# Hunting for Treasure Islands

Recent developments of hidden wealth and its allocation

**Håkon Rysst Heilmann**


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Department of Economics
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## Preface

This thesis is written as a completion of the two year master's degree programme in Economics at the University of Oslo. Approaching the end of my time at Blindern, I would like to thank fellow students and family, for invaluable support and encouragement along the way. In particular I wish to thank my supervisor for this thesis, Andreas Müller, for his guidance, constant availability and detailed feedback throughout the process. Thanks also to Mari Rysst and Trym Nohr Fjørtoft for valuable comments on the final draft, and to Oslo Fiscal Studies for granting me their scholarship. Finally, a very special thanks to Oda Sofie, for being extremely patient, supportive and generally a great person. Any remaining mistakes or inaccuracies are mine, and mine alone.

**Summary**

In the recent years, a new battle against tax havens has emerged. After decades with inefficient efforts, the number of tax information treaties signed with tax havens suddenly skyrocketed after the financial crisis of 2007-08. This thesis investigates how this may have affected the global hidden wealth and the use of tax havens. By applying modern methods of estimation, both the total amount of unrecorded assets and its allocation through the years 2009, 2010 and 2011 is calculated. By adding these estimates to an existing set covering 2001-2008, the developments in the use of tax havens are investigated throughout a crucial period of time. The analysis shows indications of a decline in the relative amount of global hidden wealth, as well as some significant changes in its allocation. While the three largest havens, Ireland, Luxembourg and Cayman Islands, appear little affected by the last years' developments, OECD-countries typically not known as tax havens suffer a significant decline in their hosting of unrecorded assets. In contrast, the United States and the United Kingdom, two of the most outspoken opponents of tax haven practices, seem to experience an increase, while the effect on unrecorded asset holdings in tax havens is more ambiguous. Further analysis on the causal effects of tax treaties imply that tax havens may benefit of a shift towards more legal, financial activity, as tax treaties appear to have a significant, positive effect on total asset holdings in treaty-signing havens.

# Contents

# 1 Introduction

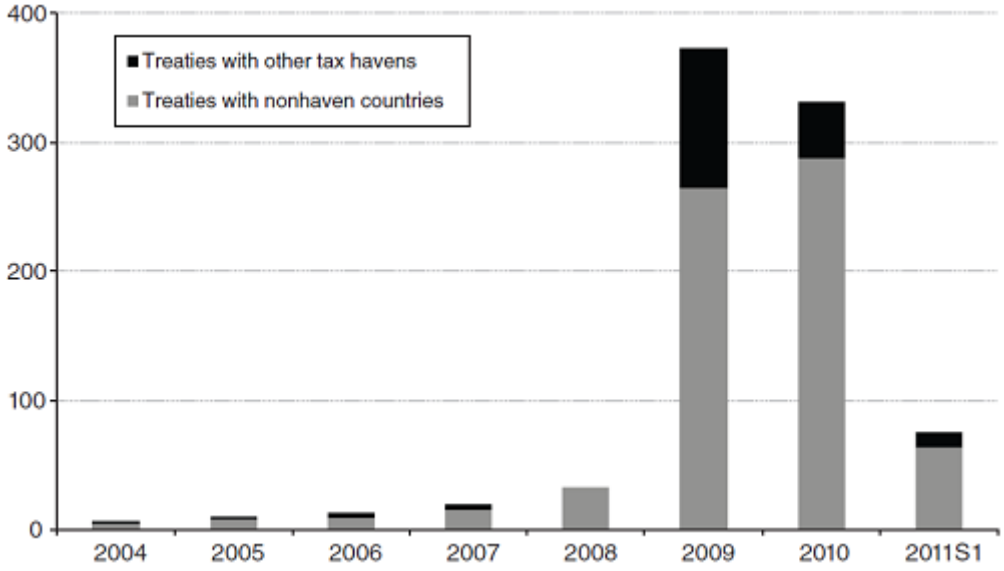
> "The magistrates are like sheriffs in the spaghetti westerns who watch the bandits celebrate on the other side of the Rio Grande... They taunt us - and there is nothing we can do."
>
> (Eva Joly, Tax Justice Network, 2013)

Following the globalization and increased mobility on capital, the number of tax havens, popularly known as treasure islands, has increased dramatically over the last few decades. Through secrecy and extremely low tax burdens, they have attracted capital from all over the world, allowing large corporations to pay practically no taxes at all, while accumulating frustration among the countries watching their tax base shrink. In addition, tax havens are rumored to create instability and uncertainty in the financial markets and to make illegal money flows impossible to trace (NOU 2009).

