

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

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Abstract

There are two puzzles in international investment statistics. First, the world as a whole is a net debtor. Next, contrary to what the neoclassical growth model suggests, the rich world is a net debtor. Both puzzles, I argue, stem from the fact that international accounts miss most of the wealth held by households through tax havens. I use systematic inconsistencies in portfolio investment positions and a unique Swiss dataset to study households' offshore wealth. I find that 8% of the global financial wealth of households is held offshore, of which at least 6% is unrecorded. The bulk is invested in mutual funds. Most Swiss accounts belong to Europeans. Under minimal assumptions, accounting for tax havens turns the euro area, officially the world's second biggest net debtor, into a net creditor. It also significantly reduces the U.S. net negative position. I conclude with concrete proposals to improve international investment statistics.

Keywords: Tax havens, International investment positions

JEL classifications: F32, H26, H87.

*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 puzzle is a statistical anomaly: the world as a whole is a net debtor, as shown by Lane and Milesi-Ferretti (2007). In the world international investment position, more cross-border liabilities can be identified than assets. In the world balance of payments, similarly, more investment income is paid than received. Historically, this anomaly has been the main driver of the current account deficit that the world has tended to run (Motala, 1997). Since the problem was identified in the 1970s, several reports have been written to investigate its causes (IMF, 1987; 1992). National statistical agencies and the International Monetary Fund have devoted considerable resources to improve their accounts. Although substantial progress has been made, a set of large discrepancies remain; in particular, many portfolio investments have no identifiable owner (Milesi-Ferretti et al., 2010). What do these anomalies reflect?

The second puzzle is a theoretical challenge: the rich world is apparently a net debtor, dragged down by the U.S. and Europe. According to readily available public statistics, it has been so since the mid-1980s. This stands in sharp contrast to what the neoclassical growth model suggests: with decreasing returns to capital, capital-abundant countries should lend to capital-scarce countries and accumulate a positive net stock of foreign claims until returns are equalized. Why rich countries have such a low level of net foreign claims has fascinated economists since Lucas (1990), and two kinds of explanations have been put forward. Sovereign risk in developing countries can explain why cross-border positions are small compared to simple theoretical predictions (Reinhart and Rogoff, 2004; Kraay et al., 2005). Lower endowments of human capital and the high relative price of capital can explain why the net flow of new investments from rich to poor countries is small today (Caselli and Feyrer, 2007). These explanations leave two questions. Why has the rich world apparently been a net debtor for more than 25 years? How can we explain the difference between the euro area's net foreign asset position (-3.5% of world GDP in 2009) and Japan's (+5%), both high saving, low growth, highly productive and aging economies?

I argue in this paper that the anomalous indebtedness of the world and the puzzling net debt of the rich world are illusions caused by tax havens.¹ International accounts fail to capture most of the assets held by households in tax havens: they miss the equity and bond portfolios that households own through banks in Switzerland, the Cayman Islands, Singapore, and similar offshore centers. According to my computations, around 8% of households' net financial wealth is held in tax havens, of which at least 6% goes unrecorded. The unrecorded stock of offshore wealth is twice bigger than the officially reported net foreign debt of the rich world (Figure I).²

The rest of this paper has two main goals: first, to explain how the stock of unrecorded offshore wealth can be estimated reliably; second, to provide evidence on who are the likely owners of unrecorded fortunes in tax havens

To estimate the amount of unrecorded offshore wealth, I explain why tax havens are bound to provoke anomalies in international investment statistics, in particular in portfolio securities data (Section II); I then systematically exploit the observed anomalies (Sections III and IV). When a French household owns a U.S. equity through its account in Switzerland, France underestimates its foreign assets, because Swiss banks do not exchange data with French accountants. U.S. accountants properly record a foreign liability: they are aware that a foreign resident owns a U.S. equity. Switzerland, which is simply a conduit, records nothing. Therefore, more securities liabilities are bound to be recorded globally than assets, and liability figures published by the U.S. are bound to be bigger than the holdings of U.S. securities reported by the rest of the world.

Relying on a highly harmonized dataset – the IMF Coordinated Portfolio Investment Survey (CPIS) – and on new estimates for non-CPIS participating countries, I show that each year between 2001 and 2008 and for each asset class, identifiable equity and bond assets fell short of liabilities. The discrepancy amounted to USD 4,500bn in 2008: 10%

¹“Tax havens are low-tax jurisdictions that offer businesses and individuals opportunities for tax avoidance” (Hines, 2008). In this paper, I will use the expression “tax haven” and “offshore financial center” interchangeably (the list of tax havens considered by Dharmapala and Hines (2009) is identical to the list of offshore financial centers considered by the Financial Stability Forum (IMF, 2000), barring minor exceptions). The term “countries” will refer to nations, territories, colonies, etc.

²In 2008, the global financial wealth of households was 120% of world GDP. The unrecorded offshore wealth of households, I estimate, was 7.3% of world GDP or 6.1% of global household financial wealth.

of all cross-border securities had no identifiable owner. The gap was particularly large for equities (20%) because of massive unrecorded investments in mutual funds located in Luxembourg, Ireland, and the Cayman Islands. The use of tax havens by households can fully explain these anomalies.

The missing securities must belong to some countries. To shed light on this issue, I draw on a unique and previously unused Swiss dataset (Section V). For years, the Swiss National Bank (SNB) has published the aggregate value of the offshore fortunes managed by Swiss banks, and it has provided precious information – though at first sight hard to interpret – on who owns Swiss bank accounts. Based on the SNB data, I estimate that one third of the global missing wealth is managed in Switzerland and that, contrary to a widely held view, the vast majority of Swiss bank accounts belong to rich countries' residents. Around 45% belong to euro-area residents.

Although we do not know what happens in other tax havens such as Luxembourg, Singapore, or the Cayman Islands, we can propose various scenarios for how unrecorded offshore assets affect published international investment positions (Section VI). Under all plausible scenarios, accounting for tax havens turns the euro area — officially the world's second biggest net debtor — into a net creditor. It also significantly reduces the U.S. net foreign debt. Japan and developing countries seem to be proportionally less affected, plausibly because tax rates are lower and simpler tax evasion technologies exist. Thus, measurement errors caused by tax havens can explain why the rich world seems to be a net debtor, and why Europe's and Japan's net foreign asset positions apparently differ so much.

Unrecorded household wealth in tax havens can explain virtually all the anomalies in portfolio data, but residual anomalies remain in other parts of the international accounts (Section VII). More foreign direct investment assets are recorded than liabilities, and the world has recently started to run a big trade surplus. I argue that the residual anomalies most probably come from errors in the accounts of developing countries. I investigate what happens to the net foreign asset positions of rich countries when unrecorded offshore assets are well accounted for *and* the world international investment position is purged

from all statistical discrepancies. The most likely scenarios still make the euro area and the rich world net creditors.

This paper is related to two strands of the literature. First, it adds to the literature dealing with the empirics of external wealth. International investment statistics are widely recognized as one of the most challenging fields of national accounting: measurement errors are known to be substantial, and conceptual issues are tremendous. 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 et al. (2008) show that accounting for inconsistencies within the set of U.S. accounts is critical to computing accurate returns on cross-border investments. Compared to the existing literature, the key contribution of the present paper is to stress the role of tax havens in generating systematic anomalies at the global level. The paper builds fully exhaustive bilateral portfolio asset data for the first time, which allows me to isolate the anomalies caused by tax havens from those caused by incomplete country coverage in standard datasets. I show how accounting for tax havens reconciles the facts with basic theoretical expectations; I also give practical recommendations on how to improve international investment statistics in the conclusion (Section VIII).

Second, this paper is related to the literature concerned with tax havens and capital flight that developed in the 1980s (Dooley, 1988), with a focus on developing countries (Boyce and Ndikumana, 2001; Collier et al., 2001). Authors in this field use discrepancies within a country's balance of payments to capture potentially unrecorded outflows. In particular, a negative "net errors and omissions" line in the balance of payments is seen as evidence of unrecorded transfers of assets abroad (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. The approach I take in this paper relies crucially on stock data that have become available only recently. The new stock data help make clear what happens exactly in tax havens, where, and why.

II. Tax Havens and Anomalies in International Accounts

II.A. The Recording of Foreign Securities in Principle

First, let's recall the basic accounting 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 gives the stock of existing cross-border investments at the end of each year, while the financial account of the balance of payments gives the flow of new investments that have occurred during the year.

On the asset side of the IIP, five categories are distinguished: direct investment (participations above 10%), portfolio investments (equity and debt securities held outside a direct investment relationship), other assets (mainly loans and deposits), financial derivatives, and reserve assets (including foreign securities held by central banks). The same categories are used 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 for which the issuer and the owner are in two different countries.³ At the end of 2007, traded securities (around USD 50tr) accounted for 50% of all cross-border investments.

To measure A_{ij} , the data collection system of each country i covers some agents directly and others indirectly (IMF, 2002a). 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 sheet) and on their clients' holdings (i.e., on the foreign securities that are off their balance sheet, but that they can observe). Governments

³For instance, A includes the U.S. bonds held by French insurance companies (which are classified as portfolio assets of France and portfolio liabilities of the U.S.) and the U.S. bonds held by the Chinese central bank (which are classified as reserve assets of China and portfolio liabilities of the U.S.). But it excludes the equity participations that U.S. multinational corporations have in their Chinese subsidiaries (which are classified as direct investments in both countries).

and nonfinancial corporations above a 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. Small entities such as trusts, personal wealth-holding companies, or 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 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. Until the 1960s, all securities existed in the form of paper certificates whose owners wanted to put in a safe place, usually a bank vault. 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.⁴ 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 biggest off-balance sheet businesses of banks. Let's indicate the residence country of the custodian 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 that it uses an *onshore* custodian. In some cases, however, it will use a foreign custodian bank, say 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 an option not to pay taxes. In most non-haven countries, domestic custodians automatically tell domestic and foreign tax authorities how much interest and dividends their clients have earned during the tax

⁴For a description of the securities custody industry, see Chan et al. (2007).

year. Such a third-party reporting makes evading personal income taxes impossible. By contrast, haven-based banks don't exchange information with tax authorities, making tax evasion possible. Taxes can only be collected if taxpayers choose to self-declare the dividends and interest they have earned on their offshore accounts. De facto, cross-border custody for households is a service offered only by tax havens, although not all tax havens offer it.

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

II.B. The Recording of Foreign Securities in Practice

In practice, cross-border custody provokes systematic errors in published accounts. To see why, consider what international accountants are able to measure.

First, in France (country i), all the U.S. securities belonging to French banks, investment funds or insurance companies are directly declared to French accountants, whether they are held in France or abroad. Capturing the U.S. securities held in France by households 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: it is a blind spot of international accounts. The blind spot is well known among international accountants, though they do not try to estimate it.⁵ Let's denote with a hat French statisticians' estimations. I assume that all the foreign securities held by direct reporters are accurately measured, as well as all the foreign securities held onshore by households:

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

Second, in Switzerland (country k), domestic banks are asked to report on the stock of securities that they have in custody. Swiss statisticians observe that Swiss banks have

⁵See for instance European Central Bank (2002, p. 8).

in custody some U.S. securities belonging to French residents. Following the residence principle, Swiss statisticians disregard these holdings when they compile Switzerland's international investment position. Table I shows that in 2004, the foreign (that is, non-Swiss) securities in custody in Swiss banks were 2.4 times bigger than the foreign securities recorded in the Swiss IIP. It means that two thirds of the foreign securities in the vaults of Swiss banks belonged to foreigners, while only one third belonged to Swiss residents. By contrast, there was almost as much foreign securities in custody in French banks than recorded in the French IIP.

