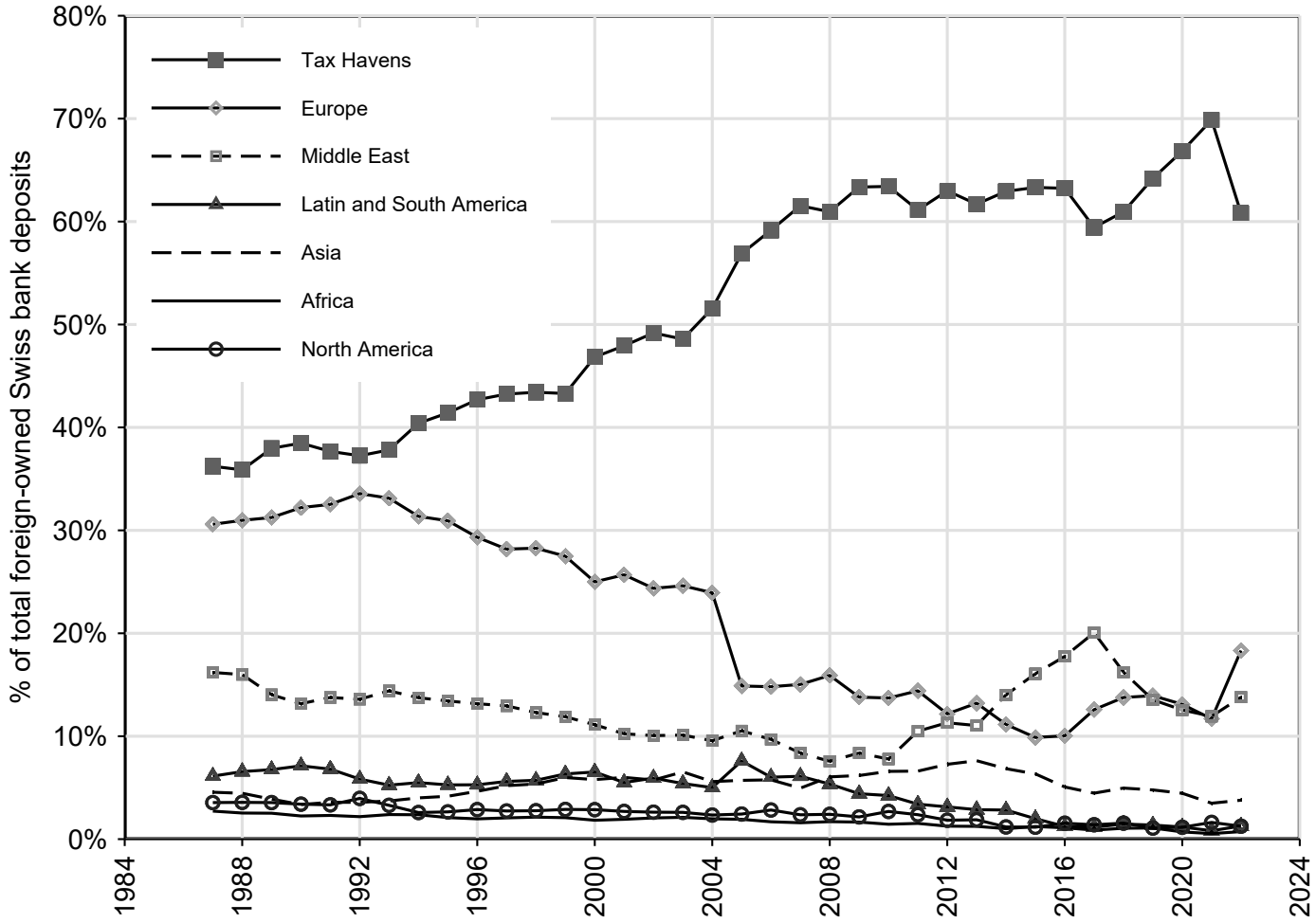
Notes: This figure illustrates the distribution of offshore wealth ownership, differentiating between high-income countries and lower-income countries, as a share of global offshore wealth. Income level country groups are defined using the World Bank classification as of 2022. We categorize upper-middle income, lower-middle income, low-income, and unclassified countries within the middle and lower-income group. Source: Appendix Table A.3

