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**JEL Codes: F32, H26, H87**

**Keywords: Tax havens, International investment positions, Global imbalances**

# THE MISSING WEALTH OF NATIONS: ARE EUROPE AND THE U.S. NET DEBTORS OR NET CREDITORS?

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## Abstract

This paper shows that official statistics substantially underestimate the net foreign asset positions of rich countries because they fail to capture most of the assets held by households in offshore tax havens. Drawing on systematic anomalies in portfolio investment positions and a unique Swiss dataset, I find that 8% of the global financial wealth of households is held in tax havens, 6% of which goes unrecorded. On the basis of plausible assumptions, accounting for unrecorded assets turns the eurozone, officially the world's second largest net debtor, into a net creditor. It also reduces the U.S. net debt significantly. The results shed new light on global imbalances and challenge the widespread view that, after a decade of poor-to-rich capital flows, external assets are now in poor countries and debts in rich countries. I provide concrete proposals to improve international investment statistics.

**Keywords:** Tax havens, International investment positions, Global imbalances

**JEL classifications:** F32, H26, H87.

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\*A detailed data appendix is available online at <http://www.parisschoolofeconomics.eu/en/zucman-gabriel/>. All comments are welcome (zucman@pse.ens.fr).

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# I. Introduction

There are two puzzles in international investment statistics. The first is a set of statistical anomalies. At the global level, liabilities tend to exceed assets: the world as a whole is a net debtor (Lane and Milesi-Ferretti, 2007). Similarly, the global balance of payments shows that more investment income is paid than received each year. Since the problem was identified in the 1970s, the International Monetary Fund has commissioned a number of reports to investigate its causes, and national statistical agencies have put considerable resources into improving their data. Yet despite a great deal of progress, large anomalies remain. Many European equities, in particular, have no identifiable owner (Milesi-Ferretti, Strobbe, and Tamirisa, 2010).

The second puzzle is a theoretical challenge. Since the latter half of the 1990s, capital has been flowing from poor to rich countries. As a result, the rich world now appears to be a sizable net debtor in the official statistics, dragged down by the U.S. and Europe. While the literature has put forward possible explanations for the U.S. net debt and the rise in China's assets,<sup>1</sup> the negative net foreign asset position of Europe and the overall rich world remains largely unexplained. Despite this, many observers have grown accustomed to the view that external assets are now in poor countries and debts in rich countries. In the public debate, the view that "China owns the world" has become particularly popular. Should it be correct, the implications for policymaking and open-economy modeling would be far-reaching.

My paper challenges this view. The negative net foreign asset position of the rich world, I argue, is an illusion caused by tax havens. International investment statistics fail to capture most of the assets held by households in tax havens: they overlook the equity and bond portfolios that households own through banks in Switzerland, Singapore, and similar tax havens. This coverage gap explains most of the long-standing statistical anomalies in global accounts. My computations find that around 8% of households'

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<sup>1</sup>See Dooley, Folkerts-Landau, and Garber (2003), Bernanke (2005), Dollar and Kraay (2006), Engel and Rogers (2006), Caballero, Farhi, and Gourinchas (2008), Mendoza, Rios-Rull, and Quadrini (2009), Carroll and Jeanne (2009), Ma and Haiwen (2009), Obstfeld, Shambaugh, and Taylor (2010), Aguiar and Amador (2011), Song, Storesletten, and Zilibotti (2011), and Alfaro, Kalemli-Ozcan, and Volosovych (2011) among others.

financial assets are held in tax havens, 6% of which go unrecorded. This stock of unrecorded assets is double the recorded net debt of the rich world (Figure I). Accounting for tax havens turns the rich world into a net creditor, as a body of evidence suggests that most of the funds in tax havens belong to residents of rich countries, especially to Europeans. Thus, despite a decade of global imbalances, external assets are still in rich countries overall: China does not own the world yet. Back in the 1980s-1990s, the rich world had a large positive net position; over the last decade, it has eaten some of its claims away; but today, poor countries are still repaying their debts to rich countries. Taking a global perspective on external positions, the net foreign wealth of the rich world and the poor world seem to converge, as if output convergence went hand in hand with wealth convergence – a plausible yet far from systematic outcome in standard models.

These findings have direct implications for core issues in international macroeconomics. On the basis of plausible assumptions, accounting for tax havens turns the eurozone, officially the world's second largest net debtor, into a net creditor. It also improves the U.S. net foreign asset position. Now, the net foreign asset position is a key state variable in dynamic macroeconomic models. Accurate net positions are essential to assess the merits of the different views put forward on the causes of global imbalances. They are important to monitor financial stability. A large body of literature has questioned the sustainability of global imbalances.<sup>2</sup> If indeed the net positions of Europe and the U.S. are better than in the official statistics, the required international adjustment is smaller than commonly thought. Domestic imbalances and public finance issues may be more serious today for rich countries than global imbalances: rich countries taken as a whole are rich, but some of their wealthiest residents hide part of their assets in tax havens, which contributes to making governments poor.

The paper has three main goals: to explain how the stock of unrecorded assets held in tax havens can be estimated; to provide evidence as to the likely owners of these assets; and to address the implications for global imbalances of accounting for tax havens.

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<sup>2</sup>See Obstfeld and Rogoff (2005), Blanchard, Giavazzi, and Sa (2005), Gourinchas and Rey (2007), the papers in Clarida (2007), Curcuru, Dvorak, and Warnock (2008), and Blanchard and Milesi-Ferretti (2009) among others.

To estimate the amount of unrecorded assets in tax havens, I first explain why these assets cause anomalies in international investment statistics, especially in portfolio securities data (Section II). Households do not open bank accounts in Switzerland and Singapore to place their funds in low-yield bank deposits. Through their bank accounts in tax havens, they invest in portfolio securities. But when a French household owns a U.S. equity through a Swiss bank, France underestimates its foreign assets, because Swiss banks do not exchange data with French statisticians. U.S. statisticians duly record a foreign liability: they are aware that a foreign resident owns a U.S. equity. Switzerland, which is simply a conduit, records nothing. Thus, more equity liabilities than assets are recorded worldwide, and equity liability figures published by the U.S. are greater than the holdings of U.S. equities reported by the rest of the world.

I exploit these anomalies to shed light on the wealth held by households in tax havens. Until recently, observable anomalies in portfolio statistics were hard to interpret because the statistics were insufficiently harmonized. My approach relies on harmonized stock data that have become available since 2001 thanks to the IMF Coordinated Portfolio Investment Survey (CPIS). I derive new estimates for non-CPIS participating countries in order to build the first ever fully comprehensive bilateral portfolio asset database (Section III). This database enables to measure the wealth held by households in tax havens globally and to know where it is invested.

The comprehensive database reveals a set of large, persistent, and internally consistent anomalies (Section IV). Identifiable equity and bond assets fall short of liabilities each year. At the end of my sample (2008), the discrepancy amounts to \$4,500bn. The gap is particularly large for equities because a considerable fraction of the equities issued by Luxembourg, Ireland, and the Cayman Islands have no identifiable owner. These anomalies have a simple explanation: through their accounts in Switzerland and similar tax havens, households invest in mutual funds incorporated in Luxembourg, Ireland, and the Cayman Islands, the three countries where most mutual funds are incorporated. Hence, I estimate, in 2008 households held in tax havens \$4,500bn – 6% of their financial assets – in the form of unrecorded portfolios of securities, the bulk of which were composed

of mutual fund shares. In addition, they held in tax havens 2% of their financial wealth in the form of bank deposits, which are partially recorded in international statistics.

Who owns the unrecorded portfolios of securities? To investigate this issue, I draw on a unique and previously unused Swiss dataset (Section V). For years, the Swiss National Bank has published the value of the portfolios held by foreigners in Swiss banks and it has provided valuable information on which countries' residents own Swiss bank accounts. The Swiss data are fully consistent with what the anomalies in global portfolio positions reveal. They show that about one-third of the portfolios missing from the international statistics are managed in Switzerland. Contrary to popular belief, the majority of Swiss bank accounts belong to rich countries' residents. Around half belong to eurozone residents.

Although we do not know if the same holds true in other tax havens such as Luxembourg or the Cayman Islands, we can propose a number of scenarios as to how unrecorded assets affect published international investment positions (Section VI). These scenarios are necessarily speculative. In all plausible scenarios, however, accounting for tax havens turns the eurozone into a net creditor over the 2001-2008 period. It also improves the U.S. net foreign asset position – albeit by a smaller amount – and shifts upwards the pre-2001 net positions of rich countries, which sheds new light on global imbalances.

Unrecorded assets held in tax havens can explain the portfolio data anomalies, but residual anomalies still remain in other international statistics (Section VII). Since 2004, in particular, the world has been running a large trade surplus. I argue that the residual anomalies probably come from errors in the statistics on the developing countries. When accounting for unrecorded assets in tax havens and purging global accounts of all their other anomalies, the most likely scenarios still make the eurozone and the rich world net creditors. Based on the key anomalies identified in this research, the conclusion makes concrete proposals to improve international investment statistics (Section VIII).

In addition to the large body of literature on global imbalances, this paper ties in with three strands of the literature. First, it adds to the literature on the empirics of external wealth. International investment statistics are reputed to be particularly challenging:

measurement errors are known to be substantial and the conceptual questions are huge. Hausmann and Sturzenegger (2007) and McGrattan and Prescott (2010) question the puzzling net debt of the U.S., stressing the role of unrecorded intangible capital. Curcuro, Dvorak, and Warnock (2008) show that accounting for inconsistencies within the set of U.S. statistics is critical to computing accurate returns on cross-border investments.

Second, the paper contributes to the literature on tax havens and capital flight that developed in the 1980s (Dooley, 1988) with a focus on developing countries (Boyce and Ndikumana, 2001; Collier, Hoeffler, and Patillo, 2001). Authors in this field draw on discrepancies within a country's balance of payments to capture potentially unrecorded outflows (see Roine and Waldenström (2009) for a recent application in Sweden). I depart from this approach by focusing on inconsistencies between countries rather than within countries, on stock positions rather than on flows, and on a well-identified kind of wealth: portfolio equities and bonds.

Last but not least, the paper is related to, and partly motivated by, the recent articles that study the evolution of top income shares around the world (Atkinson, Piketty, and Saez, 2011) and the global distribution of wealth (Davies et al., 2011). So far, tax havens have been ignored by this literature.<sup>3</sup> My macro-based estimate of the funds held in tax havens could be used as a first step to include these funds into micro-based estimates of income and wealth distributions.

## II. Tax Havens Cause Anomalies in International Statistics

### II.A. How Foreign Securities Should be Recorded in Principle

First, let's look at the basic statistical concepts that will be used throughout the paper. A country's foreign assets and liabilities are recorded in its international investment position (IIP). The IIP is the stock equivalent of the financial account of the balance of payments: the IIP shows the stock of existing cross-border investments at the end of each year, while

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<sup>3</sup>An exception is Dell, Piketty, and Saez (2007) who use Swiss tax data to put an upper bound on the amount of capital income earned in Switzerland by non-resident taxpayers. Tax data, however, are not an appropriate source in this case, because the bulk of income earned by foreigners in Switzerland does not have to be declared to Swiss tax authorities.



the financial account of the balance of payments shows the flow of new investments that have occurred over the year.

On the asset side of the IIP, there are four broad categories of investments: direct investments (holdings of over 10%), portfolio investments (equity and debt securities that do not qualify as direct investment), other assets (mainly loans and deposits), and reserve assets (gold, deposits, and securities held by central banks). The same categories appear on the liability side of the IIP, except that there is no “reserve” line. In this paper, we will focus on the securities held as portfolio or reserve assets. We will denote  $A_{ij}$  the amount of securities issued by country  $j$ , owned by residents of country  $i \neq j$ , excluding all the securities held as “direct investment,” but including the fraction of  $i$ ’s reserve assets invested in securities.  $A = \sum_i \sum_j A_{ij}$  is simply the stock of all traded equities and bonds whereby the issuer and the owner are in two different countries.<sup>4</sup> At the end of 2008, as shown by Table I, cross-border securities amounted to \$40tr (65% of world GDP). Securities accounted for about one-half of all cross-border investments, which totaled \$90tr (146% of world GDP).

To measure  $A_{ij}$ , the data collection system of each country  $i$  covers some agents directly and others indirectly (IMF, 2002). Banks, investment funds, and insurance companies are direct reporters. They provide data on their own holdings (i.e., on the foreign securities that are on their balance sheets) and on their clients’ holdings (i.e., on the foreign securities that are off their balance sheets, but that they can observe). Governments and nonfinancial corporations above a certain size threshold are also direct reporters. By contrast, households are indirectly covered, for practical reasons. Their holdings are reported by banks, investment funds, and insurance companies. Trusts, personal wealth-holding companies, and other small nonfinancial corporations are indirectly covered as well. For the purpose of this paper, the best way to deal with them is to include them in the household sector. Thus, we can write  $A_{ij}$  as the sum of the foreign securities owned

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<sup>4</sup>For instance,  $A$  includes the U.S. bonds held by French insurance companies (which are classified as portfolio assets for France and portfolio liabilities for the U.S.) and the U.S. bonds held by the Chinese central bank (which are classified as reserve assets for China and portfolio liabilities for the U.S.). But it excludes the equity holdings by U.S. multinational corporations in their Chinese subsidiaries (which are classified as direct investments in both countries).

by the directly covered agents ( $a_{ij}$ ) and by households ( $\tilde{a}_{ij}$ ):  $A_{ij} = a_{ij} + \tilde{a}_{ij}$ . For instance, an equity issued by a U.S. ( $j$ ) corporation and held by a household living in France ( $i$ ) is part of  $\tilde{a}_{ij}$ .

Investors entrust their portfolios to domestic or to foreign banks for custody. Through to the 1960s, all securities existed in the form of paper certificates and certificates were deposited in safe places such as bank vaults. Keeping their clients' certificates safe was the custodians' job. Today, paper has been replaced by electronic records, but investors still use custodian banks as book-keepers and for other low valued-added services.<sup>5</sup> Securities kept by custodian banks on behalf of third parties do not appear on the banks' balance sheets: securities custody is one of the oldest, simplest, and largest off-balance sheet businesses for banks. Let's denote the custodian's country of residence with a superscript letter:

$$A_{ij} = \sum_k A_{ij}^k = \sum_k (a_{ij}^k + \tilde{a}_{ij}^k) = \underbrace{[a_{ij}^i + \tilde{a}_{ij}^i]}_{\text{onshore}} + \underbrace{\sum_{k \neq i} (a_{ij}^k + \tilde{a}_{ij}^k)}_{\text{offshore}}$$

In most cases, a French resident who invests in U.S. equities will use a French custodian bank. We will say, in this case, that it uses an onshore custodian. In some cases it will use a foreign custodian bank, for instance in Switzerland. We will say that it uses an offshore custodian.