Finally, in the U.S. (country j), statisticians can fairly easily measure the securities liabilities of the U.S. (L_j). Few agents issue securities (households don't), and this is standard balance sheet information. Identifying whether U.S. securities are held by U.S. or by foreign residents is relatively simple, because securities markets are extremely centralized. In the end, all traded securities issued by the U.S. are kept by the U.S. central securities depository, which is the ultimate book-keeper where all settlements take place. Most foreign-owned securities can thus be directly observed by U.S. statisticians.⁶ Accordingly, I will assume that estimates of foreign portfolio liabilities (\hat{L}_j) are accurate.

$$\hat{L}_j = L_j \tag{H2}$$

II.C. Anomalies Provoked by Tax Havens

We can now see that we are bound to observe a series of inconsistencies in international investment statistics at the global level.

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

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

⁶The centralization of securities markets is not specific to the U.S. An exception concerns the so-called eurobonds (bonds issued by domestic agents directly abroad in a currency not native to the country where they are issued), which are ultimately kept in custody in one of the two international central securities depositories (one is in Belgium, the other in Luxembourg). The effect of eurobonds on the estimates of L_j is ambiguous: eurobonds are quite hard to capture, hence they tend to bias downwards estimates of L_j . But in general, IIP compilers assume that all identified eurobond liabilities are held by foreigners, which tends to bias upwards estimates of L_j .

havens, more securities liabilities are bound to be recorded than assets.

Anomaly 2: *Debtor-reported liabilities are bound to be bigger than creditor-derived liabilities.*

When a French household owns a U.S. equity through a Swiss bank, this asset on the U.S. is neither recorded by France (wrongly) nor by Switzerland (rightly), but well recorded by the U.S. as a liability. Portfolio liabilities recorded by the U.S. are bound to be bigger than the sum of all U.S. securities holdings recorded by the rest of the world.

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

In domestic balance of payments, dividends and interest income are usually estimated by applying estimated yields to observed stock positions. If a stock of securities is missing in published stock accounts, the interest and dividends paid by these securities will be missing in published flow accounts. Because of tax havens, more cross-border investment income is bound to be paid than received globally.

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

When a French household buys a U.S. equity from its Swiss account, the U.S. records a sale, but Switzerland does not record any purchase, and France cannot record any purchase. As long as households buy securities from their offshore accounts, more cross-border securities are bound to be sold than purchased.

Reciprocally, if we observe in the data the four anomalies described above, then they reflect exactly the value of households' unrecorded offshore fortunes under three assumptions: (H1) international accountants measure accurately the onshore and offshore holdings of corporations and governments; (H2) they measure accurately portfolio liabilities; (H3) all countries and territories are covered by the data. In what follows, I construct a dataset that approximates as closely as possible these three assumptions, and use the observed anomalies to study households' offshore fortunes.⁷

⁷Tax havens also contribute to generating anomalies in bilateral investment data, e.g. between the U.S. assets reported by Switzerland and the liabilities vis-a-vis Switzerland reported by the U.S (Bertaut et al., 2006). But the effect of tax havens is harder to isolate, so I do not use bilateral inconsistencies in the present research (see, however, Section C of the online Appendix for more details on bilateral anomalies).

III. Data

The dataset used in this research consists of:

- Sixteen 238×238 $\hat{\mathbf{A}}_{ij}$ matrices that give the securities holdings of 238 creditors i on 238 debtors j . There is one matrix per year over 2001-2008 and per instrument (debt, equity). The 238 creditors and debtors considered are all countries and territories (including very small offshore financial centers) and international organizations (which count for one).
- Sixteen 238×1 \mathbf{L}_j vectors that give the securities liabilities of 238 debtors vis-a-vis the rest of the world.

III.A. Main Data Sources

The Coordinated Portfolio Investment Survey (CPIS) organized under the auspices of the IMF is the main data source for the asset side. Conducted yearly since 2001, it gives the bilateral portfolio holdings of 74 countries (in 2008) on 238 debtors. It is complemented by a survey of the securities held on aggregate as reserve assets (the so-called SEFER) and by international organizations.

We have all reasons to think that the CPIS and SEFER capture accurately all the onshore and offshore holdings of participating countries' corporations and governments – assumption (H1). Leaving aside households' offshore assets, portfolio figures are easy to establish: securities markets are very centralized; there is in most countries an old tradition to survey custodians; and custodians observe all the securities held onshore. Securities data are reliable: traded stocks and bonds have exact and readily available market prices. Positions are established at year-end, and converted to U.S. dollars using IMF exchange rates. Except in very specific cases, there is no valuation issue. Finally, since the end of the 1990s, the IMF and central banks across the world have made considerable efforts to improve data quality. At the national level, compilers opt increasingly for security-by-security accounting. At the global level, the CPIS has been launched precisely to solve the long-standing anomalies in international investment statistics; the IMF

has emphasized the importance of following strictly defined guidelines, and the CPIS has contributed considerably to harmonize collection methods and to spread best practices.

Admittedly, there remain some practical difficulties, mostly for bonds. It is not always easy to distinguish direct and portfolio investments. When partial repayment of a debt security is possible, as is the case for asset-backed securities, some custodians keep track of the original principal, others only of what is remaining. Several operations can lead to under- or double-counting (repurchase agreements, securities lending, depository receipts, stripped securities). In all cases, however, the IMF has provided clear guidelines through the CPIS (IMF, 2002a).

The main data source on the liability side is the updated and extended version of the External Wealth of Nations dataset constructed by Lane and Milesi-Ferretti (2007), which covers 178 countries. In the database, estimates of portfolio liabilities come from published IIPs or are derived by cumulating flows and adjusting for valuation effects. Though some measurement error is possible, there is no particular reason to think that portfolio liability data are systematically biased in a way or another. The assumption (H2) that portfolio liability figures are accurate is likely to hold.⁸

The main problem of the the CPIS-SEFER and External Wealth of Nations databases is their incomplete coverage: I estimate that the CPIS and SEFER covered 86% of all cross-border securities assets in 2008 (down from 93% in 2001) and that the External Wealth of Nations database covered each year 86-87% of all liabilities. To isolate the anomalies caused by tax havens from those cause by incomplete country coverage, we need data from all countries – assumption (H3). So I fill the gaps of the three databases with new estimates for each non-covered country. The online Appendix describes extensively the raw sources used to make these estimations, presents all the computations line by line, provides consistency and robustness checks, and compares the results with other studies. Below are the main steps.

⁸In section B.2 of the Appendix, I describe minor corrections made to the External Wealth of Nations data.

III.B. Filling the Coverage Gaps for Portfolio Assets

The 74 biggest private creditors of the world were participating in the CPIS at the end of 2008. For each non-participating country, I start from the portfolio asset figures P_{it} in the updated and extended External Wealth of Nations database, and use a simple gravity-like model to construct bilateral portfolio holdings P_{ijt} . The model is of the form:

$$\log(1 + P_{ijt}) = \phi_j + \theta_t + \beta Z_{ijt} + \gamma X_{it} + \epsilon_{ijt}$$

where ϕ_j denotes debtor-country fixed-effects, θ_t denotes year fixed-effects, Z_{ijt} is a vector of bilateral controls, and X_{it} is a vector of creditor-country controls. This model has been used for similar imputations purposes by Lane and Shambaugh (2010), following Lane and Milesi-Ferretti (2008) who present both empirical and theoretical arguments for this procedure. X_{it} includes i 's population, latitude, GDP per capita, whether it is landlocked, and whether it is an offshore financial center (OFC). Z_{ijt} includes the log of distance, the log of the GDP gap and of the GDP per capita gap, the longitude gap (a proxy for time zone differences), as well as dummies indicating a common language, the existence of a colonial relationship, whether i and j are both industrial countries, and an interacted term $OFC_i \times \phi_j$.

I estimate the model on the CPIS dataset, separately for debt and equity. In the previous literature, offshore financial centers were excluded from the sample. Table II shows that after including offshore financial centers, such a simple gravity-like model can still explain 70% of the variance in bilateral portfolio holdings. All covariates enter with expected signs and magnitudes. I use the predictions of the model to generate the bilateral portfolio assets of non-CPIS participants, imposing the constraint that $\sum_j \hat{P}_{ijt} = P_{it}$. I have checked that the model performs well in sample by comparing the predicted pattern of U.S., Japanese, and French investments abroad with official data. The model is sufficiently accurate to provide sensible imputed values.⁹

Example: Lane and Milesi-Ferretti (2007) estimate that Taiwan had USD 197bn of portfolio equity assets in December 2007. The gravity model predicts that 15% were

⁹See Appendix Tables A16-A17 and Figures A2-A7.

invested in the U.S, 11% in Hong-Kong, 7% in South Korea, 6.5% in Japan, etc.

In some cases, there is no estimate of portfolio holdings P_{it} in the External Wealth of Nations database and in the CPIS. The most noteworthy coverage gap concerns the Cayman Islands,¹⁰ which only reported the portfolio holdings of its banks in the CPIS, disregarding its large hedge fund industry.

In order to estimate the Cayman Islands' total assets, I start from the Caymanian holdings of U.S. securities observed from the U.S. (USD 213bn of equity liabilities and 494bn of debt liabilities were recorded by the U.S. vis-a-vis the Cayman Islands at the end of 2008). Next, I estimate the share represented by U.S. securities in the Cayman Islands' portfolio using the gravity-like model. For 2008, the model predicts a U.S. share of 46% for equities and 62% for debt, implying total Caymanian holdings of USD 1.25tr. Finally, I use the other predicted shares to allocate the rest of the Cayman Islands' portfolio. Reassuringly, this method is consistent with published data on the holdings of Cayman-domiciled hedge funds.¹¹

III.C. Filling the Coverage Gaps for Securities Held as Reserve

The CPIS gives portfolio holdings. If we want an estimate of all securities assets identifiable globally, we must add the securities held as reserve. Some of them are covered by the SEFER survey, but not all countries participate in the SEFER. The list of participating countries is confidential, but we know that the CPIS and SEFER coverages overlap considerably.¹² I assume that they overlap perfectly. This leaves China, Middle Eastern oil exporting countries, and smaller sovereign investors to deal with.

I assume that China invests 85% of its non-gold reserves in securities. On average, central banks invest 75% of their assets in securities and 25% in bank deposits, but Wooldridge (2006) notes that the securities share is probably higher in China. The

¹⁰See Section A.6 of the Appendix for the case of smaller offshore centers not covered by the CPIS and the External Wealth of Nations database, e.g. the British Virgin Islands.

¹¹See Section A.2 and Table A6 of the Appendix for a detailed analysis of available sources and complete references.

¹²According to the IMF (2002b, p. 3), "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."

comparison between U.S. portfolio liabilities vis-a-vis China and my estimate of China's holdings of foreign securities implies that around 70% of China's portfolio was invested in the U.S. throughout 2001-2008, which is consistent with available evidence and previous studies.¹³ I assume that China invests its non-U.S. reserve assets in the same way as the average central bank participating in the SEFER.

Middle Eastern oil exporters are widely thought to invest abroad through offshore banks in Switzerland, London, and Hong-Kong, which makes it hard to trace their holdings (see Milesi-Ferretti et al., 2010). Against this backdrop, I choose to include all Middle Eastern oil exporters' offshore holdings in my unrecorded household offshore wealth residual.¹⁴ To estimate their onshore assets, the right way is to use counterpart country data. Starting from Middle Eastern oil exporters' holdings of U.S. securities as seen from the U.S., I make assumptions on the share of U.S. securities in their portfolio. All geographical breakdown estimates published recently share two convictions: the U.S. share is high, and it has declined in recent years.¹⁵ Assuming for 2001 a 70% share of U.S. assets and a regular decline of 2 percentage points per year fits best the various available estimates. I allocate the non-U.S. investments of Middle Eastern oil exporters according to the shares predicted by the gravity model.