Figure 4: Offshore wealth in Large Economies: 2007 vs. 2021 (% of GDP)



Notes: This figure portrays the proportion of offshore wealth held in tax havens, comparing data from 2007 to 2021, as a percentage of each country's GDP.The analysis includes countries with a GDP exceeding $200 billion. The estimates for each country's offshore wealth are derived by allocating a portionof the global offshore wealth, as determined through the Zucman (2013) methodology, and utilizing the shares observed in the distribution of cross-border bank deposits in offshore financial centers and fiduciary deposits in Switzerland. Source: Appendix Table A.4

Figure 5: Who Owns Swiss Fiduciary Deposits?



Notes: This figure characterizes the geographical residence of owners of Swiss fiduciary bank deposits, as recorded by the Swiss National Bank (SNB). The SNB fails to see through sham corporations set in tax havens such as the Channel Islands, that may be used by rich countries' households as virtual owners.
Source: Appendix Table A.6

Online Appendix

A Update of Zucman (2013)

A.1 The gravity model

As in Zucman (2013), we estimate a gravity model following Lane and Shambaugh (2010) and use the estimated coefficients to predict the distribution of bilateral portfolio assets. We use the predicted shares of each country to distribute unallocated assets from the aggregate CPIS and estimated assets of non-reporting or not fully reporting countries. For updating the predicted shares we use the CEPII Gravity database (Conte et al 2022)[3]. We import the time-constant variables landlocked, industrial pair, and latitude and longitude from the GeoDist database (Mayer and Zignago 2011).[4] The GDP variables and population are from the World Development Indicators (World Bank 2023)

A.2 Cayman Islands

Portfolio debt assets. From 2015 onward, Cayman portfolio debt assets are taken from the CPIS, with no correction. Pre-2015, Cayman portfolio debt assets are estimated using TIC data on Cayman holdings of US debt, and we assume that the share of US debt in the total portfolio debt assets of the Cayman is constant back to 2001, and equal to its 2015 value of 66% (computed in the CPIS in Dec. 2015). We checked that the US portfolio debt assets of the Cayman Islands are about the same as reported by the Cayman in the CPIS vs. as reported by the US in the TIC. We also checked that the US share of Cayman portfolio debt assets over the period 2015-2021 is stable, at around 2/3. Our updated methodology delivers 2001-2008 estimates consistent with Zucman (2013), which based on a gravity model predicted a US debt share of about 60% (cf. Appendix Table A6 line 7) and applied this predicted share to US holdings recorded in the TIC over the 2001-2008 period.

Portfolio equity assets. From 2015 on, Cayman portfolio equity assets are taken from the CPIS, with a correction to replace reported US equity holdings by holdings of US equity by the Cayman recorded in the TIC (which are significantly larger). Pre-2015, Cayman portfolio equity assets are estimated using TIC data, and assuming that the US share of equity assets in 2015 is constant back to 2001. The US share of equity assets in 2015 is computed as US equity liabilities to the Cayman recorded in the TIC data, divided by our estimate of total equity assets of the Cayman (from the corrected CPIS); this share is equal to 80% in 2015. We checked that this share is quite stable over the period 2015-2021, around 70%-80%. Note that this share is higher than the share of 35%-45% in 2001-2008 predicted in Zucman (2013) based on a gravity model (cf. Zucman's Appendix Table A6 line 6). As a consequence, our revised estimates of Cayman holdings of portfolio equity assets over 2001-2008 are lower than in Zucman (2013), where they were computed as TIC holdings / predicted US share. It is possible that the US

[3] http://www.cepii.fr/CEPII/en/bdd_modele/bdd_modele_item.asp?id=8

[4] http://www.cepii.fr/CEPII/en/bdd_modele/bdd_modele_item.asp?id=6

share of Cayman holdings has been rising over the period 2008-2015 (indeed the gravity model predicted an increase over 2001-2008), but for simplicity we assume constant shares prior to 2015. This has no impact on the global assets/liabilities gap (and hence on offshore wealth estimates), because Cayman equity liabilities are estimated proportionally to Cayman portfolio assets, see below.