Offshore custodians provide high value-added financial services to wealthy households, such as investment advice and tax planning. They also provide opportunities to evade taxes. In non-haven countries, domestic custodians automatically report the investment income earned by their clients to the tax authorities. Such third-party reporting makes tax evasion impossible. By contrast, haven-based banks do not generally report any information to tax authorities, making tax evasion possible. Taxes can be collected only if taxpayers choose to self-declare the investment income they have earned offshore. Cross-border custody for households is a service offered only by tax havens, although not all tax havens offer it.<sup>6</sup>

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<sup>5</sup>For a description of the securities custody industry, see Chan et al. (2007).

<sup>6</sup>Tax havens host a great deal of activities: many investment funds and financial vehicle corporations

International investment statistics work on the basis of the residence principle (IMF, 1993). The residence principle states that a security issued by the U.S. and held by a French resident through a Swiss bank must be recorded as an asset for France on the U.S. and a liability for the U.S. vis-à-vis France. The location of the custodian is irrelevant.

## II.B. How Foreign Securities Are Recorded in Practice

In practice, offshore custody causes systematic errors in published statistics. To see why, consider what statisticians are able to measure.

First, in France (country  $i$ ), all U.S. securities belonging to French banks, investment funds, and insurance companies are directly declared to French statisticians, whether they are held in France or offshore. Capturing U.S. securities held by households in France is easy too: French statisticians simply ask French custodians to report them. But when French households use Swiss custodians, their assets cannot be captured by surveying French banks. They go unrecorded in France: this is a blind spot for international statistics. The blind spot is well known among international statisticians, though they do not try to estimate it (see, for instance, European Central Bank, 2002, p. 8). Let's denote with a hat French statisticians' estimations. I assume that all foreign securities held by direct reporters are accurately measured along with all foreign securities held onshore by households:<sup>7</sup>

$$\forall k \quad \hat{a}_{ij}^k = a_{ij}^k \text{ and } \hat{\tilde{a}}_{ij}^i = \tilde{a}_{ij}^i \quad (\text{H1})$$

Second, in Switzerland (country  $k$ ), domestic banks are asked to report on the securities that they hold in custody. Swiss statisticians observe that Swiss banks hold some U.S. securities belonging to French residents in custody. In keeping with the residence principle, Swiss statisticians disregard these holdings when they compile Switzerland's international investment position. Table II shows that, in 2004, there were 2.4 times

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are incorporated offshore; non-financial corporations also use tax havens for treasury operations or group insurance, etc. Some of these activities do have legitimate roles. My paper only deals with one particular kind of tax haven activity: cross-border personal wealth management.

<sup>7</sup>There are known issues with available asset data, so in practice assumption (H1) does not always hold. Section IV.C. discusses how relaxing this assumption affects the results.

more foreign (i.e., non-Swiss) securities in custody in Swiss banks than recorded in the Swiss IIP. This means that two-thirds of the foreign securities in the Swiss banks vaults belonged to foreigners, while only one-third belonged to Swiss residents. By contrast, there were almost as many foreign securities in custody in French banks as recorded in the French IIP.

Lastly, in the U.S. (country  $j$ ), statisticians easily measure the portfolio liabilities of the U.S. ( $L_j$ ). Few agents issue securities – households do not – and this is standard balance sheet information. Identifying whether U.S. securities are held by U.S. or by foreign residents is quite simple, because securities markets are highly centralized. In a nutshell, all traded securities issued by the U.S. are kept by the U.S. central securities depository, the ultimate book-keeper where all settlements take place. Most foreign-owned securities can thus be directly observed by U.S. statisticians.<sup>8</sup> Accordingly, I assume that estimates of portfolio liabilities ( $\hat{L}_j$ ) are accurate.

$$\hat{L}_j = L_j = \sum_i A_{ij} \tag{H2}$$

## II.C. How Transfers of Funds to Tax Havens Are Recorded

The major international banks provide offshore custody services through their subsidiaries in tax havens. Banks in tax havens also provide brokerage services – they buy and sell securities on behalf of their clients – and wire transfer services – they can receive funds from abroad and send funds abroad. To analyze how these operations are recorded in balance of payments statistics, let’s consider the case of a French person who transfers funds from France to Switzerland.

There are basically two ways funds can be sent from France to Switzerland. The simplest way is a wire transfer. Following the double-entry bookkeeping system used in balance of payments accounting, a wire transfer from France to Switzerland must be recorded twice in the French balance of payments: both as an “other investment” credit (funds flow from a French bank to a Swiss bank) and an “other investment” debit (a

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<sup>8</sup>See Bertaut, Grier, and Tryon (2006) for more details. Section IV.C. discusses how identified issues with liability figures affect the results.

French person purchases a Swiss asset, namely a Swiss bank deposit).<sup>9</sup> In practice, an “other investment” credit will be recorded – interbank flows of funds are easy to capture. But French statisticians may fail to record the balancing debit: trillions of cross-border wire transfers are made each year; identifying which transfers correspond to households purchasing Swiss bank deposits is extremely challenging. On that matter, practices differ across countries; some do a better job than others. If French statisticians fail to record a debit when a French individual transfers funds to Switzerland, then they will record negative “net errors and omissions” in order to balance total credits and debits.

Second, a French person can transfer funds to Switzerland by carrying banknotes, gold, or diamonds over the border. Such transfers will not be recorded anywhere in the balance of payments. Funds legally earned are unlikely to be massively transferred this way but funds illegally earned may well be, in which case the flows of funds to tax havens and the stocks of offshore assets will both go fully unrecorded in French statistics.

Once the funds are in Switzerland, let’s say that they are used to purchase U.S. equities. French statisticians will know nothing of this purchase: they will not be able to record any transaction. Swiss statisticians will observe that a French person sells a Swiss bank deposit, so they will record an “other investment” debit. They will also observe funds flowing from Switzerland to the U.S., so they will record an “other investment” credit. But they will notice that the buyer of the U.S. equities is not a Swiss person, so in keeping with the residence principle they will not record any equity purchase.

## II.D. Tax Havens Cause Stock and Flow Anomalies

We can now see that we are bound to observe a series of inconsistencies in international investment statistics. First, tax havens cause two related anomalies in stock data.

**Anomaly 1:** *More cross-border liabilities than assets are recorded globally.*

Total cross-border security assets should equal liabilities, but the securities that households entrust to offshore custodians are recorded nowhere as assets. Because of tax havens, more security liabilities will be recorded than assets.

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<sup>9</sup>In the financial account of the balance of payments, credits denote a reduction in assets or an increase in liabilities, while debits denote an increase in assets or a reduction in liabilities.

**Anomaly 2:** *For a given country  $j$ , debtor-reported liabilities  $L_j$  are greater than creditor-derived liabilities  $\sum_i \hat{A}_{ij}$ .*

The second anomaly is a corollary of the first one: when a French household owns a U.S. equity through a Swiss bank, this asset on the U.S. is recorded neither by France (wrongly) nor by Switzerland (rightly), but is duly recorded by the U.S. as a liability. Portfolio liabilities recorded by the U.S. will be greater than the sum of all U.S. security holdings recorded by the rest of the world.

Tax havens also cause anomalies in flow data.

**Anomaly 3:** *More cross-border dividends and interest are paid than received globally.*

Because position data are usually considered more reliable than financial flow data (Curcuro, Thomas, and Warnock, 2009), statisticians compute dividends and interest income by applying representative yields to observed stock positions.<sup>10</sup> If some securities are missing from stock statistics, the interest and dividends paid by these securities will be missing from the flow statistics. More investment income will be paid than received globally.

**Anomaly 4:** *More cross-border securities tend to be sold than purchased globally.*

When a French household buys a U.S. equity through a Swiss account, the U.S. records a sale but Switzerland does not record a purchase and France cannot record a purchase: more cross-border securities are sold than purchased globally.

**Anomaly 5:** *In individual countries' statistics, there are "net errors and omissions" or discrepancies between cumulated flows and stock positions.*

When statisticians fail to identify as such the wire transfers made by French residents to their offshore accounts, this causes negative "net errors and omissions" in the French balance of payments. When transfers to tax havens are duly recorded but French residents invest in portfolio securities from their offshore accounts, the flow data (in the financial account of the French balance of payments) are accurate but the position data (IIP) are not: transfers of funds into tax havens cause a discrepancy between cumulated flows and stock positions. The discrepancy shows up as an "other change" in the statistics that

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<sup>10</sup>See for instance BEA (2011, p. 42) for the case of the U.S.

attempt to reconcile flows and stocks as per the identity  $\Delta Stocks = Flows + Valuation + OtherChange$ .

The anomalies in stock data can be used to measure the wealth held by individuals in tax havens. If asset data accurately capture the total assets of corporations, governments, and the onshore assets of households (assumption H1) and if liability data accurately capture portfolio liabilities (H2), then the global asset-liability discrepancy reveals the value of the portfolios held by households in tax havens. Similarly, the discrepancies between debtor-reported liabilities  $L_j$  and creditor-derived liabilities  $\sum_i \hat{A}_{ij}$  reveal in which countries  $j$  households invest through their offshore accounts – whether they own U.S. bonds or shares of mutual funds incorporated in Luxembourg. In the following, I focus on stock data to study households’ offshore wealth and show that most of the flow data are consistent with what the stock data reveal.

### III. A Comprehensive Dataset on Foreign Security Assets and Liabilities

To compute the value of the portfolios held by households in tax havens, we need aggregate security asset and liability figures for all countries. To know where households’ offshore portfolios are invested, we need in addition bilateral asset data. Accordingly, the dataset used in this research consists of:

- Sixteen  $238 \times 238$   $\hat{\mathbf{A}}_{ij}$  matrices that show the securities held by 238 creditors  $i$  on 238 debtors  $j$ . There is one matrix per year from 2001 to 2008 and per instrument (debt or equity). The 238 creditors and debtors considered are all the countries and territories of the world.<sup>11</sup>
- Sixteen  $238 \times 1$   $\mathbf{L}_j$  vectors that show the security liabilities of 238 debtors vis-à-vis the rest of the world.

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<sup>11</sup>My list also include all international organizations (the IMF, the World Bank, regional development banks, etc.). They form one single synthetic “territory.”

### III.A. Main Data Sources

The Coordinated Portfolio Investment Survey (CPIS) commissioned by the IMF is the main data source for the assets side. Conducted yearly since 2001, it presents the bilateral portfolio holdings of 74 countries (in 2008) on 238 debtors. It is rounded out by a survey of securities held as reserve assets, called SEFER, and by international organizations.

CPIS data have a number of key strengths for the purpose of this paper. The IMF has launched the CPIS precisely to solve the long-standing anomalies in international investment statistics, in response to a number of IMF reports (IMF, 1987; 1992). The CPIS has established comprehensive guidelines that have gone a long way towards harmonizing collection methods and spreading best practices (IMF, 2002). Leaving aside households' offshore assets, portfolio figures are quite easy to establish: securities markets are highly centralized; most countries have a long-standing tradition of monitoring custodians; and custodians observe all the securities held onshore. There is usually no valuation issue: traded stocks and bonds have readily available market prices. In most leading countries, portfolio asset data are now based on security-by-security accounting, allowing for extensive cross-checking.

There are known issues with the CPIS, however. Individual countries do not always follow the IMF guidelines. The U.S., for instance, does not currently count short positions as negative assets or liabilities, so reported asset and liability figures are slightly too high. The same problem probably exists in other countries. There are some valuation issues with asset-backed securities (ABS): when partial repayment of a debt security is possible, as is the case for ABS, some custodians keep track of the original principal, others only of what is remaining.<sup>12</sup>

The main data source on the liabilities side is the updated and extended version of the External Wealth of Nations dataset constructed by Lane and Milesi-Ferretti (2007), which covers 178 economies. In the database, estimates of portfolio liabilities come from published IIPs or are derived by cumulating flows and adjusting for valuation effects. Aggregate liability figures for rich countries are generally considered reliable (Bertaut

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<sup>12</sup>As explained in Section IV.C, however, the limitations of the CPIS are of second-order importance for the paper's key results.



and Grier, 2004). Though liability figures are certainly not perfect, their identified shortcomings cannot explain the paper’s key results.<sup>13</sup>

The main data challenge is the incomplete coverage of the CPIS, because the non-participation of a number of countries  $i$  causes a discrepancy between debtor-reported liabilities  $L_j$  and creditor-derived liabilities  $\sum_i \hat{A}_{ij}$  independently from tax havens. So in order to isolate the anomalies caused by tax havens from those caused by incomplete country coverage, I have filled all the gaps in the CPIS. The resulting database allows to precisely identify the offshore portfolios of households.

### III.B. Filling the Coverage Gaps in the CPIS

Filling the coverage gaps in the CPIS does not pose major difficulties. The CPIS has an excellent coverage rate. It captures 93% of all cross-border securities at the beginning of my sample (2001) and 86% at the end (2008).<sup>14</sup> All the leading industrial countries and the large offshore financial centers participate in the CPIS – although one offshore center, the Cayman Islands, only reports on its banks’ portfolio holdings, disregarding its large hedge fund industry. To reach a 98-99% coverage rate throughout the 2001-2008 period, we only need to add data on four large non-reporters: China, Middle Eastern oil exporters, Taiwan, and the Cayman Islands’ hedge funds. The remaining 150 non-reporting economies have negligible holdings. Now, we have reasonably good information on the portfolios of the four large non-reporters, coming from an array of independent sources: official international investment positions, quasi-official statistics, central bank reports, counterpart country data, and previous studies. The online Appendix extensively describes the raw sources used to fill the gaps in the CPIS, presents all the computations line by line, provides consistency and robustness checks, and compares the results with other studies. Below are the essential building blocks.

First, we have a good idea of the total holdings of CPIS non-reporters, which is what we need to compute the offshore portfolios of households using the difference between

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<sup>13</sup>See section IV.C below. The Appendix Section B.2 describes minor corrections made to the External Wealth of Nations data. I have also derived new portfolio liability estimates for the few countries not covered by the External Wealth of Nations database, see Appendix Sections B.3 and B.4.