For all other non-SEFER participants, I start from the non-gold reserves that each of them reports to the IMF. Following Wooldridge (2006), I assume that 75% are invested in securities and that non-SEFER participating countries have the same investment patterns as SEFER-participating countries.¹⁶ For instance, in 2008, Taiwan did not participate in the CPIS hence arguably not in the SEFER either. Taiwan had USD 296bn in reserve assets. I assume that USD 222bn were invested in foreign securities, of which 51% in the U.S., 15% in Germany, 6% in France, 4% in the U.K. and in Japan, etc.

¹³See Appendix Table A7.

¹⁴Admittedly, part of Gulf countries' offshore assets may not belong directly to private persons but to sovereign wealth funds. But the distinction between private and public wealth is not always clear, so I take the simplifying view that all the offshore holdings of Middle Eastern oil exporters can be considered as ultimately privately held – an assumption that we will have to keep in mind in Section VI when we study how unrecorded offshore fortunes affect published net foreign asset positions.

¹⁵See Section A.5 of the Appendix for a discussion of these studies and complete references.

¹⁶See Appendix Table A15.

III.D. Filling the Coverage Gaps for Liabilities

Lane and Milesi-Ferretti's (2007) External Wealth of Nations database does not cover the portfolio liabilities of several offshore centers (most notably the Cayman Islands, Bermuda, the Bahamas, the British Virgin Islands, Jersey, and Guernsey). Accounting carefully for them is essential to the results presented in this paper. I use three kinds of sources: (i) domestic sources, such as central banks' or financial authorities' reports, (ii) counterpart country data, and (iii) the Bank for International Settlements (BIS) international debt data.¹⁷

Example: (i) From the Cayman Islands Monetary Authority's *Statistical Investment Digest*, I estimate that Cayman-based hedge funds had USD 1.0tr in equity liabilities at the end of 2008. (ii) The U.S. recorded USD 61bn of equity assets on entities domiciled in the Cayman Islands other than mutual funds, which provides a lower bound for the Cayman non-fund equity liabilities. (iii) The BIS indicates that the Cayman Islands had issued USD 1.1tr in international bonds. I assume that they were owned by foreigners. My estimate of the Cayman Islands' portfolio liabilities equals $\text{USD } 1.0\text{tr} + 0.06\text{tr} + 1.1\text{tr} = \text{USD } 2.2\text{tr}$.

IV. Globally Unrecorded Wealth in Tax Havens

Now that we have a comprehensive database on identifiable cross-border securities assets and liabilities, we can observe that the predicted anomalies caused by tax havens exist. They are large, systematic, and internally consistent.

IV.A. The Missing Wealth of Nations

Figure II shows that each year, identifiable assets are less than liabilities (Anomaly 1). In 2008, the gap Ω amounted to USD 4.5tr. 11% of all cross-border securities had no identifiable owner. Figure III and IV plot the discrepancy for equities and bonds separately. Two thirds of the discrepancy comes from equities. Strikingly, 20% of all

¹⁷See Appendix Sections B.3 and B.4 and Tables A10 and A11.

cross-border equities have no identifiable owner each year. Bonds are less affected (with a 6% discrepancy in 2008).

Because I consider all countries and territories, the USD 4.5tr asset-liability discrepancy cannot come from incomplete country coverage. It is not sensitive to the precision of the bilateral model used to fill the gaps of the CPIS: the discrepancy only rests on estimates of total assets and liabilities, not on estimates of bilateral investment patterns. In principle, it is not sensitive either to the imputations for offshore centers with no official portfolio asset and liability data, because I have taken care to provide consistent estimates for both sides of their balance sheet. For instance, if my estimate of Caymanian assets is USD 200bn too small, then my estimate of Caymanian liabilities is also USD 200bn too small, leaving the global discrepancy unchanged. Finally, 85-90% of all identified assets come from high-quality and highly harmonized surveys. Thus, the expected asset-liability discrepancy exists, it is big, and it most likely comes from the non-recording of households' offshore holdings.

All the other expected anomalies exist as well. The discrepancy in stock data has its exact counterpart at the flow level in the world balance of payments computed independently from the present study by the IMF.

The IMF world balance of payments includes all countries' reports plus undisclosed IMF estimates for non-reporters. It exhibits two striking anomalies. First, more cross-border investment income is paid than received each year (Anomaly 3). In 2008, the discrepancy amounted to $D = \text{USD } 156\text{bn}$.¹⁸ To see how this flow discrepancy fits with the stock discrepancy, denote r_Ω the yield on the missing wealth Ω (i.e., the flow of missing dividends and interest divided by the stock of missing securities). A USD 156bn missing flow implies a sensible yield of $r_\Omega = 3.5\%$ on the stock of missing wealth, consistent with the yield observed on identified cross-border portfolio securities (4%¹⁹).

Second, there are more securities sold than purchased in the world balance of payments (Anomaly 4). The portfolio investment balance of the world financial account is always positive, barring one exception in 1998. To see how this flow discrepancy fits with the

¹⁸See Appendix Table A21.

¹⁹See Appendix Table A22.

stock discrepancy, we can write the change in the stock of unrecorded offshore wealth Ω 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 accounts. Table III breaks Ω down following equation 1. We see a reasonable pattern: steady inflows, negative valuation effects during equity bear markets, positive valuation effects during bull markets, and reasonable yields r_Ω throughout the period.

The discrepancy between identifiable securities assets and liabilities captures only household wealth: it does not capture the value of corporations' or governments' offshore portfolios, because those are well captured both as assets and liabilities in published accounts. Thus, Ω can directly be compared to household wealth figures. At the end of 2008, global household net financial wealth (i.e., cash, stocks, bonds, and insurance contracts of households less household debt) was USD 74tr according to Credit Suisse (2010).²⁰ Unrecorded offshore assets (USD 4.5tr) accounted for 6% of the net financial wealth of households.

IV.B. Where the Missing Wealth is Invested

Using bilateral asset data allows us to go beyond the aggregate stock of missing wealth and to know where it is invested. This is revealed by the difference between debtor-reported liabilities (L_j) and creditor-derived liabilities ($\sum_i \hat{A}_{ij}$) (Anomaly 2).

In 2008, the missing wealth was invested in two groups of countries (Figure V). The first group includes some of the main developed countries: the U.S., Japan, France, Italy, the Netherlands, 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

²⁰This report builds on the methodology developed by Davies et al. (2011) to compute the level and distribution of world wealth in 2000.

domiciled) and Ireland (that hosts traditional investment funds, hedge funds, and money market funds).

The discrepancy between the size of the offshore fund industry and the low level of claims reported on it is huge. Half the fortunes managed by Luxembourgish and Caymanian funds cannot be traced to any owner, as well as 70% of those managed by Irish funds. This anomaly is robust. It had been documented by Lane and Milesi-Ferretti (2007) in the case of Luxembourg and Ireland, and suggested by Lane and Milesi-Ferretti (2010) in the case of the Cayman Islands. It has been growing rapidly, as Figure VI shows: in 2001, most of the equities held offshore were invested in the U.S. and other developed countries; in 2008, more than three quarters were invested in the three big offshore fund centers.

The black hole in the offshore fund industry can be explained as follows. On 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 holding on Luxembourg. The gap does not come from incomplete country coverage. It cannot come from errors in my estimations of China’s or oil exporters’ assets: central banks and sovereign wealth funds invest only marginally in mutual funds; they manage the bulk of their assets directly. We can confidently rule out any big error in the liability figures published by Luxembourg and Ireland, which reflect mostly the net asset value of their mutual funds: net asset values are calculated daily and checked by independent auditors.²¹ Finally, anyone can see on the banks’ websites that most mutual funds marketed by Swiss banks are incorporated in Luxembourg and similar offshore centers.

Investing in a Luxembourgish fund from a Swiss accounts makes perfect sense for a French tax evader: Luxembourg does not tax cross-border payments, so one receives on his Swiss account the full dividend paid by the fund, and the French personal income tax can be evaded, since there is no automatic exchange of information between Swiss

²¹The equity liability figure of the Cayman Islands is my own estimate based on the Cayman Islands Monetary Authority’s *Statistical Investment Digest*. It is conservative: if anything, it understates the size of the Caymanian hedge fund industry (in which case the gap for the Cayman Islands would be bigger, the gap for all other countries smaller, and the aggregate missing securities wealth unchanged).

banks and the French tax authority. Conversely, a French resident has to go through each step of the France-Switzerland-Luxembourg circuit to evade taxes. Investing in a Luxembourgish fund from a French account does not allow one to save taxes. Investing in a Swiss mutual fund from a Swiss account is useless too, because all capital income paid by Swiss entities (e.g., dividends paid by Swiss mutual funds) is subject to a 35% advance tax withheld at source by Switzerland. The advance tax can only be refunded when individual taxpayers declare their income on their tax returns. It explains why less than 5% of the missing wealth is invested in securities issued by Switzerland. The tax does not apply to income paid by foreign entities (e.g., Luxembourgish mutual funds) and credited on a Swiss account.²²

In sum, anomalies in international investment statistics suggest that 6% of households' financial wealth was held unrecorded in tax havens at the end of 2008, of which half was invested in mutual funds located in Luxembourg, Ireland, and the Cayman Islands. The final piece of evidence comes directly from Switzerland, which publishes precious information on its cross-border wealth management business, fully consistent with what anomalies in international investment statistics suggest.

V. Offshore Wealth in Switzerland

V.A. The Consistency Between Swiss and Global Offshore Fortunes

Swiss banks have in custody Swiss securities belonging to Swiss residents, Swiss securities belonging to foreigners, foreign securities belong to Swiss residents, and foreign securities belonging to foreigners, which I denote Ω^s . The value of each kind of custodial holding has been published monthly by the Swiss National Bank (SNB) since 1998, based on a comprehensive survey of Swiss-domiciled custodians. The monthly survey covers 95% of all custodial holdings, an exhaustive survey is conducted yearly.²³

²²The advance tax is strictly applied, and almost impossible to avoid: only a few Swiss funds – that invest more than 80% of their assets in foreign securities – can be exempted. Created in 1945, the advance tax is how Switzerland enforces its own personal capital income tax, since there is no automatic exchange of information between Swiss banks and the Swiss tax administration.

²³The 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 $D5_1$, $D5_{1a}$, $D5_1$, $D5_{1b}$, $D5_2$

The Ω^s series are truly unique: to the best of my knowledge, no other country in the world publishes similar statistics on a regular basis and with a comparable level of details. 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 dataset systematically to document the amount of offshore wealth in Switzerland.

To compare Ω^s to the global stock of missing household wealth Ω , we have to assume that the foreign securities put in custody in Swiss banks by foreigners belong to households. Although there is no reliable way to check this assumption, it is reasonable on a priori grounds. It makes little sense for foreign banks, insurance companies or investment funds to entrust their foreign securities to Swiss banks: doing so does not provide any tax or regulatory advantage. From the 2004 survey of French custodians (Table I), 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 have specialized in the business of cross-border custody for financial corporations. By contrast, anecdotal evidence that Swiss banks have specialized in the business of cross-border custody for individuals is plentiful, from numerous journalist investigations, to industry reports, and recent high-profile tax scandals in the U.S., France, or Germany. Ω^s is thus a good proxy for the amount of household offshore wealth managed by Swiss banks.²⁴

At the end of 2008, offshore fortunes managed in Switzerland (Ω^s) represented 34% of all offshore fortunes (Ω). Table IV shows that the offshore fortunes managed in Switzerland look exactly like the missing wealth of nations derived in Section IV, although both have been established by completely different methods, relying on fully independent

and *D52b*.) The results of the yearly survey are published in SNB’s *Banks in Switzerland* (<http://www.snb.ch/en/iabout/stat/statpub/bchpub/stats/banken.ch>, series 38a, 38b, 38c).