Portfolio equity liabilities. Equity liabilities are the sum of the equity liabilities of Cayman hedge funds and the equity liabilities of listed non-financial companies incorporated in the Cayman Islands.

Hedge funds. Throughout the period, we compute Cayman hedge funds equity liabilities as total (debt+equity) portfolio assets of the Cayman Islands (as estimated above), minus total portfolio (debt+equity) assets of the sectors other than hedge funds covered by the CPIS.[5] This gives a close approximation of the equity liabilities of Cayman hedge funds, since for them equity liabilities are equal to the net asset value of the funds, which in turn are equal to the cross-border portfolio equity and debt assets owned by the funds. A similar approach was followed in Zucman (2013), who obtained slightly higher Cayman equity liabilities in 2001-2008 because of the higher predicted Cayman equity assets (see above), with no consequence for the global assets/liabilities gap (and hence offshore wealth estimates).

Non-financial corporations. An important development since Zucman (2013) has been the rise in the number and size of publicly listed non-financial companies (especially Chinese) incorporated in the Cayman Islands, e.g., Alibaba, Tencent, Baidu, etc. The number of listed companies incorporated in the Cayman has increased from less than 100 in 2001 to about 1,750 in 2022. Throughout the period, we compute their equity value using data from *Compustat Global – Security Daily* on the end-of-year market value of all listed firms incorporated in the Cayman Islands.[6] We adjust this by a factor of 0.75 to take into account the fact that some of these equities are not portfolio liabilities but direct investment liabilities, because some shareholders own more than 10% of the stock (e.g., SoftBank owned 24% of Alibaba in 2022; Prosus 28% of Tencent).

Portfolio debt liabilities. We take Cayman portfolio debt liabilities from the updated External Wealth of Nations database throughout the period. The EWN estimate is equal to max(BIS international debt securities, CPIS-derived debt liabilities), which is also the methodology implemented in Zucman (2013)

A.3 China

China has started to partially report to the CPIS with bilateral data being available from 2015 onwards. As in Zucman (2013) we estimate private portfolio assets before 2008 by extrapolating

[5]Before 2014 only banks reported in the CPIS so we remove the total portfolio assets of the Cayman Islands; starting in 2015 hedge funds are included so we only remove the holdings of the "deposit-taking corporations" sector (identified in CPIS Table 3.A); starting in 2016 insurance companies are included in the CPIS so we also remove the holdings of this sector.

[6]Some of thees companies may own cross-border portfolio assets, but these assets are not covered by the CPIS (which does not capture non-financial companies), hence there is no double counting with our estimate of hedge fund equity liabilities.

backwards from the 2008 International Investment Position by using the proportional change of U.S. equity liabilities vis-a-vis China from Bertaut and Tryon (2007).[7] However, the bulk of Chinese assets are publicly held and these still seem to be unreported as we do not find a visible upward correction of global SEFER+SSIO assets in the CPIS. We assume that 85% of Chinese foreign exchange reserves were held in portfolio assets between 2001 and 2008, and that this share gradually increased to 95% in 2012 and remained constant afterwards. We derive the equity-debt ratio and the share of Chinese assets held in the US from the end-of-year U.S. liabilities reported by the TIC[8] We distribute Chinese non-US assets to host countries based on the share of international SEFER+SSIO in each non-US country assuming that the Chinese central bank follows similar geographic diversification strategies as other central banks.

A.4 Middle Eastern oil exporters

Middle Eastern oil exporting countries are Bahrain, Iran, Iraq, Kuwait, Oman, Qatar, Saudi Arabia, and the United Arab Emirates. Bahrain and Kuwait report to the CPIS. Since Zucman (2013), Saudi Arabia has started to partially report to the CPIS with data being available from 2013 onwards. However, Saudi Arabian public assets still seem to be unreported as we do not find any visible upward correction of global SEFER/SSIO assets. Thus, Saudi Arabian total assets and those of other non-reporting Middle Eastern oil exporters still need to be estimated. An important share of Middle Eastern foreign assets is held by sovereign wealth funds which are not necessarily included in official reserve statistics.