<sup>14</sup>See Appendix Table A1.

globally identifiable liabilities and assets. Admittedly, there are some uncertainties, but the combined uncertainty is one order of magnitude less than my estimate of households' offshore portfolios. We do know the value of China's and Taiwan's total assets, since both countries publish their international investment position.<sup>15</sup> The only unknown parameter is the asset allocation of their reserves. Wooldridge (2006) documents that on average central banks invest 75% of their assets in securities and 25% in bank deposits, so I assume that the central banks of non-SEFER countries, including Taiwan's, do the same.<sup>16</sup> Wooldridge (2006) suggests that the share of securities is probably higher in China, so I assume a 85% securities share for China. There is a \$100-200bn uncertainty surrounding China's portfolio and a 30\$bn uncertainty surrounding Taiwan's, which is negligible compared to my estimate of the offshore portfolios of households (\$4,500bn in 2008). We also have information on the Cayman Islands' hedge funds coming from official surveys and U.S. Treasury sources. Both sources provide consistent estimates, e.g. total Caymanian holdings of \$1.25tr at the end of 2008.<sup>17</sup>

Second, we have valuable information on the bilateral holdings of the four large CPIS non-reporters. We know that CPIS non-reporters invest a lot in the U.S., in particular in U.S. Treasury bonds. In 2010, for instance, a quasi-official Chinese newspaper revealed the complete allocation of China's reserves: two thirds are invested in U.S. bonds, around 25% in eurozone bonds, and the remainder in U.K. and Japanese bonds.<sup>18</sup> Importantly, there is no indication that non-CPIS countries invest massively in mutual funds. Hence CPIS non-reporters cannot explain the key anomaly that we will see in portfolio securities statistics: why the equity liabilities  $L_j$  reported by the countries  $j$  that host a large mutual

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<sup>15</sup>See Appendix Sections A.4 (China) and A.6.2 (Taiwan and other non-SEFER reporters).

<sup>16</sup>The list of SEFER participants is confidential, but we know that the CPIS and SEFER coverages overlap considerably: the IMF (2002b, p. 3) reports that "a total of 70 countries and jurisdictions [were] participating in the 2001 CPIS and were, except for one country and some non-reserve holding jurisdictions, participating in the 2001 SEFER." Accordingly, I assume that SEFER non-reporters are the same as CPIS non-reporters.

<sup>17</sup>Although there remains some uncertainty on the holdings of Cayman-based hedge funds, this uncertainty does not affect my estimate of households' offshore portfolios, because I use the same method to estimate the Cayman Islands' equity liabilities than to estimate its funds' assets. Thus, if my estimate of Caymanian fund assets is \$200bn too small, then my estimate of Caymanian equity liabilities is also \$200bn too small, leaving the global asset-liability discrepancy unchanged. See Sections A.2 and B.3.1 of the Appendix for more details on the Cayman Islands.

<sup>18</sup>See Gourinchas, Rey, and Truempter (2011) and Appendix Section C.1.2.

fund industry, such as Luxembourg, are considerably larger than their creditor-derived liabilities  $\sum_i \hat{A}_{ij}$ .

For less than 5% of global assets – e.g., the non-reserve portfolio of Taiwan, Croatia, Morocco or Peru; the non-U.S. assets of Cayman-based hedge funds –, we have little information on where these assets are invested. In this case, I use a gravity model to construct bilateral holdings. As shown by Lane and Milesi-Ferretti (2008), the gravity model fits cross-border portfolio stock data well.<sup>19</sup> Using the gravity model to estimate the portfolios of say Japanese ( $j$ ) securities held overall by a number of non-CPIS investors  $n$  is reasonable, because on average the gravity model is accurate.<sup>20</sup> We do not need more. In particular, we are not interested in the exact portfolios  $A_{nj}$  of each non-CPIS country  $n$ , but only in the aggregate holdings  $\sum_n A_{nj}$  of non-reporters. Because I only apply the gravity model to a small fraction of global assets, any error introduced by the model has negligible consequences for the paper’s main results.<sup>21</sup>

Middle Eastern oil exporters deserve special attention. Because they sometimes invest abroad through offshore banks in Switzerland or Singapore, it is quite hard to trace their holdings (Milesi-Ferretti, Strobbe, and Tamirisa, 2010). Against this backdrop, I choose to include all Middle Eastern oil exporters’ offshore assets in my unrecorded household offshore wealth total.<sup>22</sup> The right way to estimate their onshore assets is to

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<sup>19</sup>The gravity model has been used for similar imputation purposes by Lane and Shambaugh (2010). I estimate the same model as they do on the CPIS dataset for debt and equity separately; the results are presented in Appendix Table A9B. The model has a high explanatory power (with  $R^2$  around 0.75), sufficiently high to provide sensible imputed values. The main difference compared with Lane and Shambaugh (2010) is that, in order to have a full breakdown of non-reporters’s portfolios, my model includes the securities issued by offshore centers. But the model, it turns out, does a good job at explaining CPIS countries’ holdings of securities issued by offshore centers (see Appendix Table A9C). That is, France invests more in securities (mostly mutual fund shares and ABS) issued by Luxembourg and Jersey; Japan more in those issued by Hong Kong and Singapore, etc. I also use the model to generate the bilateral claims of the few non-CPIS offshore centers (the British Virgin Islands, Andorra, Liechtenstein, etc.). These offshore centers have negligible holdings (around \$200bn at the end of 2008, of which \$136bn for the British Virgin Islands, see Appendix Section A.6.1). Further, the model does a good job at explaining the investment patterns of the 22 CPIS offshore centers (see Appendix Table A9C): Bermuda’s mutual funds and insurance companies tend to invest in the U.S. and U.K.; Luxembourg mutual funds tends to invest in France and Germany, etc.

<sup>20</sup>The model predicts well the aggregate investments of CPIS-countries in each developed economy, see Appendix Table 16. At the level of individual countries, the model reproduces well the full investment patterns of the U.S., Japan, and France, see Appendix Tables A17 and Figures A2-A7.

<sup>21</sup>See Section IV.D for a discussion of how errors in my data imputations affect the results.

<sup>22</sup>Part of the Gulf countries’ offshore assets may not belong directly to private person, but to sovereign wealth funds. Yet the distinction between private and public wealth is not always clear, so I simplify matters by taking the view that all the offshore holdings of Middle Eastern oil exporters can be considered

use counterpart country data. Starting with oil exporters' holdings of U.S. securities as seen from the U.S., I make assumptions regarding the share of U.S. securities in their portfolio. Many geographical breakdown estimates have been published in recent years, relying on different methodologies. They share two convictions: the U.S. share is high and it has declined in the 2000s.<sup>23</sup> The assumption for 2001 of a 70% share of U.S. assets and a regular decline of two percentage points per year fits the available estimates best. By construction, the assets missed by this procedure will end up in my unrecorded offshore wealth total. But this is exactly what we want: counterpart country data miss some of oil exporters' assets precisely because oil exporters invest through offshore banks. Although some uncertainty remains, available studies, official sources, and Swiss statistics suggest that oil exporters account for about 10% of my unrecorded offshore wealth total. I allocate the identifiable non-U.S. investments of oil exporters according to the shares predicted by the gravity model.

The imputed data for non-CPIS reporters are certainly not as reliable as the data for CPIS countries. Using a gravity model to generate some of the non reporters' bilateral claims is not fully satisfactory. But this is a minor issue, because bilateral data do not enter into the computation of the wealth held by households in tax havens, which only relies on aggregate figures. What matters most is to have the aggregate assets of CPIS non-reporting countries right. For this exercise, there exist many studies to rely on, drawing on independent sources. By construction, my figures are in line with these studies, which makes me confident in their accuracy. We can quantify the uncertainty on the assets of the large CPIS non-reporters, and it is very small compared to my estimate of the offshore portfolios of households. Lastly, and reassuringly, my estimate of households' offshore portfolios based on stock data is consistent with independent flow data, as we will now see.

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ultimately privately held.

<sup>23</sup>See Section A.5 of the Appendix for a discussion of these studies and full references.

## IV. Estimates of the Unrecorded Portfolios Held in Tax Havens

### IV.A. Total Value of the Unrecorded Portfolios Held in Tax Havens

Exploiting the comprehensive database, we can first calculate the amount of portfolio wealth likely held offshore by households. Figure II shows that each year, there are less security assets than liabilities identifiable worldwide. At the end of my sample (2008) total security liabilities  $\sum_i L_i$  equal \$40tr. But identifiable security assets  $\sum_i \hat{A}_i$  reach \$35.5tr only. There is a \$4.5tr discrepancy  $\Omega = \sum_i L_i - \sum_i \hat{A}_i$ . In other words, more than 10% of all cross-border equities and bonds have unknown owners. Figures III and IV plot the discrepancy for equities and bonds separately. Each year, 20% of all cross-border equities have no identifiable owner. Bonds are less affected: equities account for two-thirds of the overall discrepancy  $\Omega$ . Therefore, a global overview of portfolio positions suggests that individuals held unrecorded portfolios worth  $\Omega$ =\$4.5tr in tax havens at the end of 2008, of which two-thirds were invested in equities and one-third in bonds. At the end of 2008, the global net financial wealth of households (i.e., households' bank deposits, equities, bonds, and insurance contracts, net of debts) was about \$74tr.<sup>24</sup> Unrecorded offshore portfolios accounted for 6% of the net financial wealth of households.

The global asset-liability discrepancy has its exact counterpart at the flow level in the world balance of payments computed by the IMF independently from the present study. The IMF world balance of payments includes all countries' reports plus undisclosed IMF estimates for all non-reporters. It displays two striking anomalies. First, more cross-border investment income is paid than received each year (Anomaly 3). In 2008, the discrepancy amounted to  $D$ =\$156bn.<sup>25</sup> To see how this flow anomaly fits in with the stock anomaly, denote  $r_\Omega$  the yield on the missing portfolios  $\Omega$  – that is, the flow of missing dividends and interest divided by the stock of missing securities. A missing flow of \$156bn implies a yield of  $r_\Omega$ =3.5% on the stock of missing securities, consistent with

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<sup>24</sup>This figure comes from the pioneering work of Davies et al. (2011) who provide the first comprehensive estimate of the level and distribution of world wealth in 2000 based on an exhaustive exploitation of available national balance sheets. A report by Credit Suisse (2010) builds on the methodology developed by Davies et al. (2011) to provide yearly estimates for the 2000-2010 period; the \$74tr figure for 2008 comes straight from Credit Suisse (2010).

<sup>25</sup>See Appendix Table A21.

the yield observed on recorded cross-border securities.<sup>26</sup>

Second, barring one exception in 1998, there are more securities sold than purchased in the world balance of payments (Anomaly 4). To see how this flow anomaly fits in with the stock anomaly, write the change in the stock of unrecorded portfolios  $\Omega$  between  $t - 1$  and  $t$  as:

$$\Omega_t - \Omega_{t-1} = I_t + VAL_t \quad (1)$$

where  $I_t$  denotes the net unrecorded purchases of securities from offshore accounts, and  $VAL_t$  the net capital gains on existing offshore portfolios. Table III breaks  $\Omega$  down as per equation 1. A reasonable pattern emerges: steady inflows, negative valuation effects during equity bear markets, positive valuation effects during bull markets, and reasonable yields  $r_\Omega$  throughout the period.

#### IV.B. Where the Unrecorded Portfolios Are Invested

What kinds of investments do the holders of Swiss accounts make? This is revealed by the difference between debtor-reported liabilities,  $L_j$ , and creditor-derived liabilities,  $\sum_i \hat{A}_{ij}$ .

The owners of unrecorded portfolios invest in two groups of countries, as shown by Figure V. Unsurprisingly, the first group includes some of the main developed countries: in their offshore accounts, individuals own securities issued by the U.S., Japan, France, etc. The second and more important group includes the three countries that host a large mutual fund industry: Luxembourg (the world's second largest investment fund center after the U.S.), the Cayman Islands (where most hedge funds are domiciled) and Ireland (which hosts hedge funds and a large number of money market funds). Take the case of Luxembourg ( $j$ ). At the end of 2008, mutual funds incorporated in Luxembourg had around  $L_j = \$2\text{tr}$  in equity liabilities.<sup>27</sup> However, only  $\sum_i \hat{A}_{ij} = \$1.1\text{tr}$  in equity assets on Luxembourg were identifiable worldwide: \$900bn of Luxembourg mutual fund shares had no identifiable owner. Likewise, a considerable fraction of Irish and Caymanian fund

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<sup>26</sup>See Appendix Table A22.

<sup>27</sup>Note that as per current statistical guidelines, all mutual fund shares are considered equities – including shares of mutual funds that mostly invest in bonds.

shares had no identifiable owner.

The missing claims on Luxembourg and the other offshore mutual fund centers have a straightforward explanation. Through their Swiss accounts, French residents own shares of mutual funds incorporated in Luxembourg. These “Switzerland”-Luxembourg investments are accurately recorded by Luxembourg as equity liabilities, but no country records any claim on Luxembourg. The vast majority of the mutual funds distributed in Switzerland are incorporated in Luxembourg and Ireland.<sup>28</sup> The holding of mutual fund shares by foreigners through their Swiss accounts is bound to create the statistical anomalies that we observe in the data. These anomalies are robust: they have been documented by Lane and Milesi-Ferretti (2007) and the European Central Bank (2009) in the case of Luxembourg and Ireland, and suggested by Lane and Milesi-Ferretti (2011) in the case of the Cayman Islands.

The discrepancy between the size of the offshore fund industry and the low level of claims reported on the three major offshore fund centers has grown sharply over the years 2001-2008. In 2001, as shown by Figure VI, most of the missing equities were equities issued by the U.S. and other rich countries. In 2008, by contrast, more than three-quarters of the missing equities were mutual fund shares issued by the three major offshore fund centers. In other words, in 2001 the holders of unrecorded accounts in tax havens invested most of their wealth in U.S., Japanese, and French equities; in 2008, they invested most of their wealth in Luxembourg, Irish, and Caymanian fund shares.