²⁴Note that the SNB provides a breakdown of Ω^s by sector of the owner (private customers, commercial customers, and institutional investors). But this breakdown is deeply misleading: the SNB cannot and does not “look through” intermediate wealth-holding structures used by individuals that have a Swiss account. The securities of a French individual using a shell Panamian holding company are erroneously counted as belonging to the foreign “institutional investors” sector, although the beneficial owner is clearly a household. This is a pervasive 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 his portfolio of foreign securities, his holdings will be recorded as Swiss-owned by the SNB, hence will not appear in Ω^s .

sources. Equities account for two thirds of global offshore fortunes Ω and two thirds of Swiss-managed offshore fortunes Ω^s , bonds for one third, and most equities are mutual fund shares. The dynamics match as well: just like for Ω , we observe a shift in Ω^s towards mutual fund shares over 2001-2008.²⁵ I see these simple facts as the most compelling proof that anomalies in international investment statistics reflect accurately households' offshore holdings.

V.B. Offshore Cash Deposits and Total Offshore Wealth

The foregoing discussion has centered on a particular kind of household wealth, namely securities. In tax havens, however, households can hold securities but also cash deposits – that is, they can open an investment account (securities) or a simple bank account (deposit). How big are offshore bank deposits?

Contrary to what happens for securities, offshore bank deposits are not completely unrecorded in international statistics. All significant financial centers tell the Bank for International Settlements (BIS) how much deposits foreigners have put in their banks.²⁶ Accountants of a country i can use the BIS data to estimate the value of the offshore bank deposits belonging to residents of i . The IMF has been advocating the use of the BIS data by international accounts compilers since the 1990s, hoping that it would contribute to eliminate the world current account deficit. The U.S. proceeded to the substitution of BIS data for U.S. sources at the beginning of the 1990s. Not all countries do so, however, so offshore bank deposits are still imperfectly captured globally. To measure the global level of wealth held in offshore bank deposits, some might be tempted to use the aggregate value given by the BIS. Unfortunately, the BIS does not disentangle household bank accounts from corporate bank accounts.

To go further, we must again turn to Switzerland. Swiss banks provide a unique kind of account which they refer to as a “fiduciary account.” Money put on a fiduciary account is invested in foreign money markets by Swiss banks on behalf of their clients.

²⁵See Appendix Table A23.

²⁶The BIS does not disseminate bilateral data (e.g., bank deposits of U.S. residents in the Cayman Islands), only aggregate data (e.g., bank deposits of U.S. residents in all BIS-reporting countries.)

Legally speaking, all interest is considered to be paid by foreigners to the depositors, the Swiss banks acting only as “fiduciaries.” Thus, fiduciary accounts are not subject to the 35% Swiss advance tax: they are completely untaxed in Switzerland, just like foreign securities held in custody there. They cannot be used as medium of exchange, hence are useless for corporations. Fiduciary accounts are *the* Swiss bank account – and the value of Switzerland’s fiduciary deposits is published by the SNB.

In the second column of Table IV, I disentangle the stock of household offshore wealth managed by Swiss banks in two: offshore securities (Ω^s) and fiduciary deposits. In 2008, fiduciary deposits accounted for 24% of the total. The composition of the offshore fortunes managed by Swiss banks corresponded to one of the most commonly advised conservative asset allocation: one fourth deposits, one fourth bonds, one half equities. In order to give a rough estimate of the global stock of household offshore assets, I assume in the first column of Table IV that the same deposits/securities allocation held in other tax havens. Global offshore wealth then amounted to USD 4.5tr (securities) plus USD 1.4tr (deposits). The resulting USD 5.9tr figure represents 8% of households’ financial wealth. Out of these 8%, at least 6% (securities) were unrecorded and at most 2% (deposits) were recorded in international accounts.

While this paper is the first in the academic literature to estimate the wealth held by households in tax havens, several 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 USD 6.7tr in 2008 (Boston Consulting Group, 2009, p. 31). Cap Gemini and Merrill Lynch (2002, p. 11) put it at USD 8.5tr in 2002. The Tax Justice Network (2005) has a USD 11.5tr figure for 2005, and Palan et al. (2010, p. 5) write that “in 2007, the global rich held 12 trillion dollars in tax havens.” My estimate (USD 5.9tr in 2008) is therefore at the low-end. Note that I focus on financial wealth only, whereas households can also use tax havens to hold real assets, such as real estate or works of art held through offshore trusts. There is, however, no way to quantify these holdings.

V.C. Owners of Offshore Fortunes in Swiss Banks

Since 1976, the SNB has published a full country breakdown of fiduciary deposits' owners, thus giving precious information on who owns unrecorded accounts in Switzerland.

Country breakdowns are difficult to interpret at first sight – which may explain why they have been seldom used. As Figure VII shows, a big and growing fraction of Swiss fiduciary deposits are recorded as belonging to tax havens, most notably Panama, Liechtenstein, the British Virgin Islands, the Bahamas, and the Cayman Islands. Such “holdings” are recorded because the SNB does not look through intermediate structures used by households. If an account is opened in the name of a sham corporation “located” in Panama whose beneficial owner is a French person, then the fiduciary deposits are recorded as Panama's. Using sham entities as nominal owners of Swiss accounts has a long tradition, dating back at least to the end of the Second World War (Schaufelbuehl, 2009). When one understands the purposes that sham entities serve, there is clear evidence that most fiduciary accounts “of” tax havens belong to residents of rich countries, in particular to Europeans.

A sham entity adds a layer of secrecy between the owner of a Swiss account and his holdings, making it harder for tax authorities to investigate tax fraud cases. When numerous intermediate wealth-holding structures in multiple tax havens are combined, it can be practically impossible to find who is the beneficial owner of a Swiss account. Sham entities are less useful for residents of countries where there is no income tax or where tax administrations have no resource to investigate offshore accounts.

To curb offshore tax evasion, the European Union has adopted the savings tax directive: since 2005, interest earned by European Union residents through Swiss and other offshore accounts are subject to a tax which must be withheld at source by banks.²⁷ But the directive only applies to accounts opened by European households in their own name, not to accounts which on paper belong to entities outside the European Union. Sham entities are a straightforward way to avoid the EU savings directive.

Inspection of Figure VII shows that there is a perfect negative correlation between the

²⁷Since July 2011, the tax rate is 35%. 75% of the receipts of the tax are transferred to the European country where the account owner is resident.

share of fiduciary deposits held by Europeans and “by” tax havens. European depositors have shifted their holdings to sham entities over time. The reaction of European deposits to the introduction of the EU savings directive in July 2005 is particularly striking: Europe’s share of Swiss fiduciary deposits declined by 10 percentage points between December 2004 and December 2005, while tax havens gained 8 percentage points. Other regions kept a fairly stable share.²⁸ In a recent book, a Swiss journalist documents how Swiss bankers created sham entities on a large scale during the Summer of 2005 to help their European clients avoid the directive (Zaki, 2010).

Other evidence of rich countries’ residents using sham entities is given by the U.S. Internal Revenue Service (IRS). The IRS has recently released several case studies of tax evasion by U.S. residents in a big Swiss bank.²⁹ In almost all cases, the Swiss accounts were owned through sham entities with an address in Panama, the Bahamas, the British Virgin Islands, Liechtenstein, or Hong-Kong. Accounts initially opened in the name of a U.S. individual had been transferred to such entities in the 1990s or 2000s. Note that in many IRS cases, the sums involved are gigantic (reaching USD 100 millions 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 which were not “held by” tax havens, it also owned 10% of the deposits which were “held by” tax havens. Let’s also assume that Gulf countries do not use sham entities (which is plausible since they have no capital income tax). Then the rich world owned 62% of Swiss fiduciary deposits in 2004.³⁰ In comparison, the Boston Consulting Group (2009) estimates that 62% of Swiss offshore accounts belonged to Europeans and Americans in 2008. Contrary to a widely held view, there is no indication that African dictators or rich persons from Asia or Russia own the bulk of Swiss accounts.

²⁸See Johannesen (2010) for a thorough analysis of the reaction of Swiss bank deposits to the directive.

²⁹<http://www.irs.gov/newsroom/article/0,,id=110092,00.html>.

³⁰See Appendix, Table A26. The list of rich countries considered is the same as in Figure I, except that it excludes Switzerland, as well as Luxembourg and Cyprus (two tax havens).

VI. Implications of Tax Havens for net Foreign Asset Positions

Switzerland is the quintessential tax haven: cross-border wealth management has been invented by Swiss banks, and all industry reports suggest that Switzerland is still by far the biggest player on this market. Although we do not know what happens in other tax havens such as Luxembourg, Singapore, or the Cayman Islands, we can make simple assumptions and see how they affect the recorded net foreign asset positions of rich countries.

VI.A. The net Foreign Assets of the Rich World

Published statistics have portrayed the rich world as a net debtor since the mid-1980s (Figure I). This stands in sharp contrast to what the neoclassical growth model suggests. To see why, consider a world in which all countries have the same standard, infinitely-lived representative household with preferences

$$U = \int_0^\infty \frac{C^{1-\theta} - 1}{1-\theta} e^{-\rho t} dt$$

where ρ is the pure rate of time preference, and θ the inverse of the intertemporal elasticity of substitution. All countries produce the same homogeneous good using effective labor ($e^{gt}L_t$) and capital (K_t) according to the Cobb–Douglas production function

$$Y_t = K_t^\alpha (e^{gt}L_t)^{1-\alpha}$$

Assume that financial autarky prevails initially, and that countries differ only in their level of development, as in Gourinchas and Jeanne (2006). Rich countries have reached their steady-state, in which capital per unit of efficient labor k^* is constant. Developing countries are still on their transition to the steady-state, with capital per unit of efficient labor k_t . Consider what happens when developing countries move to financial integration. Domestic agents can now lend or borrow at the world interest rate r , which is the steady-state interest rate of rich countries: $r = \rho + \theta g$. At the time of opening, k_t jumps immediately to its long-run level k^* . As long as $k_t < k^*$, developing countries borrow

immediately to purchase the capital that allows them to reach their steady-state. After financial integration, rich countries are net creditors, the former developing countries net debtors. In the basic model, the transition of developing countries to their steady-state is implausibly fast. But if we introduce human capital in the production function and assume that it cannot be used as collateral for foreign borrowing, then the open-economy neoclassical growth model exhibits a plausible speed of convergence (Barro et al., 1995).

Admittedly, countries have different savings rates, and the model does not exclude a scenario in which a developing country with a low rate of time preference and high capital/output ratio opens up and asymptotically owns the whole world. However, it seems hard to argue that the developing world was more capital-abundant than the rich world in the 1980s, a decade of crisis. Caselli and Feyrer (2007) suggest that capital/output ratios were more unequal in the 1980s than today. For most years, the negative net foreign asset position of the rich world makes little sense.

Accounting for tax havens solves the puzzle. If the rich world owns 50% of the unrecorded stock of offshore assets Ω , it is balanced today – hence, was a net creditor in the 1980s and 1990s. Now, 50% must be considered as a lower bound. Part of Ω belongs by construction to Middle Eastern oil exporters, and non-oil developing countries have offshore accounts too. But Middle Eastern oil exporters' share of Ω is no more than 10%: Middle Eastern countries have 10% of Switzerland's fiduciary deposits, and assuming that they have 10% of Ω implies total portfolio holdings for Middle Eastern countries which are well in line with the literature, if a bit higher.³¹ Non-oil developing countries only have 25-30% of the offshore fortunes managed by Swiss banks,³² while rich countries' households have more than 60%. According to the Boston Consulting Group (2009, p. 31), around 60% of all offshore fortunes globally belong to residents of rich countries. In light of all available evidence, the most likely scenario is that rich countries own more than 50% of Ω , which is hardly surprising since rich countries households' own 80% of (recorded) world wealth (Davies et al., 2011). With more than 50% of Ω , the rich world is a net creditor.

³¹See Appendix Table A8.

³²See Appendix Table A26.