We infer Middle Eastern oil exporters' global assets from their holdings of U.S. assets as reported by the TIC. More specifically, we use information on equity and long-term debt security liabilities to "Middle Eastern Oil Exporters" from Bertaut and Judson (2014) until 2010 and update the series with TIC's Foreign Portfolio Holdings of U.S. Securities[9] for 2011 onwards. After 2010, TIC reports for June instead of December. For this reason we uprate equity assets based on growth rates derived from the CPIS-reported assets of Bahrain, Kuwait, and Saudi Arabia. We estimate short-term debt securities based on the short-term long-term ratio of liabilities to foreign official institutions derived from Bertaut and Tryon (2007) and Bertaut and Judson (2014). To estimate the Middle Eastern oil exporters' assets outside of the U.S., we assume that the share of the U.S. in total decreases from 68% in 2001 to 48% in 2011 and remains constant afterwards. We distribute the estimated assets to non-U.S. countries based on the predicted shares from the gravity model.

[7] https://www.federalreserve.gov/pubs/ifdp/2007/910/ifdp910appendix.htm

[8] We combine historic tables from Bertaut and Tyron (2007) and Bertaut and Judson (2014) https://www.federalreserve.gov/econres/ifdp/estimating-us-cross-border-securities-positions-new-data-and-new-methods.htm and import most recent long-term liabilities from the TIC resource center https://ticdata.treasury.gov/resource-center/data-chart-center/tic/Documents/slt_table1.html

[9] https://home.treasury.gov/data/treasury-international-capital-tic-system/us-liabilities-to-foreigners-from-holdings-of-us-securities

A.5 Other corrections for CPIS-reporting countries

Gaps in the CPIS We adjust the original CPIS data in two steps to obtain a complete matrix of bilateral assets. First, we reallocate "confidential and unallocated assets" to jurisdictions not reporting assets in a given year. The allocation is based on predicted country shares from the gravity model but rescaled such that all unallocated assets are allocated only to countries not reporting in a given year. In 2010 this leads to puzzling jumps in debt assets assigned to Switzerland and Luxembourg. This is because the UK reports 155 billion of unallocated or confidential assets in 2010 of which our approach distributes comparably high shares to Luxembourg and Switzerland (which do not report debt liabilities to the UK in this year). This leads to the exceptional result that debt assets held by foreigners in Luxembourg and Switzerland significantly exceed liabilities to foreigners reported by these two jurisdictions (columns 4 and 10 in Table A3). We do not modify the predicted shares as this would just move this jump in creditor-derived liabilities to other (much smaller) zero or non-reporting countries and it would not affect the global gap estimate. Note that sometimes unallocated assets can also be negative. Distributing them to individual countries can thus cause negative corrections of bilateral CPIS assets (see column 4, table A1).

Second, some CPIS-reporting countries have not always reported their data. To fill the gaps, we use each country's share in total CPIS-countries' assets in reporting years and apply it to the totals in missing years. This produces some upward corrections mostly in the early years of the panel or in the last year which are included in column 4 of table A1.

Netherlands SFIs Zucman (2013) upgrades assets and liabilities reported by the Netherlands because at the time, special financial institutions (SFIs) were not, yet, included in the CPIS. With the introduction of BPM6 in September 2014, the reporting requirements have changed and SFIs have been included. A comparison of the old and the most recent CPIS versions suggests that assets and liabilities of the Netherlands have been corrected backwards up until 2003. We just drop the correction for Dutch SFIs after 2002. The corrections for 2001 and 2002 are included in column 4, table A1.