Investing in a Luxembourg fund through a Swiss account makes perfect sense for a French tax evader: Luxembourg does not tax cross-border payments, so the tax evader receives the full dividend paid by the fund on his or her Swiss account, and French personal income tax can be evaded, since there is no automatic exchange of information between Swiss banks and the French tax authority. Conversely, a French tax evader has to go through each step of the France-Switzerland-Luxembourg circuit to evade taxes. Investing in a Luxembourg fund through a French bank does not save on taxes. Investing

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<sup>28</sup>In January 2012, for instance, of the 8,000 funds registered for distribution in Switzerland, 4,600 were incorporated in Luxembourg and 1,200 in Ireland (<http://www.swissfunddata.ch>). Most hedge funds are not registered, hence not covered by these statistics.

in a Swiss mutual fund through a Swiss bank is also useless, because capital income paid by Swiss corporations is subject to a 35% advance tax withheld at source by Switzerland.<sup>29</sup>

#### IV.C. Discussion of Assumptions

If asset figures accurately reflect the securities held by corporations and governments and those held onshore by households (H1), and if portfolio liability figures are accurate (H2), then anomalies in global portfolio data reflect exactly the value of the portfolios held by households in tax havens: 6% of households' financial assets are held unrecorded in tax havens, half of which are invested in mutual funds. A few words are called for as to how relaxing assumptions (H1) and (H2) affects the results.

First, asset surveys conducted for the CPIS have known weaknesses. Asset-backed securities and short positions are sometimes imperfectly recorded. But these shortcomings cannot explain the considerable amount of missing Luxembourg, Irish, and Caymanian fund shares. Another issue with the CPIS is that some U.S. hedge funds and private equity funds have been unaware of their reporting duties. This coverage gap probably explain part of the missing claims on the Cayman Islands.<sup>30</sup> The Bureau of Economic Analysis and the Federal Reserve Board are working on improving their coverage of U.S. hedge funds. Looking forward, these data improvements will make it possible to identify which part of the missing claims on the Cayman Islands is due to the imperfect coverage of U.S. hedge funds and which part is due to individuals investing in hedge funds from tax havens. In any case, the officially reported net foreign asset position of the U.S. is currently underestimated.

Second, published liability figures may be overestimated. Take a French person who owns French equities via a Swiss bank. From the viewpoint of international investment statistics, these equities are not cross-border claims, but they will likely be recorded by

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<sup>29</sup>The advance tax can only be refunded when individual taxpayers self-declare their income on their tax returns. The advance tax does not apply to income paid by foreign corporations (e.g., Luxembourg mutual funds) and credited to a Swiss account. This fact explains why the vast majority of investment funds distributed in Switzerland are foreign funds and not Swiss funds, and why less than 5% of the missing assets are invested in securities issued by Switzerland (Figure V).

<sup>30</sup>At the end of 2008, the U.S. recorded just \$35bn in assets on Caymanian hedge funds (Department of the Treasury, Federal Reserve Bank of New York, and Board of Governors of the Federal Reserve System, 2009, Table 30 p. 71) while the funds had issued more than \$1tr in foreign equity liabilities.



French statisticians as liabilities for France. In this case, the use of offshore banks by households does not bias asset data downwards but liability data upwards. However, such round-tripping does not affect the paper’s argument. The use of tax havens by households still causes a discrepancy between globally recorded assets and liabilities, and the discrepancy still directly reflects the portfolios held by households in tax havens.

Liability figures, on the contrary, may be under-estimated. Take a French person who owns U.S. equities via a Swiss bank. U.S. statisticians will not always be able to record these equities as U.S. liabilities. But these equities will not be recorded on the assets side of the French IIP either. So accounting for them would both deteriorate the U.S.’s net foreign asset position and improve France’s by the same amount. Overall, this would imply that the wealth held in tax havens is even greater than I have found. Accounting for tax havens would still turn the overall rich world into a net international creditor – the actual net position of the U.S., however, would be worse than my results suggest and the eurozone’s would be even better.

Lastly, there is some uncertainty surrounding the holdings of CPIS non-reporting countries. But for the vast majority of countries  $j$ , debtor-reported liabilities  $L_j$  are equal to creditor-derived liabilities  $\sum_i \hat{A}_{ij}$ , suggesting that I do not miss any large diversified investor on the assets side – such as a large sovereign wealth fund. The debtor-creditor anomalies are concentrated on mutual fund centers. Now, errors in the imputations for China and Middle Eastern oil exporters cannot explain why so many claims on Luxembourg, Ireland, and the Cayman Islands have no identifiable owner. The use of tax havens by households is a much more plausible explanation, especially for Luxembourg. It makes little sense for central banks or sovereign funds to invest in mutual funds (except in hedge funds and private equity funds) since they already pay wealth managers to design suitable investment strategies. The largest sovereign wealth fund, Norway’s, discloses its portfolio on a security-by-security basis: it has virtually no assets on Luxembourg, Ireland, and the Cayman Islands.

It is naturally impossible to have a fully accurate estimate of households’ unrecorded offshore assets. My estimate – 6% of households’ financial wealth – should be seen as a

reasonable order of magnitude that future improvements in international statistics will enable to refine. The order of magnitude is based on a transparent methodology and it is robust to relaxing key assumptions. It is internally consistent. It is also remarkably stable over time (see Figure 1) despite huge variations in potentially confounding factors such as the surge in China’s and oil exporters’ assets and the development of the Cayman Islands’ hedge fund industry. Most importantly, my estimate is backed by direct evidence from Switzerland, the world’s largest tax haven.

## V. Offshore Wealth in Switzerland

Anomalies in international investment statistics suggest a simple pattern: households own mutual fund shares through unrecorded accounts in Switzerland, Singapore, and similar tax havens. Switzerland publishes high-quality statistics that confirm this pattern. Further, Swiss statistics provide evidence as to who owns unrecorded accounts in tax havens, a question on which anomalies in international investment statistics are silent.<sup>31</sup>

### V.A. Consistency Between Swiss and Global Offshore Portfolios

Swiss banks hold in custody Swiss securities belonging to Swiss residents, Swiss securities belonging to foreigners, foreign securities belonging to Swiss residents, and foreign securities belonging to foreigners. Switzerland is the only tax haven that publishes the value of the foreign securities held by foreigners through its banks, which I denote  $\Omega^s$ . In the framework of Section II, Switzerland  $s$  is the only tax haven  $k$  for which we have information about the  $a_{ij}^k$  – the portfolios of U.S. or Luxembourg securities ( $j$ ) held by residents of France or Italy ( $i$ ) through Swiss banks ( $k = s$ ). Specifically, we know  $\Omega^s$  which is equal to  $\sum_i \sum_j a_{ij}^s$  (with  $i \neq s$  and  $j \neq s$ ).

The Swiss National Bank (SNB) has published the  $\Omega^s$  series monthly since 1998 based

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<sup>31</sup>In principle, one could use Anomaly 5 (net errors and omissions, and “other changes” in the flow-stock reconciliation accounts) to shed some light on which countries are most affected by tax havens. However, using Anomaly 5 is fraught with difficulty because of the lack of harmonization of balance of payments data. Readers interested in net errors and omissions and flow-stock inconsistencies are referred to Section D.4. for detailed discussions.

on a comprehensive survey of Swiss-domiciled custodians. The monthly survey covers 95% of all custodial holdings. The SNB conducts a full survey yearly.<sup>32</sup> Custodial holdings are broken down by type – equity, bond, commercial paper, mutual fund share, structured product, other – and currency. I am not aware of any other paper that uses this unique dataset to document the amount of offshore wealth in Switzerland.

In all likelihood, the foreign securities held by foreigners through Swiss banks belong to households. It makes little sense for foreign banks, insurance companies, or investment funds to entrust their non-Swiss securities to Swiss banks: doing so does not secure any tax or regulatory advantage. From the 2004 survey of French custodians (Table II), we see that such holdings are small in France, although some of the biggest global custodians are French. There is no evidence that Swiss banks provide significant custody services for foreign corporations. By contrast, there is considerable evidence from newspaper investigations, industry reports, and high-profile tax scandals that Swiss banks provide significant custody services for foreign individuals.  $\Omega^s$  is thus a good proxy for households' offshore portfolios managed by Swiss banks.<sup>33</sup>

At the end of 2008, the portfolios managed by Swiss banks ( $\Omega^s$ ) represented one-third of households' offshore portfolios ( $\Omega$ ), consistent with industry reports that rank Switzerland as the number one offshore wealth management center.<sup>34</sup> Table IV shows that the offshore portfolios managed by Swiss banks look exactly like the globally unrecorded portfolios  $\Omega$ , although both have been established by completely different methods, relying on fully independent sources. Equities account for two-thirds of the globally unrecorded

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<sup>32</sup>The results of the monthly survey are published in the SNB's *Monthly Statistical Bulletin* (<http://www.snb.ch/en/iabout/stat/statpub/statmon/stats/statmon>, series  $D5_1$ ,  $D5_{1a}$ ,  $D5_1$ ,  $D5_{1b}$ ,  $D5_2$  and  $D5_{2b}$ .) The results of the yearly survey are published in the SNB's *Banks in Switzerland* (<http://www.snb.ch/en/iabout/stat/statpub/bchpub/stats/bankenb>, series 38a, 38b, 38c).

<sup>33</sup>Note that the SNB provides a breakdown of  $\Omega^s$  by owner sector (private customers, commercial customers, and institutional investors). But this breakdown is misleading: the SNB does not see through intermediate wealth-holding structures used by individuals with a Swiss account. The SNB counts the securities of a French individual who uses a sham Panamanian holding company as belonging to the foreign "institutional investors" sector. This is a first-order issue: few individuals have an account in Switzerland with their own personal address; most Swiss bank clients use intermediate wealth-holding structures (see Section V.C. below). A second problem goes in the opposite direction: if a French resident uses a Swiss intermediary (e.g., notary) to manage her portfolio, the SNB will record her holdings as Swiss-owned and they will hence not appear in  $\Omega^s$ .

<sup>34</sup>The Boston Consulting Group (2009) estimates that 35% of households' offshore assets are held in Switzerland.

portfolios and two-thirds of the Swiss-managed portfolios, bonds account for one-third, and most equities are mutual fund shares. The dynamics match as well: over 2001-2008, clients of Swiss banks increasingly placed their assets in mutual fund shares.<sup>35</sup> These simple facts confirm that the anomalies in international investment statistics accurately reflect the portfolios held by households in tax havens.

## V.B. From Unrecorded Offshore Portfolios to Total Offshore Wealth

The foregoing discussion has centered on a particular kind of household wealth: portfolio securities. In tax havens, however, households can hold not only securities, but also bank deposits. That is, they can open an investment account (portfolio securities) or a simple bank account (deposit). Switzerland provides unique information on the importance of offshore bank deposits.

Contrary to what happens for portfolios, offshore deposits do not go completely unrecorded in the international statistics. The major financial centers tell the Bank for International Settlements (BIS) how much deposits foreigners have placed in their banks. In principle, French statisticians can use the BIS data to estimate the value of French residents' offshore bank deposits. The IMF has been advocating the use of the BIS data since the 1990s. U.S. statisticians substituted BIS data for U.S. sources at the beginning of the 1990s. Not all countries do so, however. Further, the BIS does not separate out household deposits from corporate deposits, so it is impossible to identify the value of households' offshore deposits using the BIS data.

Swiss banks provide a unique kind of deposit owned by households only, in the form of what are known as fiduciary deposits. Fiduciary deposits cannot be used as a medium of exchange: they are useless for corporations. Swiss banks invest the funds placed in fiduciary deposits in foreign money markets on behalf of their clients. Legally speaking, all interest is considered to be paid by foreigners to the depositors, with the Swiss banks acting merely as "fiduciaries." Thus, fiduciary deposits are not subject to the 35% Swiss advance tax: they are completely untaxed in Switzerland, just like foreign securities held

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<sup>35</sup>See Appendix Table A23.

in custody in the country. Fiduciary deposits are *the* Swiss bank account: around 80% of bank deposits held by foreigners in Switzerland are fiduciary deposits; non-fiduciary deposits belong to corporations or cross-border workers.

The second column of Table IV breaks down the offshore wealth of households managed by Swiss banks into portfolios and fiduciary deposits. In 2008, fiduciary deposits accounted for one-quarter of the total. The composition of offshore wealth managed by Swiss banks corresponded to one of the most commonly recommended conservative allocation of assets: one-quarter deposits, one-quarter bonds, and one half equities. In order to give a rough estimate of the global offshore wealth of households, I assume in the first column of Table IV that the same allocation of deposits/securities exists in other tax havens too. Global offshore wealth then amounted in 2008 to \$4.5tr (securities) plus \$1.4tr (deposits). The resulting \$5.9tr figure represents 8% of households' financial wealth. Of this 8%, at least 6% (securities) are unrecorded and at most 2% (deposits) are recorded in international investment statistics.<sup>36</sup>

While this paper is the first in the academic literature to estimate the wealth held by households in tax havens, a number of studies have provided estimates before, usually based on interviews with wealth managers. The most detailed industry report puts the amount of household offshore wealth at \$6.7tr in 2008 (Boston Consulting Group, 2009, p. 31). Cap Gemini and Merrill Lynch (2002, p. 11) put it at \$8.5tr in 2002. The Tax Justice Network (2005) has a \$11.5tr figure for 2005 and Palan, Murphy, and Chavagneux (2010, p. 5) write that “the global rich held in 2007 approximately \$12 trillion of their wealth in tax havens.” My estimate (\$5.9tr in 2008) is therefore at the low-end of the scale. Note that I focus on financial wealth only, whereas households can also use tax havens to hold real assets, such as works of art or real estate. I also disregard foreign direct investments – e.g., shares in closely held firms incorporated offshore – because there

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<sup>36</sup>Securities go entirely unrecorded. Deposits are only partially recorded, for two reasons. First, not all statisticians use the BIS data on cross-border bank deposits as inputs to their IIP. More importantly, the BIS data under-estimate the offshore deposits of French or German residents, because they do not see through the intermediate wealth-holding structures that the holders of offshore accounts use. The Swiss bank deposits held by French resident through sham Panamanian corporations are assigned to Panama in the BIS data. This is a first-order concern (see Section V.C. below). In practice, it is not possible to know what fraction of households' offshore bank deposits is captured in international statistics.

is no way to quantify these holdings with the data at my disposal. Finally, my estimate excludes the wealth of individuals who live in tax havens.<sup>37</sup>

### V.C. Who Owns Swiss Bank Accounts?

The last and most important contribution made by the Swiss data is to provide unique evidence as to the likely owners of unrecorded fortunes in tax havens. Since 1976, the SNB has published a full country breakdown of the owners of fiduciary deposits.