VI.B. The net Foreign Asset Position of the Euro Area

Over the last 20 years, the present-day euro area's net foreign asset position has consistently been negative,³³ which again stands in sharp contrast to what the neoclassical model suggests. To see why, consider the model with exogenous savings:³⁴ the sign of the net foreign asset position in steady-state depends on the gap between the “natural” interest rate $r^* = \alpha g/s$ (where s is the net savings rate) and the world interest rate r . A country is a net creditor if and only if $r^* < r$, and the net foreign assets/national income ratio β_F^* is (Piketty, 2011, Appendix E p. 123):

$$\beta_F^* = s \frac{1 - \frac{r^*}{r}}{g - sr}$$

As long as the world interest rate is bigger than 5%, the model predicts for the euro area a positive net foreign assets position – and one that is only slightly lower than Japan's, since both regions have had comparable growth and net savings rates over the last 30 years: $s=14\%$ in Japan and 12% in the euro area; $g = 2.2\%$ in Japan and 2% in the euro area.

Accounting for tax havens can again reconcile the predictions of the model with the facts. There are indeed four reasons to think that the euro area is the most heavily affected by unrecorded offshore wealth, while Japan seems much less affected.

First, euro-area residents own around 45% of Switzerland's fiduciary deposits³⁵ while Japanese residents own less than 1%. Second, euro-area countries tax relatively heavily households' capital income: according to the OECD, in 2005 the net personal tax rate on dividends was 22.2% in Germany, 23% in Spain, 32.3% in France, 42% in Ireland, against 10% in Japan, and 18.3% in the United States.³⁶ In the classical Allingham and Sandmo (1972) model of tax evasion, the marginal tax rate has no impact on tax evasion, but this result relies on the assumptions of risk-neutrality, linear taxation, and penalties

³³See Appendix Table A27.

³⁴The model with endogenous savings has no quantitative predictions. If preferences differ across countries, the long-run outcome is degenerate.

³⁵See Appendix Table A26

³⁶See the OECD online tax statistics. There are of course exceptions: for instance Greece did not tax dividends at the household level, only at the corporate level.

proportional to the evaded tax. With progressive taxation, an increase in the marginal tax rate can increase tax evasion. Third, in the euro area, all countries have civil law legal systems; offshore bank accounts in countries with bank secrecy are basically the only capital income tax avoidance technology available.³⁷ Finally, the most thorough industry report estimates that Europeans have 55% of Swiss offshore fortunes and 42% of all offshore fortunes (Boston Consulting Group, 2009, Exhibit 17 p. 31).

Table V shows how unrecorded offshore fortunes affect the euro area's net foreign assets/GDP ratio. If euro-area residents had no unrecorded offshore wealth – as official statistics assume – the euro area's NFA/GDP ratio averaged -8% over 2001-2008. If euro-area residents owned 40% of the unrecorded fortunes managed in Switzerland and 25% of those managed elsewhere, the euro area's average NFA/GDP ratio was positive (+3%). If they owned 50% of all offshore fortunes, the euro area was in reality a big net international creditor (+10%). It was still less positive than Japan (where the NFA/GDP ratio averaged 40%), but there is no plausible scenario in which the euro area remains a net debtor after accounting for tax havens.

VI.C. The U.S. net Foreign Asset Position

To turn the U.S. into a net creditor requires stronger assumptions, because U.S. net international liabilities were substantially bigger than the euro area's in the 2000s. The U.S. can almost be made a balanced economy if we assume that U.S. residents own 15% of Swiss-managed offshore fortunes and 75% of those managed elsewhere (Table VI).

A more reasonable scenario attributes around 20% of the unrecorded offshore wealth Ω to the U.S.: say 15 % of Swiss-managed offshore fortunes – consistent with IRS evidence that U.S. residents use sham entities almost systematically – and 25% of those managed elsewhere.

To understand why U.S. residents may own 25% of the non-Swiss managed offshore

³⁷In common law countries, trusts provide a competing technology. Just like foreign bank accounts, trusts allow assets to be separated from their owners from the viewpoint of the domestic tax authority; they also provide asset protection and privacy services comparable to what offshore accounts do. Civil law countries' residents may hold relatively more assets offshore than U.S. or U.K. residents, although, to my knowledge, optimal tax evasion with multiples technologies has not been explored yet in the literature.

fortunes, remember that around half the missing wealth is invested in mutual funds. Now, the U.S. records an implausibly low level of investments in foreign mutual funds.³⁸ In particular, it recorded only USD 35bn in assets on Caymanian hedge funds in 2008, while the funds had issued more than USD 1tr of foreign equity liabilities. This is all the more troubling that the bulk of the funds incorporated in the Caymans are actually managed in the U.S. Similarly, Lane and Milesi-Ferretti (2007, Table 2 p. 234) have documented that U.S. investments in Irish equities were 5 times bigger as recorded by Irish accountants than by U.S. accountants in 2004. Against this backdrop, the most likely scenario is that U.S. residents own a large fraction of the missing Cayman and Irish fund shares, which have accounted for more than 25% of the missing wealth Ω since 2004.³⁹

If U.S. residents own 15% of Swiss-managed offshore fortunes and 25% of those managed elsewhere, the 2001-2008 average NFA/GDP ratio of the U.S. is reduced by 6 percentage points (-12% against -18% as officially recorded). If most of the missing U.S. wealth is invested in hedge funds, accounting for it exacerbates the specificity of the “long equity/short debt” international balance sheet of the U.S. (Gourinchas and Rey, 2007). Most likely, the flow of income paid by the funds go unrecorded too in the U.S. balance of payments. Because hedge funds are high return/high risk investments, the total return that the U.S. gets on all its foreign assets is probably even bigger than currently measured.

In all of the above scenarios, I have considered that households’ offshore securities (Ω) are unrecorded in published statistics and that households’ offshore bank deposits are perfectly recorded. But we know that a fraction of households’ offshore bank deposits go unrecorded too: for instance, the Swiss bank accounts owned by French residents through shell Panamanian corporations are mistakenly recorded by the SNB and the BIS as belonging to Panama; hence they are missed by French statisticians too. Account-

³⁸Only USD 109bn of U.S. assets on foreign mutual funds were recorded at year-end 2008, over USD 2,748bn of U.S. equity claims on foreigners (Department of the Treasury et al., 2009, Table 30 p. 71).

³⁹Barring minor exception, hedge fund shares are not traded on exchanges and not entrusted to custodians. An American individual who invests in a Caymanian hedge fund will do so by directly dealing with the hedge fund, without using a custodian bank. Since households are not directly surveyed by IIP compilers, claims on offshore hedge fund held by households are not captured in published international investment positions, just like securities held with offshore custodians. See Section B.3.1 of the Appendix for a more detailed discussion.

ing properly for households' offshore bank deposits would improve even further the rich world's, the euro area's, and the U.S. net foreign asset positions.

VII. Remaining Anomalies in International Accounts

Tax havens can explain virtually all the anomalies in portfolio investment data, both at the stock and flow levels. However, two noticeable anomalies remain in international accounts. First, contrary to what happens for portfolio securities, more foreign direct investments assets can be identified than liabilities, as Lane and Milesi-Ferretti (2007, Figure 2 p. 232) have shown. Second, in a spectacular reversal of past trends, the world has started running a current account surplus since 2004. The surplus has been driven by the trade balance: since 2004, recorded exports have exceeded imports (Figure VIII).⁴⁰ Although there is no reason why the FDI and trade anomalies should be linked to households' offshore assets, they can in principle affect the claim made in this paper that the euro area and the rich world are in reality net creditors. A few words on their likely sources are thus in order.

FDI data raise huge challenges. Direct investment are decentralized, contrary to portfolio holdings which are ultimately centralized in custodian banks and central securities depositories. International accounts compilers have started only recently to spread good practices and harmonize data across countries, through a Coordinated Direct Investment Survey (CDIS) conducted for the first time in 2009. Most importantly, direct investments have no observable market value, because they usually do not 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 prices have risen more in developing countries than in rich countries during the 2000s, much of the direct investment discrepancy may come from the fact that developing countries record too low (book) values for their direct investment liabilities to the rich world. The developing world may be more indebted than we think.

The trade discrepancy comes also most likely from errors in developing countries'

⁴⁰For long-run series on the world current account, see Appendix Tables A19-A21, and Figure A1.

accounts. There is no particular reason to think that exports are over-estimated 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 percent. By 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 current account balances of developing countries are overestimated, their net foreign assets will tend to be overestimated too. Again, the developing world may be more indebted than we think.

Because of the FDI anomaly, the global net foreign asset discrepancy (the puzzling net debt of the world) is a bit smaller than my estimate of households' offshore wealth Ω over 2001-2004:⁴¹ when we add Ω 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,⁴² while my estimate of households' unrecorded offshore fortunes has kept growing (except in 2008).

If the FDI and trade discrepancies are only due to errors in developing countries' accounts, then they do not affect the results of this paper: when the world IIP is purged from all its errors, the rich world and the euro area are net creditors; the developing world is a net debtor. If each country contributes to the FDI and trade discrepancies proportionally to the size of its international balance sheet – a worst case scenario given available evidence – the central conclusions of this paper still hold. The euro area remains a net creditor – although a smaller one – and the rich world is balanced.⁴³

Thanks to considerable improvements made in recent years, the anomalies in portfolio investment data have a much clearer interpretation than the remaining anomalies in international statistics. In the global accounts purged from all their anomalies, the rich world might still be a net debtor, but the most likely scenario is that it is a net creditor

⁴¹See Appendix Table A30 for a line-by-line reconciliation of Ω and the world net foreign asset discrepancy.

⁴²In 2009, after the period covered by the present study, the IMF recorded for the first time that the world net foreign asset discrepancy was around 0.

⁴³See Appendix Tables A31-A32.

because of households' unrecorded assets in tax havens, and that the developing world is more indebted than we think because of data deficiencies in poor countries' international accounts.

VIII. Conclusion

This paper takes seriously the enormous data challenges that tax havens raise for international investment statistics. The main finding is that accounting for households' offshore holdings makes international investment positions much closer to basic theoretical expectations. Unrecorded holdings in tax havens are twice bigger than the net foreign debt of rich countries, and available evidence suggests that they mostly belong to residents of rich countries, in particular to Europeans. Under most plausible scenarios, the euro area and the rich world turn out to be net international creditors. The U.S. net debt is significantly reduced.

Accurate international investment data are crucial to many research and policy issues. They are a key input to understand what drives capital mobility. Against the backdrop of the euro-area sovereign debt crisis, whether the euro area is a net debtor (as officially recorded) or a net creditor (as Japan is, although in smaller proportions) makes a lot of differences for the future. Better international investment positions would improve our ability to track key aspects of globalization and to monitor financial stability. Major revisions in the way international investment data are compiled are thus in order.

Two simple reforms would permit 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 of the household sector should be compiled on a beneficial ownership basis. An account owned in Switzerland by a French person through a shell Panamanian corporation should not be recorded as a Panamanian holding, but as a French holding. Now, the fundamental principle of anti-money laundering regulations is that bankers must know at all times who are the beneficial owners of the funds they manage, even if the funds are held through a long chain of intermediate entities. Banks

should be asked to use this information for the compilation of cross-border banking data that relate to the household sector. It would not require much extra work, since the information already exists inside the banks.

Second, countries should exchange data on portfolio securities held offshore by households. All international financial centers should send to the Bank for International Settlements the value of the securities held in custody by foreign residents in their banks – just like they do today for cash holdings. Custodial surveys have a long history around the world and they do not raise great practical difficulties. The reform would not violate any bank secrecy provision. But it would only work if custodial holding data were also established on a beneficial ownership basis. Just like for cash accounts, an investment account opened in Switzerland by a French person through a shell Panamanian corporation should be recorded by Swiss banks as a portfolio holding of France – and the information sent to the BIS.