A.6 Other corrections

Assets of non-CPIS countries The number of countries not reporting any data to the CPIS has decreased compared to Zucman (2013). We still need to estimate the private holdings and reserve assets for a number of non-reporting countries. We also need to estimate assets of CPIS-reporting countries for which reporting gaps are too long to just impute based on constant country shares. We fill the data gaps as follows:

- We use assets reported in the External Wealth of Nations (EWN) database for non-CPIS reporting countries and for countries with long reporting gaps.
- We estimate assets of non-CPIS, non-EWN countries based on derived liabilities from the CPIS. This concerns only very few jurisdictions.
- We estimate missing global reserves by assuming a fixed share of IMF-reported reserves to be held in portfolio securities with 74% held in debt and 1% in equity securities.

These corrections can be found in table A1, columns 11 and 12.

A.7 Global Aggregate Securities Liabilities

For portfolio liabilities we use the updated version of the External Wealth of Nations Dataset (EWN) constructed by Lane and Milesi-Ferretti (2018). The most recent version comprises external financial liabilities for more than 200 countries for the period 1970 to 2022. The EWN's coverage has improved compared to Zucman (2013), where the EWN covered 178 countries and reached until 2007 only so that 2008 liabilities needed to be estimated. We still make the following corrections to the EWN liabilities:

- We add creditor-derived liabilities when countries are included in the EWN but with gaps (tabke A2, column 3).
- As in Zumcan (2013), we add liabilities of Dutch SFIs but only for the years 2001 and 2002 (table A2, column 4). For the later years, SFIs are now in included in the EWN.
- We use CPIS-derived liabilities if these are higher than the liabilities reported in the EWN (table A2, column 5)
- We correct the Cayman Islands' liabilities as described in section A.2. (table A2, column 6)
- We estimate the liabilities of non-EWN countries as creditor-derived liabilities based on our corrected assets (table A2, columns 7 and 9).
- We add liabilities of international organisations. We obtain their debt liabilities from the Bank of International Settlement (BIS) and their equity liabilities are creditor-derived from the CPIS (table A2, column 10).

A.8 Differences between the original and the reproduced assets-liabilities gap 2001-2008

Based on the updated and new data sources, we replicate the estimation of the assets-liabilities gap for the years 2001-2008 as in Zucman (2013) and extend the calculation to 2021 which is the last currently available CPIS year. Despite following the same methodology, the assets-liabilities gap deviates slightly from the original estimates. Most notably, our gap is higher in 2001, 2002, 2006, and 2007 and lower in 2008. This can be explained by data revisions: The difference in 2001 and 2002, is due to a higher estimated discrepancy in debt assets. This is due to revised U.S. debt liabilities in the EWN dataset which exceed the liabilities in the old EWN by about $200 billion in both years. In 2007, the debt liabilities of the United Kingdom were revised upwards by roughly $100 billion. Also, the equity liabilities of the United Kingdom were revised upwards by $200 and $300 billion in 2006 and 2007. Similarly, Germany's equity liabilities were revised upwards by roughly $100 and $200 billion in the same years, respectively. As a result, the equity discrepancy of "other" countries (Table A3, column 11) is higher in 2006-2007 than in the Zucman (2013) version. In addition, the older version of the EWN dataset

reached only until 2007 so that liabilities had to be estimated based on countries international investment positions or by extrapolation. With the new data available, the debt liabilities of Germany, for example, shrink by roughly $ 100 billion in 2008 which leads to a narrowing of the assets-liabilities gap for investments in Germany.

B Update of AJZ (2018)

B.1 Portfolio securities and fiduciary deposits in Switzerland.

Our estimation of offshore wealth in Switzerland is the sum between fiduciary deposits and securities. For fiduciary deposits, we use the Swiss National Bank's *Monthly Banking Statistics*[10]. It discloses comprehensive monthly amounts of fiduciary liabilities in Swiss franc (CHF) at the bank-office level. We convert them to dollars using SNB's monthly foreign exchange rates[11]. For Switzerland securities, we take year-end amounts of securities holdings in bank custody accounts (non-resident custody account holders and foreign issuers)[12]. We adjust for a less than exhaustive coverage of the SNB's monthly survey by multiplying amounts by $\frac{1}{0.968}$ [13]. We correct for the total number of securities by adding Swiss securities belonging to foreigners and foreign securities wrongly attributed to Switzerland. The former is estimated to be $77 billion[14] in 2011, while the latter is estimated to be $100 billion in 2013. We assume both follow the evolution of foreign securities belonging to foreigners since then.