Country breakdowns are difficult to interpret at first glance. As Figure VII shows, the SNB records a large and growing fraction of Swiss fiduciary deposits as belonging to tax havens, most notably Panama, Liechtenstein, the British Virgin Islands, the Bahamas, and the Cayman Islands. The SNB records such holdings because it does not see through sham corporations used by households. If a French person opens an account in the name of a sham entity incorporated in Panama, then the SNB assigns the funds to Panama. Using sham corporations as nominal owners of Swiss accounts has a long tradition, dating back to at least the end of the Second World War (Schaufelbuehl, 2009). Once you understand the purposes that sham corporations serve, it becomes clear that most fiduciary deposits assigned to tax havens in the SNB's statistics belong to residents of rich countries, in particular to Europeans.

A sham corporation adds a layer of secrecy between the owner of a Swiss account and his holdings, making it harder for tax authorities to investigate cases of tax evasion. When tax evaders combine numerous sham corporations in multiple tax havens, foreign authorities have practically no way to find out who is the beneficial owner of a Swiss account. Sham corporations are less useful to residents of countries where there is no income tax or where tax administrations have no resources to investigate offshore tax evasion. Sham corporations also help Europeans evade taxes. The European Union has adopted the Savings Directive in a move to curb tax evasion: since 2005, Swiss and other offshore banks must withhold a tax on interest earned by European Union

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<sup>37</sup>Whether these elements can explain the difference between my estimate and previous studies is a question that I leave for future research. Cross-border real estate, in particular, is an important asset class for households that the present study does not cover.

residents.<sup>38</sup> But the directive only applies to accounts opened by European households in their own name, not to accounts that belong to sham corporations. Sham corporations are a straightforward way of eschewing the EU Savings Directive.

Figure VII shows that there is a perfect negative correlation between the share of fiduciary deposits held by Europeans and the share of fiduciary deposits assigned to tax havens. European depositors have shifted their deposits to sham corporations over time. They reacted particularly strongly to the introduction of the EU Savings Directive in July 2005: between December 2004 and December 2005, Europe's share of Swiss fiduciary deposits declined by 10 percentage points while tax havens gained 8 percentage points.<sup>39</sup> In a recent book, a Swiss journalist documents how Swiss bankers created sham corporations on a large scale during the summer of 2005 to help their European clients circumvent the Directive (Zaki, 2010, p. 54).

The U.S. Internal Revenue Service (IRS) provides additional evidence that rich countries' residents use sham corporations extensively. In 2009, the IRS released case studies of tax evasion by U.S. residents in a big Swiss bank.<sup>40</sup> In almost all cases, U.S. tax evaders owned their Swiss accounts through sham entities incorporated in Panama, the British Virgin Islands, and Hong Kong. Many of them had transferred their accounts to sham corporations in the 1990s or 2000s. In many IRS cases, the sums involved are huge, attaining \$100 million for a single family in a single bank.

Let's assume that in 2004, before the EU Savings Directive, if a country owned 10% of the fiduciary deposits not assigned to tax havens, it also owned 10% of the deposits assigned to tax havens. Let's also assume that Gulf countries do not use sham corporations, which is plausible since they have no capital income tax. Then the rich world owned 62% of Swiss fiduciary deposits in 2004.<sup>41</sup> Similarly, the Boston Consulting Group (2009) estimates that around 60% of Swiss offshore accounts belong to Europeans and

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<sup>38</sup>In July 2011, the tax rate was set at 35%. Tax havens keep one-quarter of the tax revenue and transfer the remaining three-quarters to the European country where the account owner is resident. This withholding tax allows tax havens to avoid automatic exchange of bank information, which is the EU standard.

<sup>39</sup>See Johannesen (2010) for an analysis of the reaction of Swiss bank deposits to the directive.

<sup>40</sup><http://www.irs.gov/newsroom/article/0,,id=110092,00.html>.

<sup>41</sup>See Appendix, Table A26. The list of rich countries considered is the same as for Figure I, except that it excludes Switzerland, along with Luxembourg and Cyprus (two tax havens).

Americans. Contrary to popular belief, there is no indication that African dictators or rich Asian investors own the bulk of Swiss accounts.

## VI. Implications of Tax Havens for International Imbalances

Anomalies in international investment statistics suggest that around 6% of households' financial assets are held unrecorded in tax havens. The goal of this section is to propose scenarios as to how accounting for these assets affects international imbalances – both stock position imbalances and flow imbalances, commonly referred to as “global imbalances.” These scenarios are necessarily speculative, since it is impossible to accurately assign all the unrecorded offshore assets to their true owners. However, a number of robust qualitative findings emerge.

### VI.A. The Eurozone and the Rich World are Probably Net Creditors

We have seen that about one-third of households' unrecorded offshore assets are managed in Switzerland, and that Swiss accounts belong mostly to residents of rich countries, especially to Europeans. These findings provide the baseline to attribute the securities missing in global accounts to their likely owners. Although no official statistics exist on who owns the portfolios managed in Luxembourg, Singapore, or the Cayman Islands, surveys of wealth managers give some direction. Based on such surveys, the most thorough industry report estimates that 42% of all offshore wealth belongs to Europeans and 60% to residents of rich countries (Boston Consulting Group, 2009).

Table V presents a number of scenarios as to how accounting for tax havens affects the net foreign asset position of the eurozone, officially the world's second largest net debtor. If eurozone residents own 50% of Swiss-managed unrecorded offshore fortunes – as the SNB's statistics suggest – and only 25% of those managed in other tax havens, the eurozone is balanced. If eurozone residents own 50% of all unrecorded portfolios, the eurozone is in actual facts a sizable net creditor. In all plausible scenarios, the eurozone shifts into the black. Table VI presents similar computations for the U.S. Accounting



for tax havens improves the U.S. net foreign asset position, albeit by a smaller amount. If U.S. residents own 20% of all offshore wealth – say, 15% of Swiss-managed portfolios and 25% of those managed elsewhere – then the net foreign asset position of the U.S. is significantly better than in the official data: -12% of GDP on average over 2001-2008 as opposed to -18% in the official statistics.

A benchmark scenario where the eurozone owns about half of unrecorded portfolios and the U.S. about 20% turns the overall rich world into a net creditor. Although there are uncertainties on which countries' residents own assets in tax havens, this result is robust to alternative assumptions. Since unrecorded assets in tax havens are double the recorded net debt of the rich world, the rich world shifts into the black as long as it owns more than half of the world's offshore wealth. Industry reports and available Swiss data suggest that it is a lower bound, which is hardly surprising since residents of rich countries own 80% of recorded world wealth (Davies et al., 2011). Remember also that most of the unrecorded assets are Luxembourg, Irish, and Caymanian fund shares. There are good reasons to believe that these fund shares belong in the main to Europeans (especially Luxembourg fund shares) and Americans (especially Caymanian fund shares).<sup>42</sup> Developing countries have offshore accounts too, but plausibly not more than 30% of all offshore wealth: about 10% for oil exporters and 20% for non-oil developing countries.<sup>43</sup> Lastly, among rich countries, Japanese residents do not seem to use tax havens extensively – they own less than 1% of Swiss bank deposits – plausibly because capital income is much less taxed in Japan than in other developed economies.<sup>44</sup>

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<sup>42</sup>Feletigh and Monti (2008) document that about half the foreign equity holdings recorded by Italy are in Luxembourg. The European Central Bank (2009) considers that most of the missing assets on Luxembourg and Ireland probably belong to eurozone residents. Lane and Milesi-Ferretti (2007, Table 2 p. 234) document that Irish statisticians recorded five times more U.S. investments in Irish equities than U.S. statisticians in 2004, so it is likely that U.S. residents own a significant fraction of the missing claims on Ireland as well.

<sup>43</sup>Middle Eastern countries own 10% of Swiss bank deposits and non-oil developing countries 25%, see Appendix Table A26. The assumption that Middle Eastern oil exporters own 10% of the globally unrecorded portfolios implies total portfolio holdings for Middle Eastern countries well in line with the literature, see Appendix Table A8.

<sup>44</sup>In 2005, the OECD reports that the net personal tax rate on dividends was 22% in Germany, 32% in France, as opposed to 10% in Japan, and 18% in the United State

## VI.B. Implications for Global Imbalances

If indeed the eurozone is a net creditor and the U.S. less indebted than in the official statistics, then once we account for tax havens net foreign asset positions are globally less dispersed than we think. Along the stock dimension, international imbalances are still quite small. How does that affect our understanding of the dynamics of global imbalances?

Because the CPIS only started in 2001, we do not know how large was the wealth held unrecorded by households in tax havens before 2001. But we do know that statisticians have always been unable to capture households' offshore portfolios. So accounting for tax havens must improve the pre-2001 net positions of Europe and the U.S., albeit by an unknown factor. This factor depends on whether net flows into tax havens were large in the 1980-1990s. If net flows were modest, then offshore wealth was already a large fraction of world wealth in 1980 – we should scale up the officially recorded net positions of rich countries by a large factor. If net flows were large, then we should scale up their 1980 net positions by a smaller factor. Unfortunately, we know little about the magnitude of the flows into tax havens in the 1980s-1990s.<sup>45</sup> So it is not possible, at this stage, to provide quantitative evidence as to how tax havens affect the pre-2001 positions of rich countries. But my findings do have a qualitative implication: that the rich world was a net creditor in the 1980s and 1990s.

This qualitative insight lends support to a new perspective on global imbalances. In the official statistics, the poor-to-rich flows that the world has experienced since the latter end of the 1990s make the net positions of the rich world and the poor world diverge: the rich world accumulates net liabilities vis-à-vis developing countries. By contrast, if the rich world starts from a positive position in the mid-1990s, as my results suggest, then poor-to-rich flows are a factor of convergence. Developing countries are simply repaying their debts to advanced economies, as if output convergence was accompanied by net

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<sup>45</sup>There exists quantitative evidence on the amount of wealth managed by Swiss banks on behalf of foreigners dating back to the end of the first World War. I plan in future research to use these data to shed light on the long-run evolution of offshore wealth. One hypothesis often considered in the literature on capital flight is that offshore wealth increases in period of crisis, see for instance Lane (2011, p. 9) for recent evidence from Ireland.

external wealth convergence. Although this is not necessarily what theory predicts – many open-economy models do not have clear-cut predictions on steady-state net foreign asset positions, and in standard models one can have persistent inequalities in net wealth even if output converges –, it seems important to keep this possibility in mind when we analyze the determinants of global imbalances and the risks involved.

## VII. Remaining Anomalies in International Statistics

Tax havens can explain virtually all the anomalies in portfolio investment data: why there are more liabilities than assets recorded at the global level and why more investment income is paid than received, which is the key driver of the current account deficit that the world has tended to run up (Motala, 1997). However, two noticeable anomalies remain in the international statistics. First, contrary to the phenomenon found for portfolio securities, in foreign direct investment statistics, more assets can be identified than liabilities (Lane and Milesi-Ferretti, 2007, Figure 2 p. 232). Second, in a spectacular reversal of past trends, the world started running up a current account surplus in 2004. The surplus has been driven by the trade balance: since 2004, recorded exports have exceeded imports significantly (Figure VIII).<sup>46</sup> Although there is no reason why the FDI and trade anomalies should be linked with households' offshore assets, they could affect the claim made in this paper that the eurozone and the rich world are actually net creditors. A brief discussion of their likely sources is thus in order.

FDI data raise huge challenges. Direct investments are decentralized, unlike portfolio holdings which are ultimately centralized in custodian banks and central security depositories. Statisticians have only recently started spreading best practices and harmonizing data across countries by means of a Coordinated Direct Investment Survey (CDIS) conducted for the first time in 2009. Most importantly, direct investments have no observable market value, because they do not usually take the form of traded securities. Developing countries compile FDI statistics on a book value basis, while most rich countries try to infer market values based on the market prices of portfolio investments. Because asset

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<sup>46</sup>For long-run series on the world current account, see Appendix Tables A19-A21, and Figure A1.

prices rose more in developing countries than in rich countries in the 2000s, much of the direct investment discrepancy may come from the fact that the book values recorded by the developing countries for their direct investment liabilities vis-à-vis the rich world are too low. The developing world may be more indebted than we think.<sup>47</sup>

The trade discrepancy also most likely comes from errors in developing countries' statistics. There is no particular reason to believe that exports are overestimated in rich countries. In fact, the U.S. Census Bureau (1998) has argued that U.S. goods exports have tended to be systematically underestimated, by as much as 10%. In contrast, there is substantial evidence that the developing world underestimates its imports: Fisman and Wei (2004) have shown that China's imports from Hong Kong are systematically under-reported for tax reasons. Now, most developing countries' IIPs are still compiled by cumulating current account flows. If developing countries' current account balances are overestimated, then their net foreign assets are also overestimated. Once again, the developing world may be more indebted than we think.

The FDI anomaly means that the global net foreign asset discrepancy (the world's puzzling net debt) is a little smaller than my estimate of households' unrecorded assets  $\Omega$  between 2001 and 2004.<sup>48</sup> when we add  $\Omega$  to the net foreign asset discrepancy, the world turns into a slight net creditor. Since 2005, the world net foreign asset discrepancy has shrunk, driven by the large world current account surplus,<sup>49</sup> while my estimate of households' unrecorded offshore assets has grown.

If the FDI and trade discrepancies are due purely to errors in developing countries' statistics, then they do not affect the results of this paper: when the world IIP is purged of all its errors, the rich world and the eurozone are net creditors, and the developing world is a net debtor. If each country contributes to the FDI and trade discrepancies in

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<sup>47</sup>Difficulties in the identification of cross-border investments in hedge funds and private equity funds may also explain part of the direct investment discrepancy. Take a Caymanian feeder fund that invests in a U.S. master fund – a typical structure in the hedge fund industry. If the feeder owns more than 10% of the master, this investment should be recorded as a direct investment liability for the U.S. But we do know that there are large gaps in the coverage of U.S. hedge funds, on which the Bureau of Economic Analysis is currently working. The same problem probably exists in other countries as well.

<sup>48</sup>See Appendix Table A30 for a line-by-line reconciliation of  $\Omega$  and the world net foreign asset discrepancy.