Combined, both reforms would allow international accountants to close the long-standing loopholes in portfolio investment data. As this paper has argued, international investment positions would be dramatically altered.

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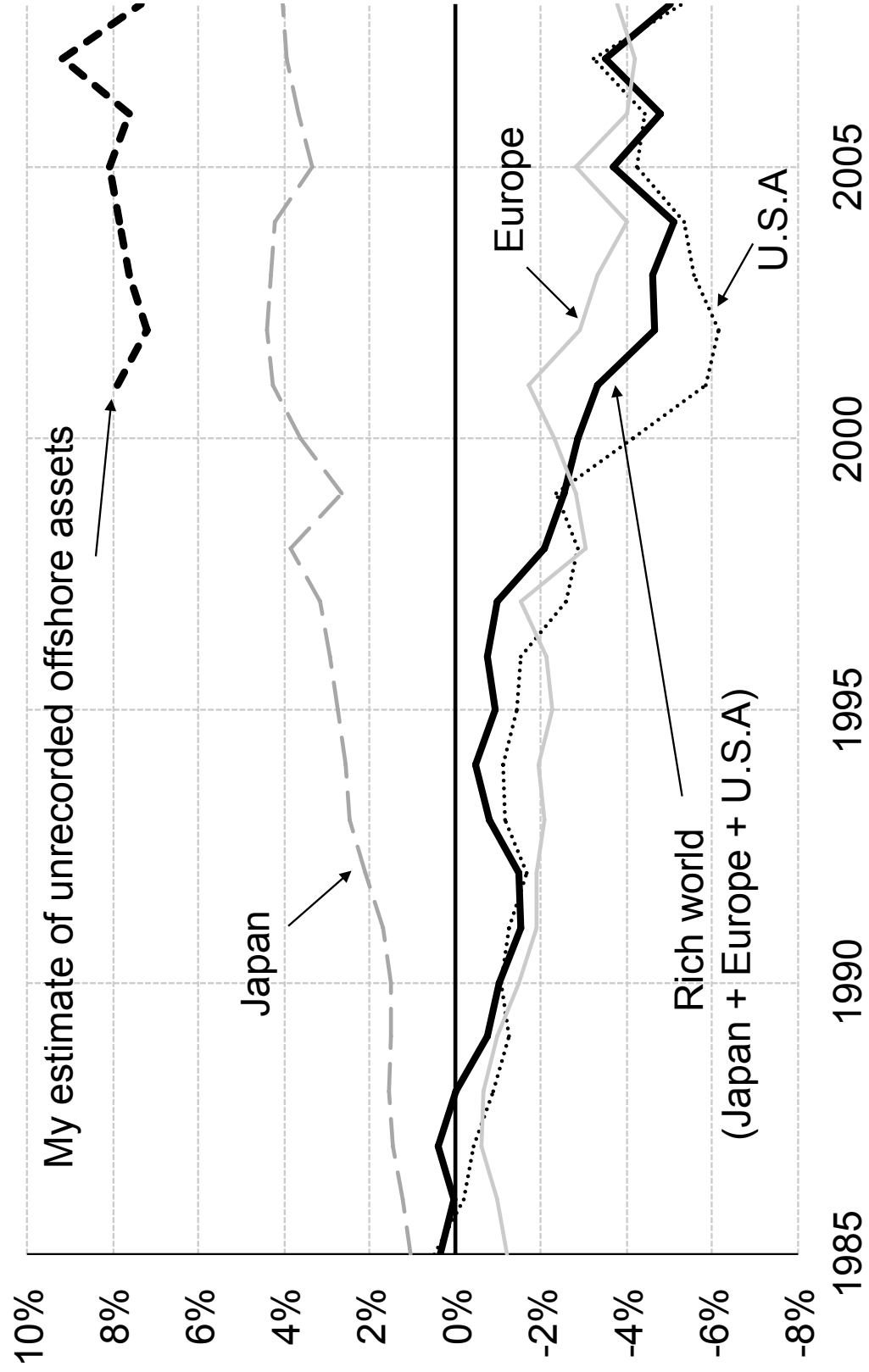
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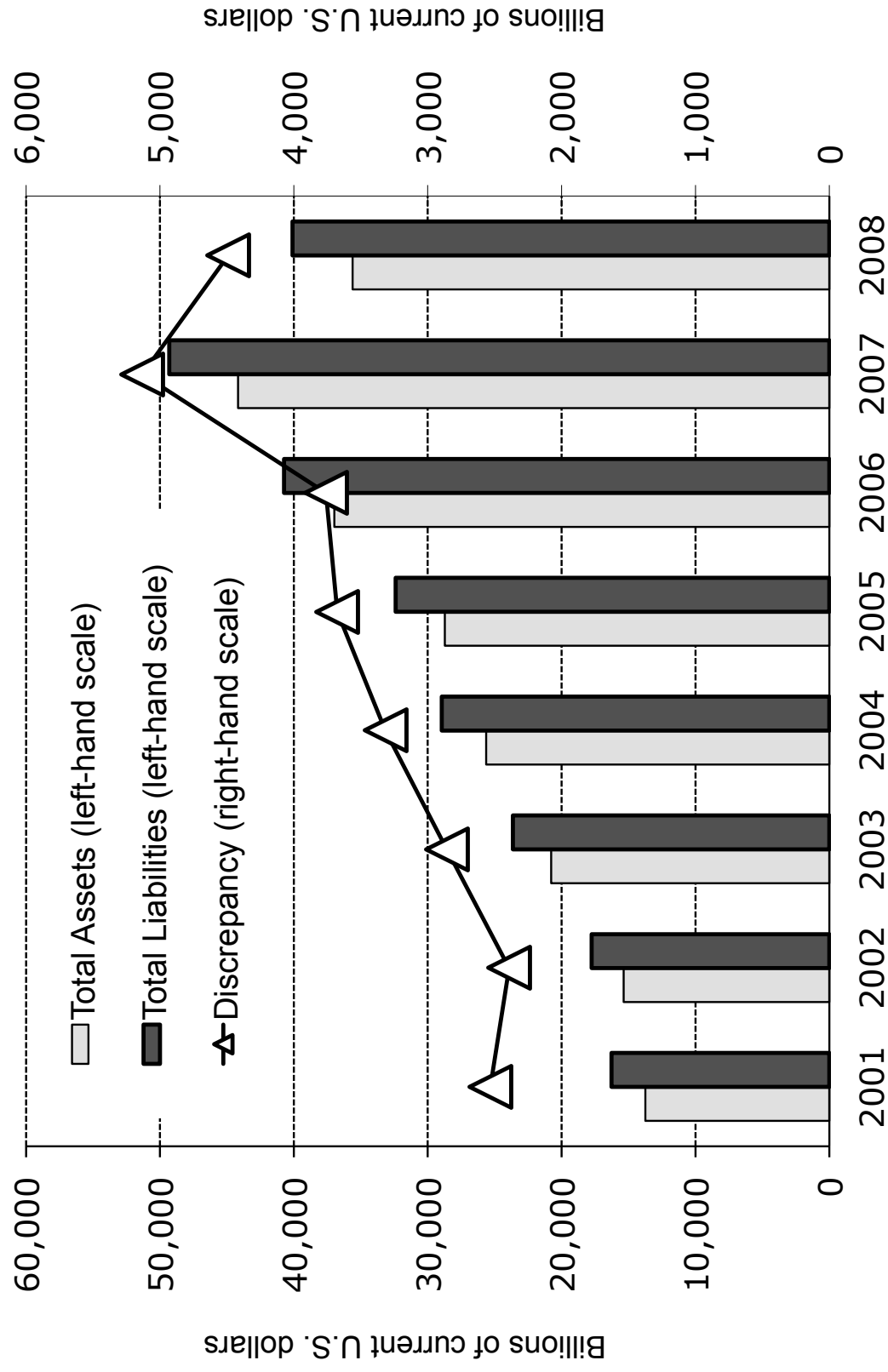
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Figure I: Recorded Net Foreign Assets vs. Unrecorded Assets, % of World GDP



Note: The figure charts the estimated value of households' unrecorded portfolio securities 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. Europe includes the 16 members of the euro area at the end of 2010, 5 additional European countries (the UK, Norway, Sweden, Denmark and Switzerland), and 3 non-European countries (Australia, New Zealand, and Canada).
Source: Appendix Tables A3 and A27.

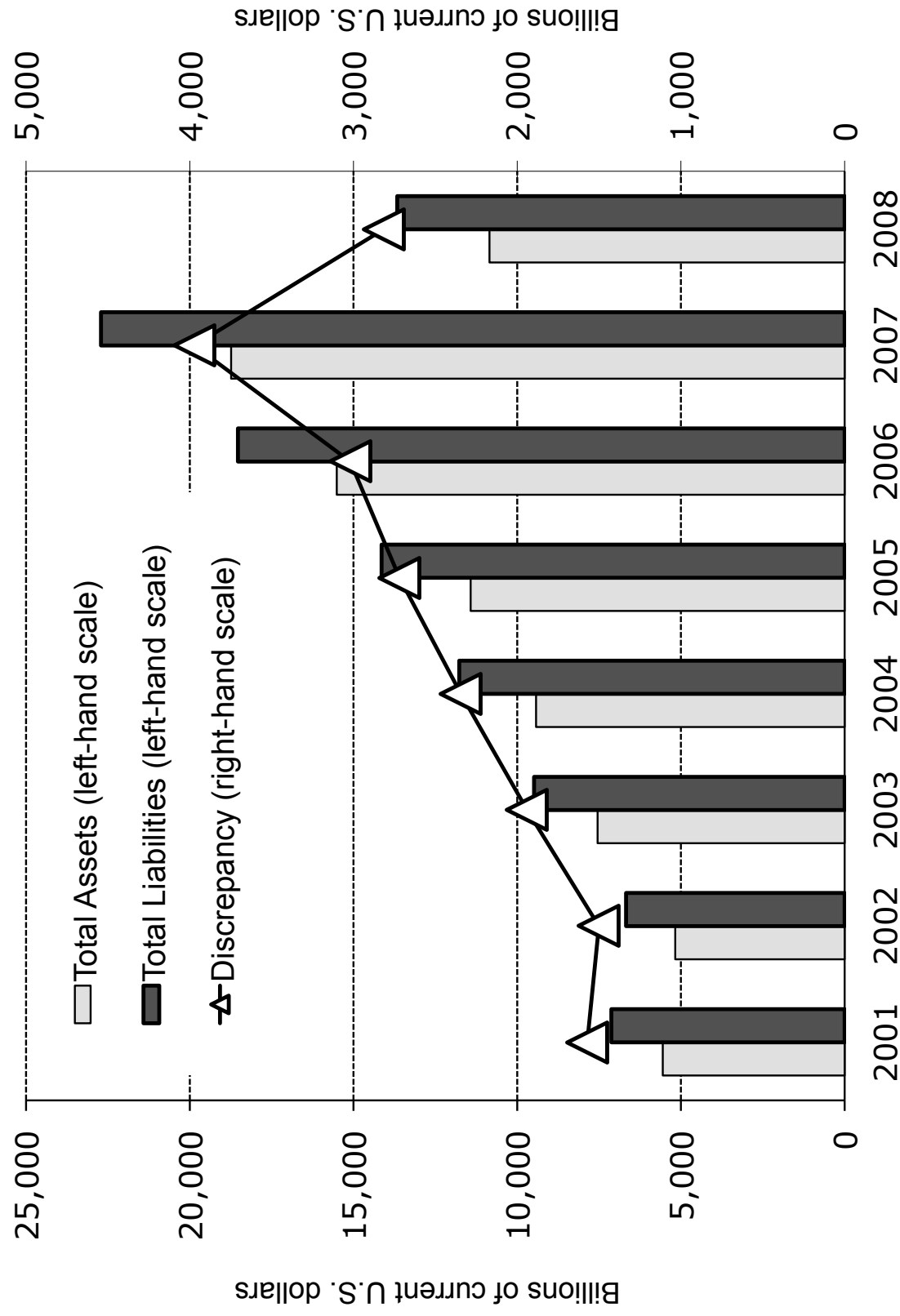
Figure II: The Missing Securities



Note: Totals include 238 countries and territories, as well as international organizations.