Bank-office level fiduciary deposits. Statistics taken from the SNB data are established at the parent company level consolidation principle, which excludes deposits invested by a parent company in one of its subsidiaries. For instance, UBS Switzerland could invest deposits in UBS Jersey. To account and correct for this, we propose to multiply each country deposits by a ratio derived from aggregate totals deposits of each consolidation method[15]. As this adjustement is the same for all amounts, it doesn't change our results on the ownership of offshore wealth in Switzerland.

B.2 Distribution of offshore wealth in Switzerland

Data source. We utilize the Swiss National Bank's *Annual Banking Statistics* survey data, which provides a country breakdown of comprehensive year-end statistics displaying fiduciary liabilities at the consolidated parent company level. Since 1987, banks with at least one foreign branch in Switzerland have been required to report fiduciary accounts, excluding banks in the Principality of Liechtenstein. Notably, there are instances of discrepancies in this SNB data. This is particularly relevant considering the dataset previously used to estimate offshore wealth in Switzerland by Alstadsæter, Johannesen, and Zucman (2018) from *Banks in Switzerland*

[10] Downloaded from `https://data.snb.ch/en/warehouse/BSTA/facets`.

[11] See `https://data.snb.ch/fr/topics/ziredev/doc/explanations_ziredev`.

[12] Series are taken from `https://data.snb.ch/en/topics/banken/cube/bawebedomsecwja`.

[13] Computation for this correction factor can be found in the file `https://gabriel-zucman.eu/files/Zucman2013LivreSuisse.xlsx`.

[14] The discrepancy between Swiss-reported portfolio liabilities and CPIS creditor-derived liabilities.

[15] Ratio between bank office level consolidation and parent company level consolidation.

and *Monthly Statistical Bulletin*[16] publications, which are no longer issued since June 2020 and August 2015, respectively. These discrepancies arise from administrative changes and the absence of certain countries. Nonetheless, for years predating the cessation of data publication by the SNB, the fiduciary deposit amounts remain consistent in both the previous and new series.

The Netherlands Antilles. The dissolution of the Netherlands Antilles in 2010 led to its division into Curaçao, Sint Maarten, and Bonaire, Sint Eustatius, and Saba. Consequently, the Swiss National Bank's data is incomplete for the period before 2012, as it does not account for fiduciary deposits owned by these entities. Furthermore, the Netherlands Antilles no longer exists as a single jurisdiction in the SNB data. We incorporate a former version of the Swiss fiduciary deposits dataset in order to include the Antilles, France, St. Kitts and Nevis, and some other countries that are absent from the current available version.

Liechtenstein. Liechtenstein was initially classified as a foreign country, but this status changed in 1984. Therefore, Liechtenstein is absent of the Swiss National Bank data series and its deposits are considered Swiss-owned. Particularly, during this period, it stood as the largest foreign holder of deposits among the countries considered. Following this change, deposits originating from Liechtenstein were considered as Swiss deposits in the dataset. For the period subsequent to 1984, we compute deposits stemming from Liechtenstein as 45% of the total Swiss-owned[17] fiduciary deposits. This computation is derived from the proportion of Liechtenstein deposits within the combined deposits of both Liechtenstein and Switzerland in the year 1983.

Distribution of offshore wealth in Switzerland. Analyzing the distribution of fiduciary deposits by location is the most reliable method for estimating the proportion of offshore wealth managed by Swiss banks that belongs to specific geographical regions. Table B.1 provides the 1987-2022 distribution of fiduciary deposits by country group of ownership. These country groups align with the definitions used by Zucman (2013):

- Tax Havens: Andorra, Antigua and Barbuda, Aruba, Bahamas, Bahrain, Barbados, Belize, Bermuda, Bonaire, Sint Eustatius and Saba, British Antilles, British Overseas Territories, Cayman Islands, China, Hong Kong Special Administrative Region, Costa Rica, Curacao, Cyprus, Dominica, Faeroe Islands, Gibraltar, Grenada, Guernsey, Isle of Man, Jersey, Lebanon, Liberia, Liechtenstein, Luxembourg, Macao, Malaysia, Malta, Marshall Islands, Mauritius, Monaco, Nauru, Netherlands Antilles[18], Palau, Panama, Saint Lucia, Saint Vincent and the Grenadines, Samoa, San Marino, Seychelles, Singapore, Sint