<sup>49</sup>In 2009, after the period covered by this study, the IMF recorded for the first time that the world net foreign asset discrepancy was around 0.

proportion to the size of its international balance sheet – a worst case scenario given the available evidence – the central conclusions of this paper still hold. The eurozone remains a net creditor – albeit smaller – and the rich world is roughly balanced.<sup>50</sup>

## VIII. Conclusion: Two Proposals to Improve Official Statistics

This paper takes a serious look at the enormous data challenges that tax havens pose for international investment statistics. The main finding is that households own globally about 8% of their financial wealth in tax havens, 6% of which goes unrecorded in official statistics. This is a considerable amount of wealth compared to the net foreign asset positions of the largest economies. In 2008, 6% of households' financial wealth is double China's reserve. It is double the officially recorded net debt of the rich world. Available evidence suggests that unrecorded offshore assets belong in the main to residents of rich countries, in particular to Europeans. On the basis of plausible assumptions, accounting for tax havens turns the eurozone into a net international creditor and significantly improves the U.S. net position. Contrary to conventional wisdom that views Europe and the U.S. as severely indebted economies, the rich world is still overall likely to be a net creditor – and poor-to-rich capital flows are a factor of convergence in net foreign asset positions, rather than a factor of divergence.

Accurate net foreign asset data are crucial to many research and policy issues. They form a key input for the analysis of patterns in capital flows. Countries with high recorded net foreign debt are labelled high risk, which has direct consequences on their borrowing terms and increases the chances of disorderedly adjustments. Better international investment positions would improve our ability to track fundamental aspects of globalization and to monitor financial stability. All of this calls for major changes to be made to the way international investment data are compiled.

Two simple reforms would make for substantial improvements. First, statistics showing that 60% of Swiss fiduciary deposits are owned by a small set of unpopulated tax havens are unhelpful. Cross-border banking data on the household sector should be com-

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<sup>50</sup>See Appendix Tables A31-A32.

piled on a beneficial ownership basis. A bank deposit owned in Switzerland by a French individual through a sham Panamanian corporation should not be recorded as a Panamanian deposit, but as a French deposit. Now, the fundamental principle of anti-money laundering regulations is that bankers need to know at all times who are the beneficial owners of the funds they manage, even if the funds are held via a long chain of intermediate entities. Banks should be asked to use this information to compile cross-border banking data on the household sector. It would not require much extra work, since the information already exists within the banks.

Second, countries should exchange data on portfolio securities held offshore by households. All international financial centers should report to the Bank for International Settlements on the value of the securities held in custody by foreign residents in their banks – just as they do today for bank deposits. Custodial surveys have a long history and they do not raise any great practical problems. The reform would not violate any bank secrecy provisions. But it would only work if custodial holding data were also established on a beneficial ownership basis. A portfolio of U.S. equities held in Switzerland by a French individual through a sham Panamanian corporation should be recorded by Swiss banks as a French portfolio holding – and the information sent to the BIS.

The combination of both reforms would enable international statisticians to fill the long-standing gaps in portfolio investment data. As this paper has argued, this would radically change the international investment positions of rich countries.

A third source can be used as input to the statistics on external positions of countries: tax data. Tax data would be a reliable source if offshore banks exchanged information with foreign tax authorities on an automatic basis. Since the beginning of the financial crisis, and under G20 pressure, a number of tax havens have started exchanging bank information with foreign tax authorities. But they only provide information “upon request:” in practice, the volume of information exchanged remains negligible (Johannesen and Zucman, 2012). Absent automatic information exchange, tax data may well remain an unreliable source to capture the offshore holdings of households.

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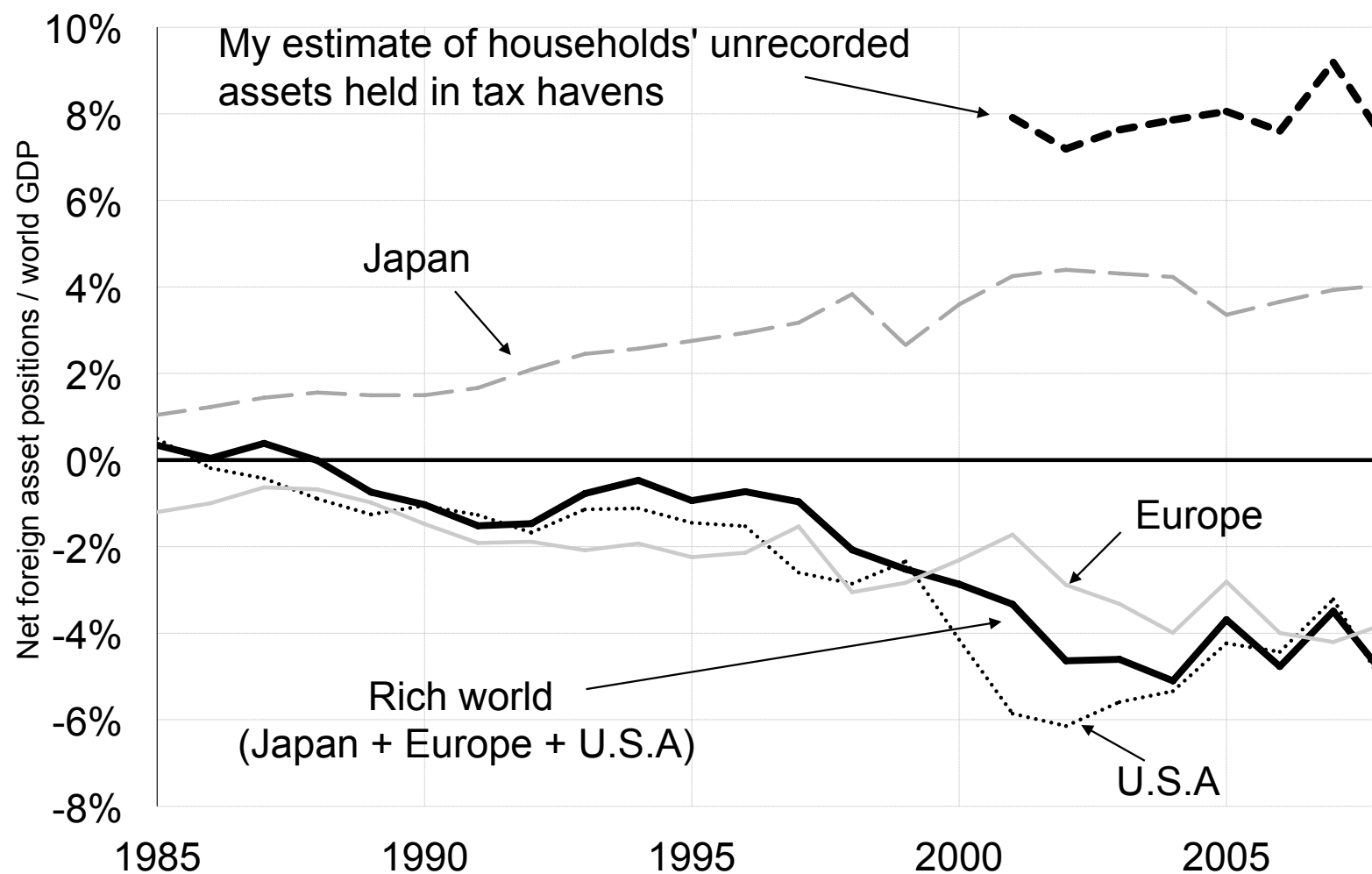
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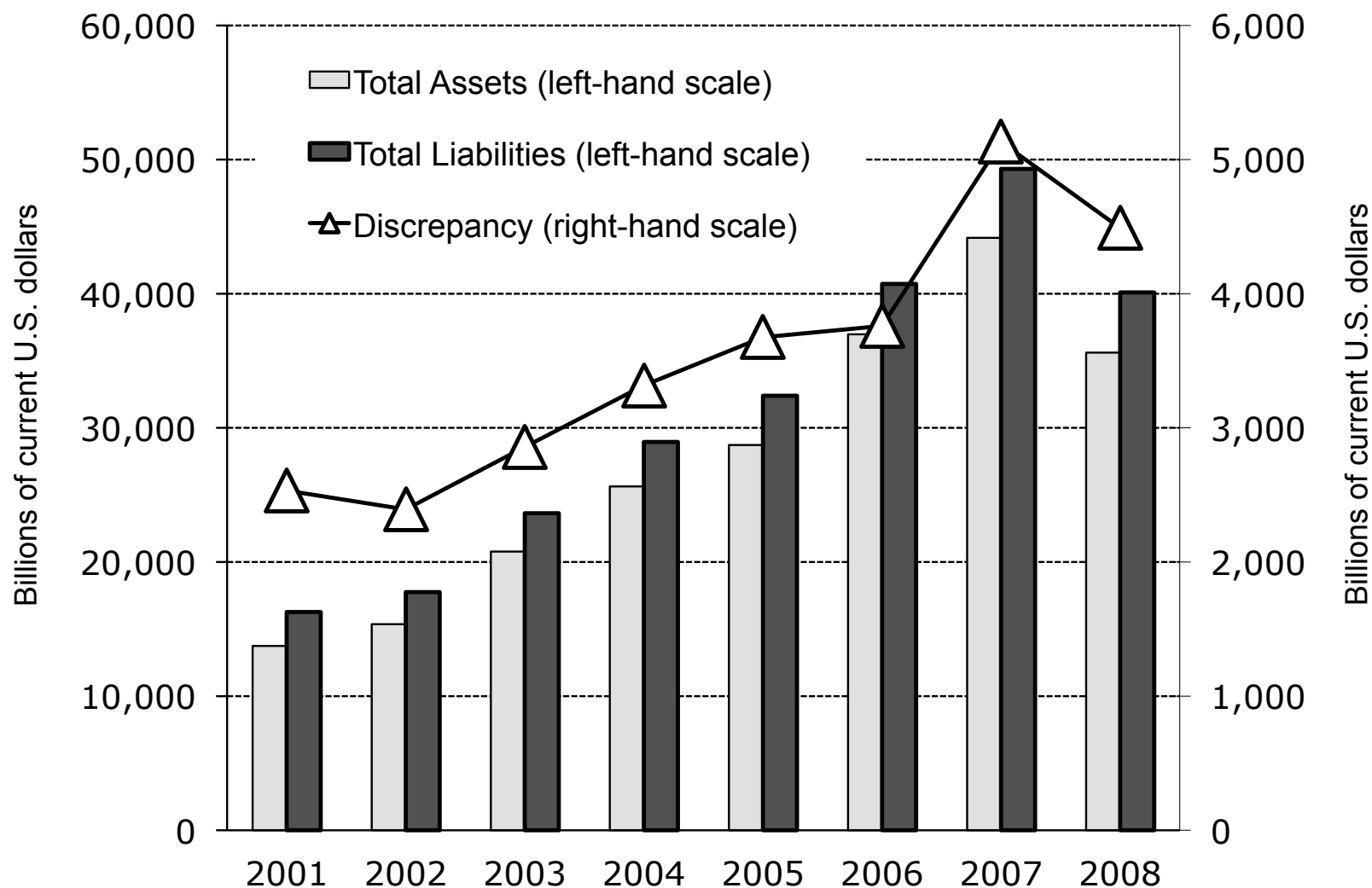
Figure I: Unrecorded Assets Held in Tax Havens Are Double the Recorded Net Debt of the Rich World



Note: The figure charts the value of unrecorded household assets held in tax havens along with the officially recorded net foreign asset positions of Japan, the U.S., and Europe. All series are scaled by world GDP. In 2008, by my estimate, unrecorded household assets amounted to 7.3% of world GDP. Total household financial assets stood at 120% of world GDP (Davies et al., 2011) so unrecorded household assets amounted to 6% of total household financial assets. Europe includes the 16 members of the eurozone as at the end of 2010, five additional European countries (the UK, Norway, Sweden, Denmark and Switzerland), and three non-European countries (Australia, New Zealand, and Canada).

Source: Appendix Tables A3 and A27.

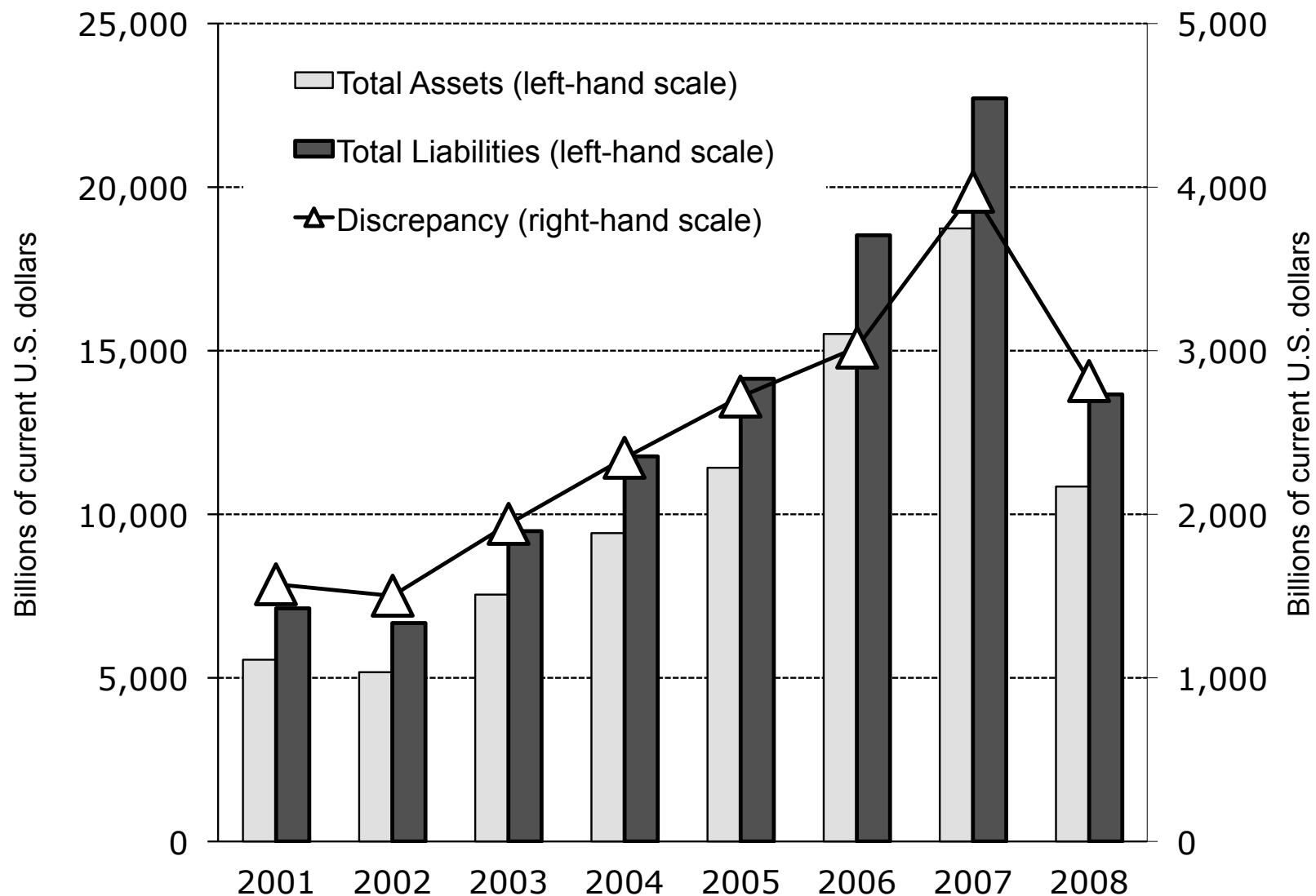
Figure II: Each Year, Less Security Assets Are Recorded Than Liabilities



Note: This figure charts the security assets and liabilities identifiable worldwide. Securities include all equities and bonds classified as portfolio investments or reserves. The totals cover 237 countries and territories along with international organizations.