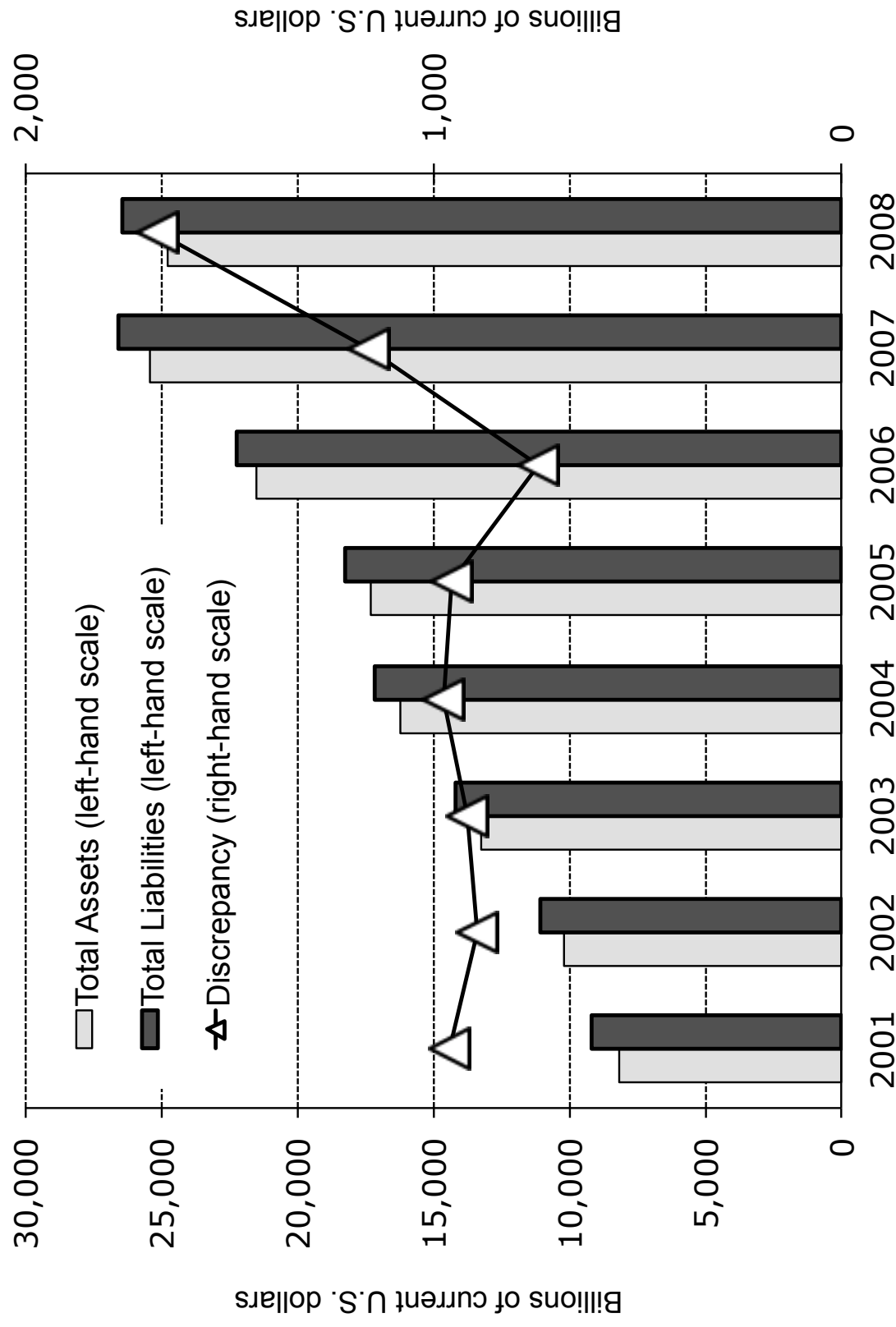
Source: Appendix Table A3.

Figure III: The Missing Equities



Note: Totals include 238 countries and territories, as well as international organizations.
Source: Appendix Table A3.

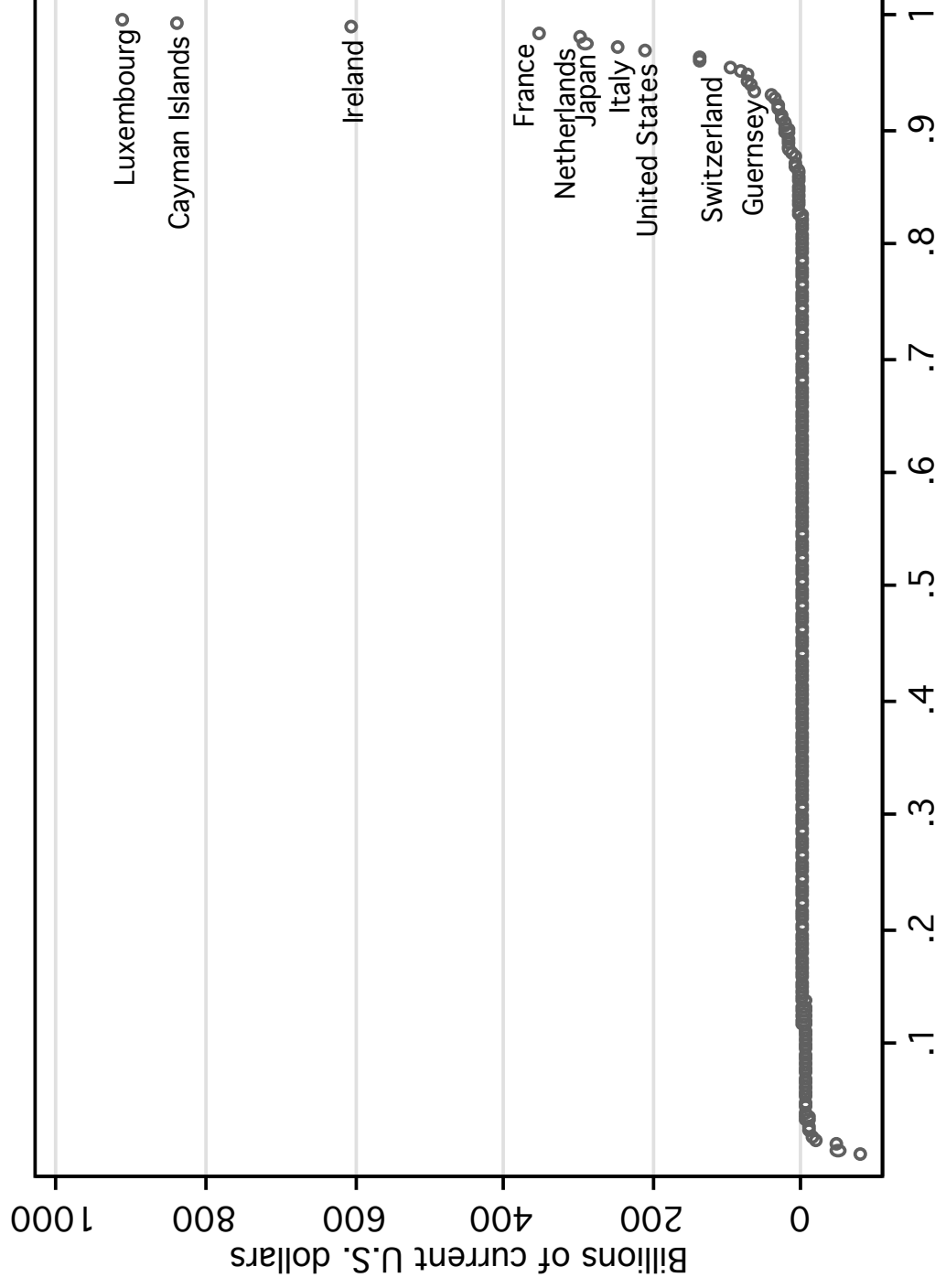
Figure IV: The Missing Bonds



Note: Totals include 238 countries and territories, as well as international organizations.

Source: Appendix Table A3.

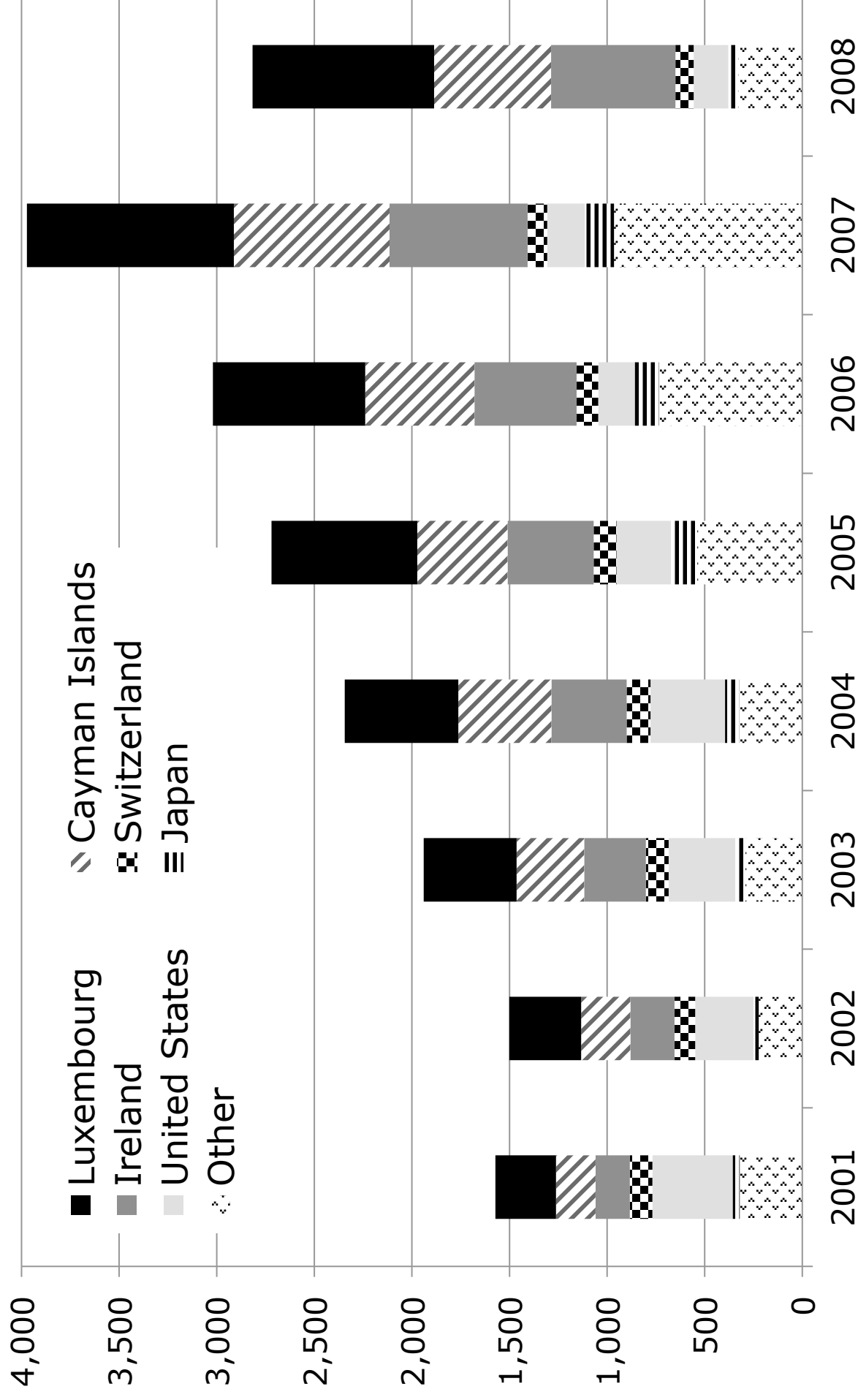
Figure V: Where the Missing Securities Are Invested, 2008



Note: Each dot is equal to the difference between reported liabilities and creditor-derived liabilities.