[16] See previous editions of Banks in Switzerland `https://www.snb.ch/en/iabout/stat/statrep/statpubdis/id/statpub_bankench`. and Monthly Statistical Bulletin `https://www.snb.ch/en/iabout/stat/statrep/statpubdis/id/statpub_statmon_arch`.

[17] In fact, nearly 100% of the fiduciary deposits labeled as "Swiss-owned" may indeed have foreign beneficial owners.

[18] Following the dissolution of the Netherlands Antilles, Curaçao and Sint Maarten became autonomous while Bonaire, Sint Eustatius and Saba became municipalities of the Netherlands. We include these islands as distinct entities from 2012 onwards. We incorporate fiduciary deposits owned by Netherlands Antilles from 1987 to 2008.

Maarten (Dutch part), St. Kitts and Nevis, Turks and Caicos Islands, Uruguay, Vanuatu, West Indies UK.

- Europe: Albania, Austria, Belarus, Belgium, Bosnia and Herzegovina, Bulgaria, Croatia, Czech Republic, Denmark, Estonia, Finland, France, German Democratic Republic, Germany, Greece, Holy See, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Macedonia (former Yugoslav), Moldova (Republic of), Netherlands, Norway, Poland, Portugal, Romania, Montenegro, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Tchecoslovakia, Ukraine, United Kingdom of Great Britain and Northern Irealand, Yugoslavia.

- Middle East: Egypt, Iran, Iraq, Israel, Jordan, Kuwait, Oman, Qatar, Saudi Arabia, State of Palestine, Syrian Arab Republic, United Arab Emirates, Yemen.

- Latin and South America: Argentina, Bolivia, Brazil, Chile, Colombia, Dominican Republic, Ecuador, El Salvador, Falkland Islands, Guatemala, Haiti, Honduras, Mexico, Nicaragua, Paraguay, Peru, Venezuela.

- Asia: Afghanistan, Armenia, Australia, Azerbaijan, Bangladesh, Bhutan, Brunei Darussalam, Cambodia, China, Fiji, French Polynesia, Georgia, India, Indonesia, Japan, Kazakhstan, Kiribati, Korea (Democratic People's Republic of), Korea (Republic of), Kyrgyzstan, Lao People's Democratic Republic, Maldives, Micronesia (Federal States of), Mongolia, Myanmar, Nepal, New Caledonia, New Zealand, Pakistan, Papua New Guinea, Philippines, Russian Federation, Solomon Islands, Sri Lanka, St Helen, Taiwan, Tajikistan, Thailand, Timor-Leste, Tonga, Turkey, Turkmenistan, Tuvalu, USSR, United States Minor Outlying Islands, Uzbekistan, Viet Nam, Wallis and Futuna Islands.

- Africa: Algeria, Angola, Benin, Botswana, Burkina Faso, Burundi, Cabo Verde, Cameroon, Central African Republic, Chad, Comoros, Congo, Congo (Democratic Republic of), Côte d'Ivoire, Djibouti, Equatorial Guinea, Eritrea, Ethiopia, Gabon, Gambia, Ghana, Guinea, Guinea-Bissau, Kenya, Lesotho, Libya, Madagascar, Malawi, Mali, Mauritania, Morocco, Mozambique, Namibia, Niger, Nigeria, Rwanda, Sao Tome and Principe, Senegal, Sierra Leone, Somalia, South Africa, South Sudan, Sudan, Swaziland, Togo, Tunisia, Uganda, United Republic of Tanzania, Western Sahara, Zambia, Zimbabwe.

- North America: Canada, United States of America.

- Caribbean: Cuba, Greenland, Guyana, Jamaica, Suriname, Trinidad and Tobago.