Source: Appendix Table A3.

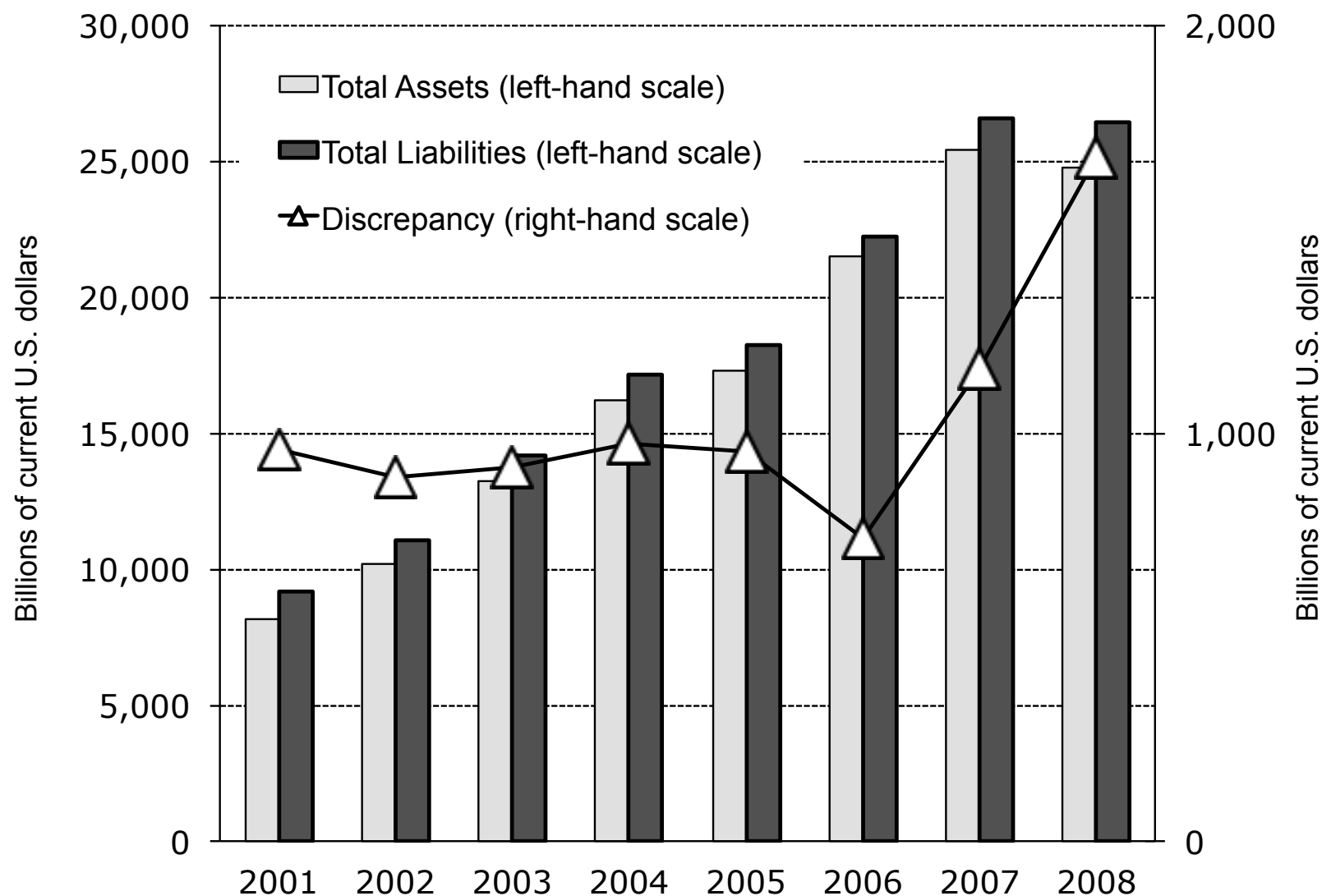
Figure III: Each Year, Less Equity Assets Are Recorded Than Liabilities



Note: This figure charts the equity assets and liabilities identifiable worldwide. Equities include all equities classified as portfolio investments or reserves. The totals cover 237 countries and territories along with international organizations.

Source: Appendix Table A3.

Figure IV: Each Year, Less Bond Assets Are Recorded Than Liabilities

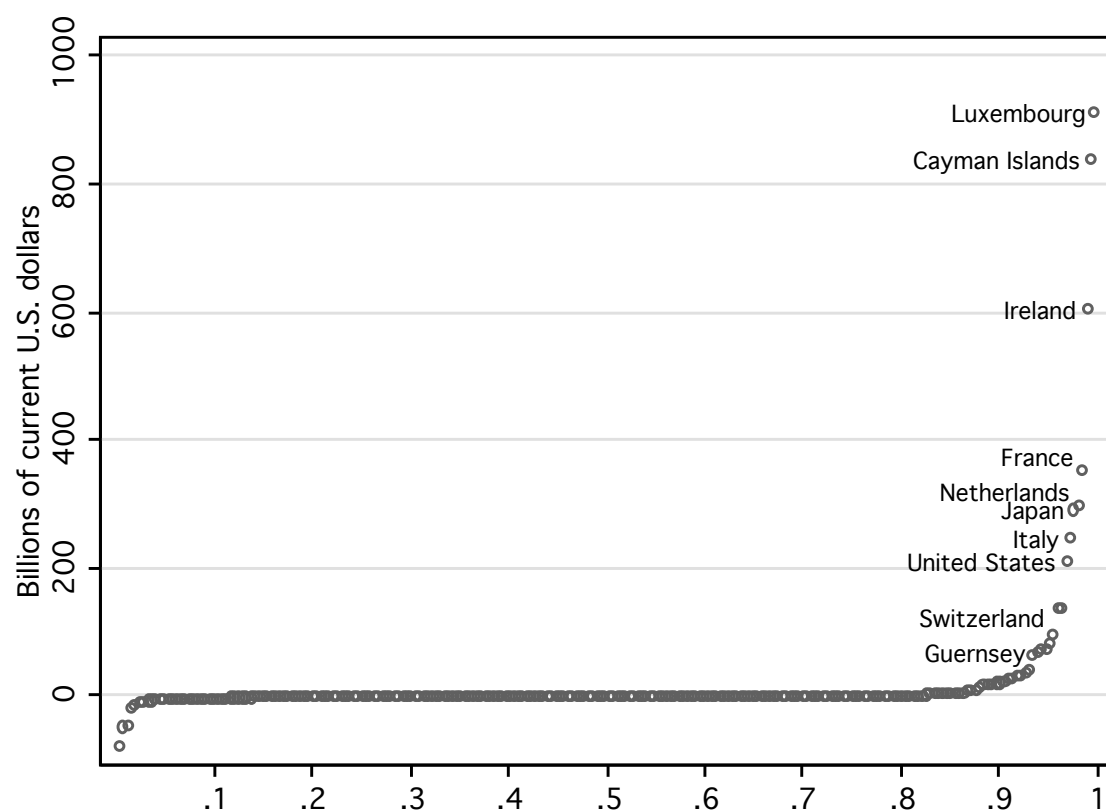


Note: This figure charts the bond assets and liabilities identifiable worldwide. Bonds include all debt securities classified as portfolio investments or reserves. The totals cover 237 countries and territories along with international organizations.

Source: Appendix Table A3.



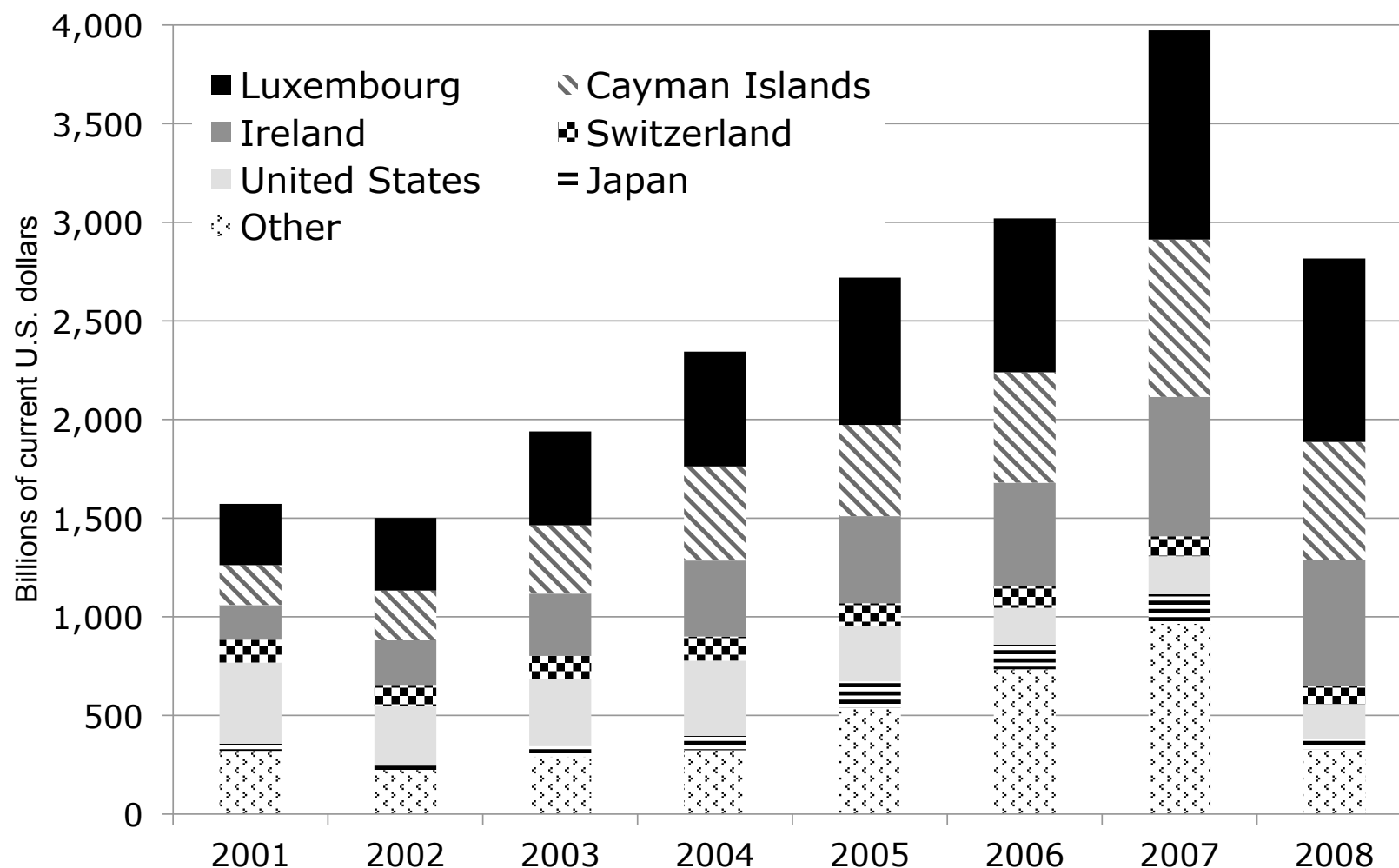
Figure V: The Owners of Unrecorded Accounts in Tax Havens Invest Mostly in Luxembourg Mutual Funds



Note: This figure shows where households that own portfolio securities through their bank accounts in tax haven invested in 2008. They invested in two groups of countries: the leading developed countries (France, Netherlands, Japan, Italy, U.S., etc.) and the three offshore centers that host large mutual fund industries (Luxembourg, Cayman Islands, and Ireland). Each dot is equal to the difference between the portfolio liabilities issued by a country  $j$  ( $L_j$ ) and the sum  $\sum_i \hat{A}_{ij}$  of the holdings of securities issued by  $j$  recorded by 236 countries  $i$  and international organizations. For 90% of the world's countries,  $L_j = \sum_i \hat{A}_{ij}$ . But for some countries there is a large discrepancy. In 2008, for instance, Luxembourg issued \$2,450bn in portfolio liabilities but only \$1,550bn of assets on Luxembourg were identifiable worldwide: the owners of unrecorded accounts in tax havens owned \$2,450bn-\$1,550bn=\$900bn in securities issued by Luxembourg, which are essentially mutual fund shares.

Source: Appendix Tables A13 and A14.