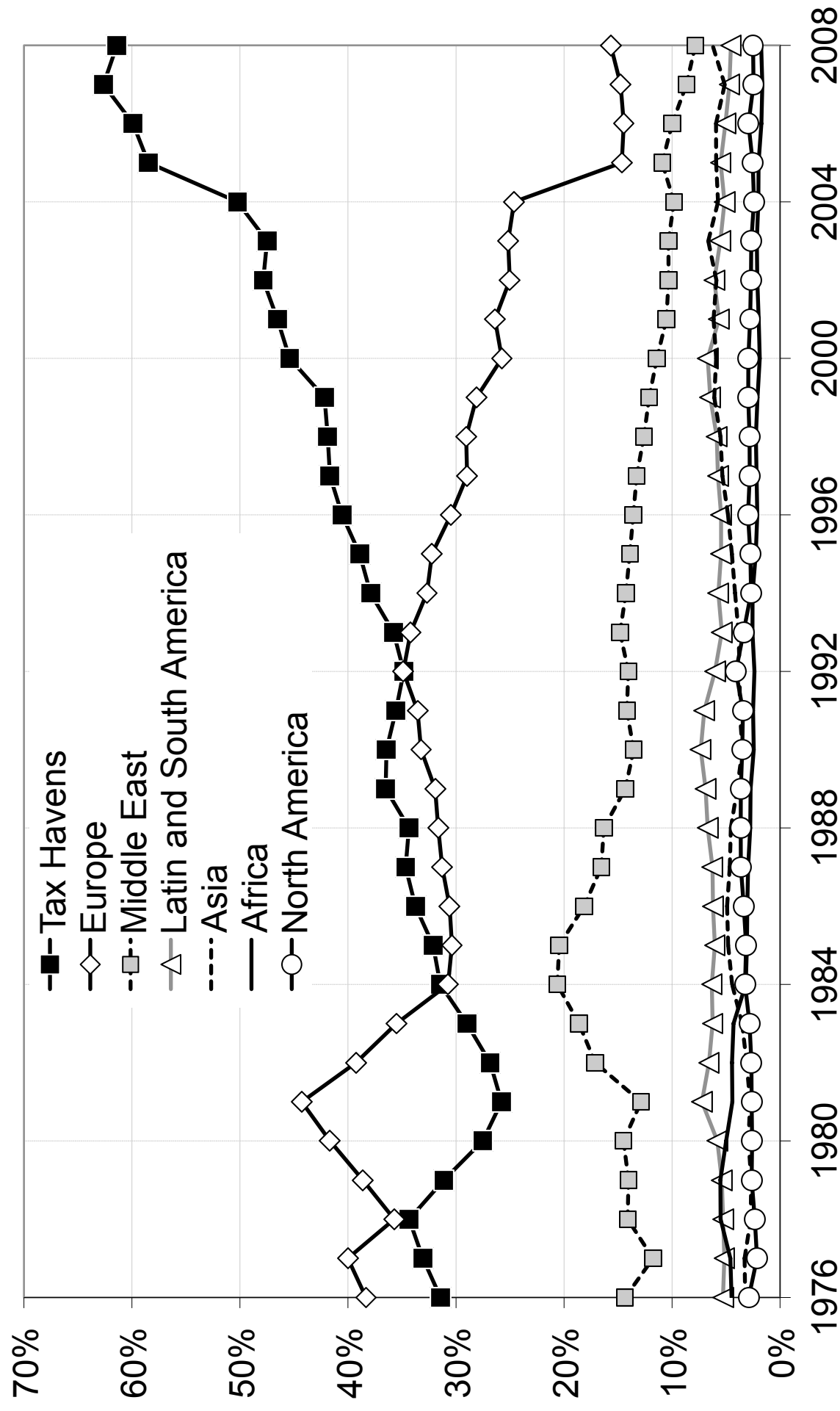
Source: Appendix Tables A13 and A14.

Figure VI: Where the Missing Equities Are Invested, bn of USD



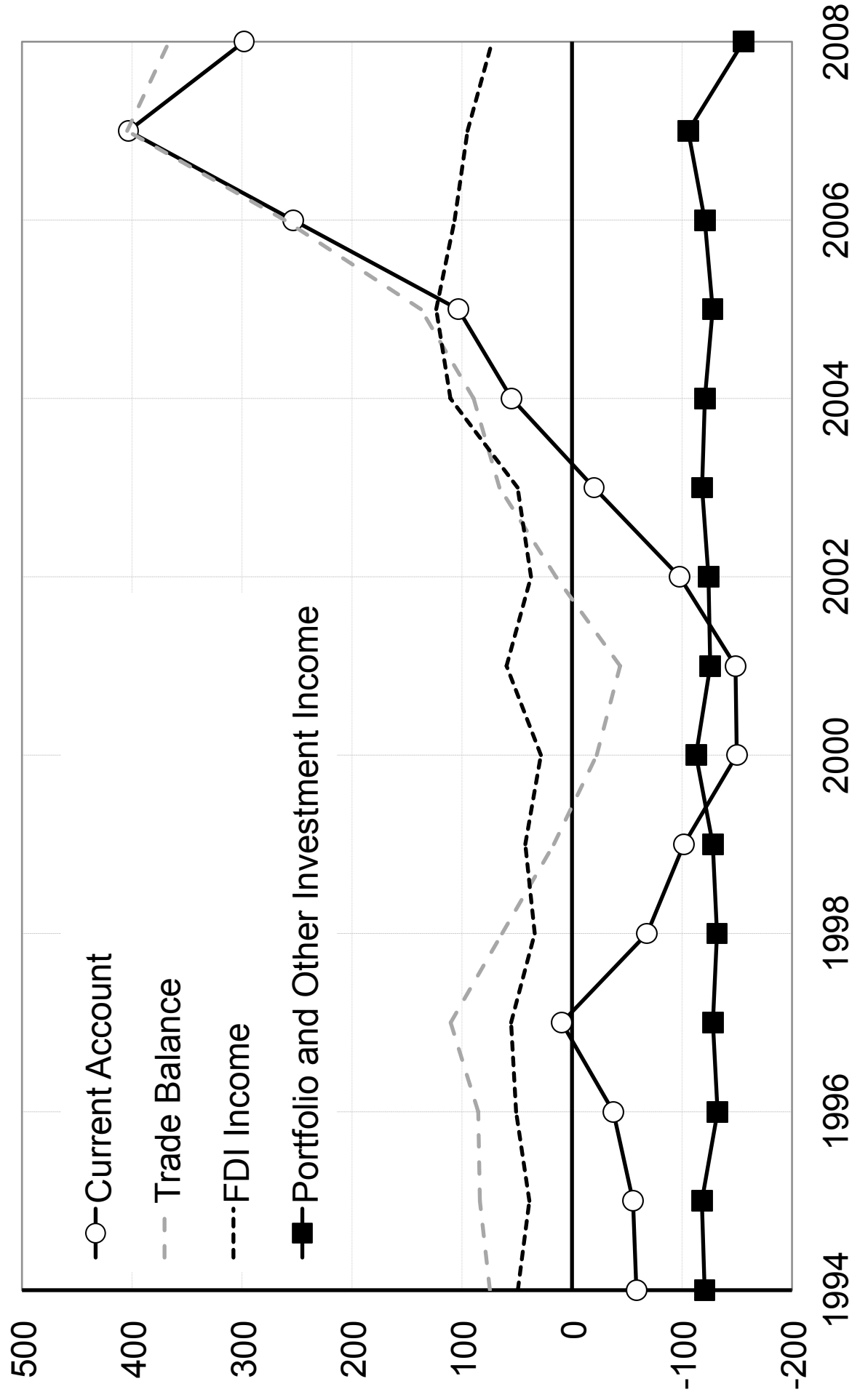
Source: Appendix Table A3.

Figure VII: Owners of Swiss Fiduciary Accounts, % of Total



Source: Appendix Table A25.

Figure VIII: The World Current Account Discrepancy, bn of USD



Source: Appendix Table A21.

Table I: Foreign Securities in France and Switzerland, 2004, bn of USD

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

Source: France: Bank of France, International investment position and *Bulletin de la Banque de France*, n°136. Switzerland: Swiss National Bank, International investment position and *Banks in Switzerland*.

Table II: Bilateral Portfolio Holdings, Panel Regressions

	Equity	Debt	Equity	Debt
Bilateral controls				
Log distance	-0.561*** (0.017)	-0.733*** (0.018)	-0.450*** (0.010)	-0.594*** (0.010)
Longitude gap	0.003*** (0.000)	0.003*** (0.000)		
Common language	0.394*** (0.030)	-0.110*** (0.032)	0.451*** (0.022)	0.014 (0.023)
Colonial relationship after 1945	0.251*** (0.055)	0.447*** (0.060)	0.343*** (0.038)	0.488*** (0.041)
Both countries industrial	2.739*** (0.043)	2.806*** (0.046)	2.499*** (0.036)	2.303*** (0.036)
Log of GDP gap	-0.307*** (0.009)	-0.159*** (0.010)	-0.230*** (0.007)	-0.149*** (0.007)
Log of GDP p.c. gap	-0.250***	-0.149***	-0.260***	-0.195***
OFC source x host dummy	No	No	Yes	Yes
Source country controls				
Latitude	(0.009)	(0.010)	(0.007)	(0.007)
	-0.003*** (0.000)	-0.003*** (0.000)	-0.005*** (0.000)	-0.005*** (0.000)
Landlocked dummy	-0.087*** (0.024)	0.208*** (0.026)	0.144*** (0.021)	0.303*** (0.021)
Population	0.517*** (0.010)	0.518*** (0.010)	0.447*** (0.007)	0.480*** (0.007)
GDP per capita	1.123*** (0.015)	0.969*** (0.016)	1.220*** (0.012)	1.157*** (0.012)
OFC dummy			1.235*** (0.141)	1.800*** (0.143)
Year fixed-effect	Yes	Yes	Yes	Yes
Host country fixed effects	Yes	Yes	Yes	Yes
OFC included	No	No	Yes	Yes
Observations	33,746	34,037	57,122	57,670
Adjusted R-squared	0.734	0.739	0.685	0.707

Note: OLS regressions, pooled data 2001-2008. Standard errors in parentheses.

* p<0.05, ** p<0.01, *** p<0.001.

Source: IMF Coordinated Portfolio Investment Survey, 2001-2008.

Table III: Stocks and Flows of Unrecorded Offshore Wealth, bn of USD

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

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

Table IV: Offshore Wealth, 2008, bn USD

	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 ^{est.}	478
Total offshore wealth	5,878	2,022
Global household financial wealth = 73,625		

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

Table V: Euro area's NFA/GDP, 2001-2008 Average

		Share of non-Swiss fortunes belonging to euro-area			
		0%	25%	50%	75%
Share of Swiss fortunes belonging to euro-area	0%	-8%	-3%	3%	9%
	40%	-3%	3%	8%	14%
	50%	-2%	4%	10%	16%
	60%	0%	5%	11%	17%

Note: The Table reads as follows. The official euro area's net foreign asset position/GDP ratio averaged -8% over 2001-2008. If euro-area residents owned 40% of the offshore fortunes managed in Switzerland and 50% of those managed elsewhere, the true net foreign asset position/GDP ratio of the euro area averaged +8%.

Source: Appendix Table A28.

Table VI: US NFA/GDP, 2001-2008 Average

		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%

Source: Appendix Table A29.