B.3 Bank deposits in Tax Havens other than Switzerland

Data source. We take the Bank for International Settlements (BIS) *Locational Banking Statistics* quarterly survey data, which provides a country breakdown of cross-border positions, by nationality of reporting bank and sector of counterparty. Since 1977, active banks have been required to report information about the geographical and currency structure of their assets and liabilities. While countries are required to report data on their banks, they are only encouraged to report the country breakdown of these bank deposits. Thus, key discrepancies appear in

the reporting practices. For instance, banks in the Cayman Islands do not report the country breakdown of their deposits.

B.4 Tax haven categories

We identify two haven categories in the BIS data. Firstly, some countries do report both the overall cross-border position of all countries on their bank deposits and the country breakdown (for some years, at the very least). These countries are:

- Guernsey, Hong Kong, Isle of Man, Jersey, Macao, the United Kingdom, the United States, Luxembourg, Chile, Belgium, and Austria.

Secondly, some countries do report the cross-border position of all countries on their bank deposits, but not the country breakdown. These countries are:

- Bahamas, Bahrain, Bermuda, Cayman Islands, Curaçao, Cyprus, Malaysia, Netherlands Antilles, Panama, Singapore.

Allocation across counterparty countries. To obtain bilateral deposits from the second category of tax havens, we make assumptions. For Cyprus, we assume that 90% of the bank deposits belong to Russia, while 10% belong to Greece. For Cayman Islands, we assume 100% of the deposits belong to the United States savers. For the other havens that fall under the second category, we create an aggregate Residual Countries, which is computed by substracting the amount in countries with bilateral deposits from the amount in all BIS reporting countries. We then take shares of each counterparty country in the residual countries aggregate to allocate the overall amounts of Singapore, Bermuda, Bahamas, Bahrain, Netherlands Antilles, Panama, and Malaysia. It should be noted that some countries do not publish bilateral deposits in certain years (e.g. Hong Kong, in 2007) and we apply the same methodology of allocation for the relevant ones. Additionaly, Bermuda, Chile, and Panama started reporting to the BIS in 2002, we assume their deposits in 2001 are equal to those in 2002. Finally, Cyprus only started reporting in 2008, we assume that their deposits follow the evolution of aggregate deposits of European havens backward.

B.5 Global Offshore Wealth Distribution

Data construction. In constructing the global offshore wealth distribution, firstly, we assume that a fraction[19] of tax havens' non bank deposits are owned by tax evading households. Secondly, we assume that the fraction owned by countries in swiss fiduciary deposits mirrors the the country shares of offshore wealth in Switzerland. We construct several tax haven country groups, namely:

- Asian Havens, composed by Hong Kong, Singapore, Macao, Malaysia, Bahrain, Bahamas, Bermuda, Netherlands Antilles, Curaçao.

[19]This fraction is heteregeneous across tax havens.

- European Havens, composed by Guernsey, Isle of Man, Jersey, Luxembourg, Austria, Belgium, United Kingdom, Cyprus.
- Caribbean Havens, composed by Cayman Islands, Panama, United States of America, Chile.

Refined country share estimates. Employing moving averages, we mitigate the year-to-year fluctuations observed in offshore wealth distribution, resulting in more consistent country share estimates. We compute this moving average in year t by applying weights: 10% for $t-2$ and $t+2$, 20% for $t-1$ and $t+1$, and 40% for t itself. In instances where certain countries had missing data for some years, rendering the computation method infeasible, we simply rely on the share for the respective years (e.g, if we want an estimate for year t, $t+1$ being set as missing, we take the estimated share t). It is worth noting that we treat differently countries that experienced substantial fluctuations in their deposits (or in general, deposits in years at the border of our time series, i.e. 2001, 2002, 2021, and 2022). In such cases, we still employ a smoothing estimation, utilizing the available data (we put weight on available years, and we harmonize by dividing by the relevant factor).

Offshore wealth time series. We utilize these improved estimates of country shares to allocate the portion of evaded non-bank deposits in each haven group and fiduciary deposits held in Switzerland. This process allows us to develop consistent and homogeneous time series of offshore wealth, covering the period from 2001 to 2021.