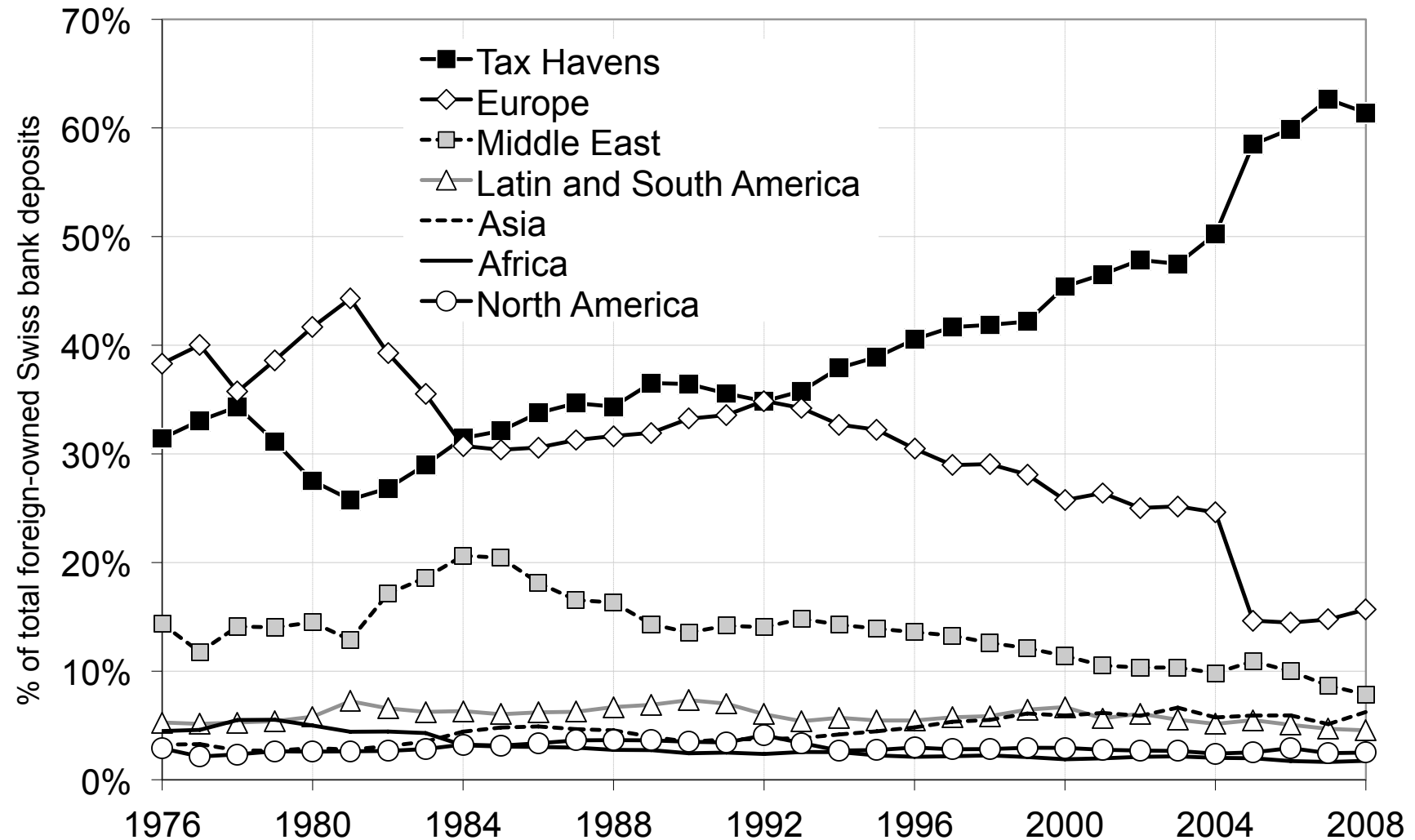
Figure VI: The Owners of Unrecorded Accounts in Tax Havens Invest Increasingly in Mutual Funds



Note: This figure shows where households that own equity securities through their bank accounts in tax havens invested each year between 2001 and 2008. In 2001, households held \$1,550bn in equity securities through their accounts in tax havens, of which \$400bn were in U.S. securities, \$300bn were in equities issued by other rich countries, etc. In 2008 they held \$2,800bn in equity securities, of which \$900bn were in Luxembourg mutual fund shares, \$600bn in Irish mutual fund shares, etc.

Source: Appendix Table A3.

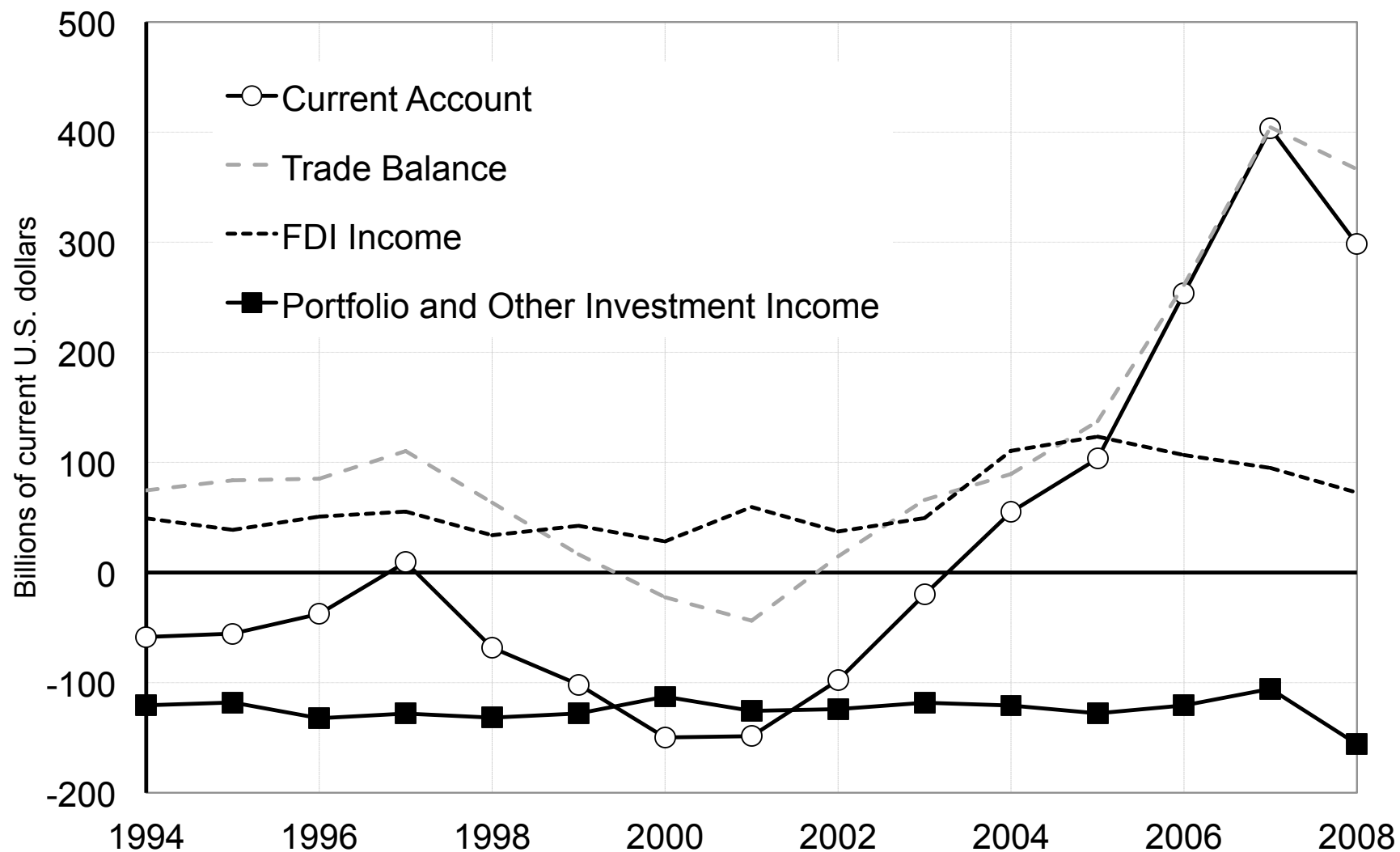
Figure VII: Most Swiss Accounts Probably Belong to Europeans



Note: This figure shows which countries' residents own Swiss bank fiduciary deposits, as reported by the Swiss National Bank (SNB). The SNB does not see through the sham corporations with addresses in such places as Panama or the British Virgin Islands used by European, U.S., and other rich countries' households as nominal owners of their accounts. This explains the high share of deposits assigned to tax havens.

Source: Appendix Table A25.

Figure VIII: The World Now Runs a Large Trade Surplus



Note: This figure charts the statistical anomalies in the world's balance of payments, which includes data for all countries and territories. Each year, more portfolio and other investment income is paid than received, the flow counterpart of missing assets in international investment positions. Since 2004, the world has been running a large trade surplus, driving a large current account surplus.

Source: Appendix Table A21.

Table I: Securities Form the Bulk of Cross-Border Wealth

(End of 2008 values)	Trillions of current \$	% of world GDP
World GDP	61	100%
Cross-Border Wealth	90	146%
Securities	40	65%
<i>Of which: Bonds</i>	26	43%
<i>Of which: Equities</i>	14	22%
FDI	18	29%
Other (loans, deposits)	32	52%

Note: This table presents the amount of cross-border wealth globally, by category of asset. Securities include all “portfolio investments” and the fraction of “reserve assets” invested in equity and bonds. FDI stands for foreign direct investment. Derivatives are excluded because they are not measured yet in all leading economies. Source: IMF Balance of Payments Statistics and the updated and extended version of the External Wealth of Nations database constructed by Lane and Milesi-Ferretti (2007).

Table II: Most Foreign Securities Held in Custody in Swiss Banks Belong to Foreigners

	[1]	[2]	[3]	[4]	[5]	[6]
(End of 2004 values in billions of current US\$)	Foreign securities owned by domestic residents onshore	Foreign securities owned by domestic financial institutions offshore	Foreign securities owned by domestic households offshore	<b>Foreign securities assets recorded in the IIP: [1]+[2]</b>	Foreign securities entrusted by foreigners to domestic custodians	<b>Foreign securities held in custody by domestic banks: [1]+[5]</b>
<i>Data collection method</i>	<i>Custody survey</i>	<i>Direct reporting</i>	<i>none</i>		<i>Custody survey</i>	
<b>Panel A: France</b>						
Long-term securities	1,198	408	unknown	<b>1,606</b>	278	<b>1,477</b>
<i>Equities</i>	<i>327</i>	<i>116</i>	<i>unknown</i>	<i>443</i>	<i>67</i>	<i>394</i>
<i>Bonds</i>	<i>871</i>	<i>292</i>	<i>unknown</i>	<i>1,164</i>	<i>211</i>	<i>1,083</i>
<b>Panel B: Switzerland</b>						
Long-term securities	612	134	unknown	<b>746</b>	1,162	<b>1,774</b>
<i>Equities</i>	<i>321</i>	<i>18</i>	<i>unknown</i>	<i>339</i>	<i>627</i>	<i>949</i>
<i>Bonds</i>	<i>291</i>	<i>116</i>	<i>unknown</i>	<i>407</i>	<i>535</i>	<i>826</i>

Note: This table presents the amount of cross-border securities held in custody in France and Switzerland, and the amount of cross-border securities recorded in the French and Swiss international investment positions, at the end of 2004.

Source: France: Bank of France, International investment position and *Bulletin de la Banque de France*, No. 136. Switzerland: Swiss National Bank, International investment position and *Banks in Switzerland*.

Table III: The Anomalies Caused by Unrecorded Assets in Tax Havens Are Internally Consistent

	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>
[1] Stock ( $\Omega$ ), bn\$	2,532	2,392	2,858	3,316	3,676	3,760	5,131	4,490
[2] Inflows ( $I$ ), bn\$	38	164	153	240	230	116	189	364
[3] Valuation ( $VAL$ ), bn\$	<i>n.a.</i>	-304	313	218	130	-31	1,182	-1,006
[4] Interest and dividends ( $D$ ), bn\$	126	124	118	121	128	121	106	156
[5] Yield ( $r_{\Omega}=D/\Omega$ )	5.0%	5.2%	4.1%	3.6%	3.5%	3.2%	2.1%	3.5%

Note: This table reports on the estimated stocks and flows of unrecorded offshore portfolios. Inflows are the net purchases of securities from unrecorded offshore accounts. Valuation denotes the net capital gains/losses on unrecorded offshore portfolios. Interest and dividends are the income earned by the owners of unrecorded offshore portfolios.

Source: Appendix Tables A3 and A21; IMF *Balance of Payments Statistics* 2010, Table C-1: “Global discrepancies in balance of payments statistics.”

Table IV: Households Own 8% of Their Financial Wealth in Tax Havens

(End of 2008 values in billions of current US\$)	World	Switzerland
Offshore securities	4,490	1,545
Bonds	37%	35%
Equities	63%	65%
<i>Mutual Fund Shares</i>	48%	50%
Offshore bank deposits	1,388	478
Total offshore financial wealth	5,878	2,022
Global household financial wealth = 73,625		

Note: Global household financial wealth includes bank deposits, portfolios of securities, insurance contracts of households net of households' debt. Offshore financial wealth includes the bank deposits and portfolios of securities held by households in tax havens. It excludes foreign direct investments in tax havens (such as real estate and shares in closely held companies incorporated offshore).

Source: Offshore financial wealth: Appendix Tables A3, A23, and A24. Global household financial wealth: Credit Suisse (2010).



Table V: Accounting for Tax Havens Turns the Eurozone Into a Net Creditor

		Share of non-Swiss fortunes belonging to euro-area			
		0%	25%	50%	75%
Share of Swiss fortunes belonging to euro-area	0%	-11%	-6%	0%	6%
	40%	-6%	0%	5%	11%
	50%	-5%	1%	7%	12%
	60%	-3%	2%	8%	13%

Note: The Table reads as follows. The official eurozone's net foreign asset position/GDP ratio averaged -11% over the 2001-2008 period. If eurozone residents owned 40% of the unrecorded offshore assets managed in Switzerland and 50% of those managed elsewhere, the true net foreign asset position/GDP ratio of the eurozone averaged +5%.

Source: Appendix Table A28.

Table VI: Accounting for Tax Havens Improves the U.S. Net Foreign Asset Position

		Share of non-Swiss fortunes belonging to the U.S.			
		0%	25%	50%	75%
Share of Swiss fortunes belonging to the U.S.	0%	-18%	-13%	-9%	-5%
	5%	-17%	-13%	-8%	-4%
	15%	-16%	-12%	-7%	-3%

Note: The table reads as follows. The official U.S. net foreign asset position/GDP ratio averaged -18% over the 2001-2008 period. If U.S. residents owned 15% of the unrecorded offshore assets managed in Switzerland and 25% of those managed elsewhere, the true net foreign asset position/GDP ratio of the U.S. averaged -12%.

Source: Appendix Table A29.