For years, the offensive against tax haven was led by the Organisation for Economic Co-operation and Development (OECD), starting already in 1987 with the report "International Tax Avoidance and Evasion". The efforts proved unsuccessful, and the apathetic view towards the problem, represented by the quote above, has been prominent. At least until the financial crisis emerged in 2007. In the aftermath of this crisis, labeled "the largest financial shock since the Great Depression" by the International Monetary Fund (IMF), the situation changed (Stewart 2008). Suddenly, the number of tax treaties increased dramatically, the rhetoric sharpened and a new battle against tax havens took form.[1] This is evident in Figure 1, which shows the number of Tax Information Exchange Agreements (TIEAs) signed by tax havens with both other havens and non-haven countries, and the increase in signed agreements after 2008 is clearly illustrated. For all the years examined in this thesis, TIEAs only provided for the exchange of tax information *on request* relating to specific investigations of civil tax matters, but was supplemented by an automatic process in 2014 (OECD 2015). While some scholars, like Ronen Palan et. al. (2010), argue that the system of TIEAs has been time-consuming, expensive and wholly ineffective, empirical research has shown that they do have some significant effects (Zucman

[1] This new offensive is often labeled the "G20 crackdown", among others by Zucman and Johannesen (2014). The OECD and the G20 works together closely on these issues. The cooperation is perhaps best described with the OECD's own words: "While the G20 has incentivised changes in OECD standards and initiatives, the OECD has in turn helped push forward cutting-edge issues on the G20 tax agenda" (OECD 2015a). Throughout this thesis, these combined efforts is for simplicity mostly referred to as OECD efforts.

Figure 1: The rush of treaties after the financial crisis




Source: Zucman and Johannesen (2014, p. 70)

and Johannesen 2014). Nevertheless, the striking increase in tax treaties is still indicating a shift in behavior towards tax havens.

The OECD declared their victory only a few years later, through the report "The Era of Bank Secrecy is Over", presenting evidence of increased tax revenues, improved fairness of the tax system and a changed attitude towards facilitating evasion. However, despite its joyful title, the report still calls for further action to unveil the "billions of dollars of undeclared assets" still hidden offshore (OECD 2011, p. 2).

In 2013, the United States reached another milestone by implementing their Foreign Account Tax Compliance Act (FATCA). The act requires foreign financial institutions (FFIs) and other non-U.S. entities to automatically provide information about US persons who have direct or indirect interests in foreign financial accounts. Those which do not comply, would be subject to US withholding taxes on their income. Shortly after this implementation, the EU's biggest countries, namely United Kingdom, Spain, France, Germany and Italy, proclaimed that they not only wish to follow this act, but also work for a global arrangement for information exchange. Such an agreement would, according to the chairman of Tax Justice Norway, effectively mean the end of the world's tax havens (Spencer 2012; Jacobsen, 2013; Moscovici et. al. 2013).

To the best of my knowledge, few empirical studies have been done to in-

vestigate the effects these efforts have had on hidden wealth. A few notable exceptions are discussed in Section 2. This is partially explained by the lack of data – the very nature of tax haven practices makes them hard to study. In this thesis, I apply modern methods of estimation to produce figures of hidden wealth for the years immediately after the financial crisis, namely 2009-2011. I add these years to an existing set for 2001-2008, produced by Gabriel Zucman (2013), yielding total time-series data on hidden wealth for years both before and after the crisis (hence also the mass-signing of tax treaties). I try to approach three questions. First, how has the massive efforts against tax havens affected the total amount of hidden wealth? Secondly, has the allocation of hidden wealth been affected? And lastly, how does these treaties affect asset holdings in tax havens? I investigate these problems in Section 4, finding that the absolute value of hidden wealth remains high, but the relative, growth-adjusted numbers are decreasing. There are also changes in where the unrecorded assets is located. While the biggest tax havens, Ireland, Luxembourg and Cayman Islands, seem little affected by the battle surrounding them, other large European economies suffer a significant decline in their hosting of unrecorded assets. At the same time, both the United States and the United Kingdom, two of the most outspoken opponents of tax haven practices, seem to experience an increase in the wealth hidden within their own borders. As for the treaties' direct effect, I find that there are a significant, positive effect on asset holdings, including both recorded and unrecorded assets, when a tax haven signs a TIEA. There could be several reasons for this, which are thoroughly discussed in Subsection 4.3.

Until recent years, theoretical models have been the most used tools for analyses of tax havens. Thus, before I get to the detailed empirical strategy in Section 3, I will give a brief overview of the most prominent theoretical research on tax havens.

# 2 Theoretical overview

A common perception, at least if you listen to politicians and activists, is that tax havens are parasites in the global economy, feeding of other countries' tax bases to increase their own incomes. In theory, things are a bit more complicated. In the following, I present different approaches to the theoretical studies of tax havens, and show how different models can yield opposite implications of how to perceive them. But first, let me define what a tax haven actually is.

## 2.1 What is a tax haven?

Despite the title of this thesis, "treasure islands" is rather imprecise, and mostly used in popular science. It is imprecise because, as this thesis clearly will demonstrate, tax havens is not a group consisting only of small island states. But also for the more technical terms, the definitions are quite vague and subject for discussion. First, there is some confusion connected to the definition of a tax haven, and how the term differs from Offshore Financial Centers (OFCs) and Preferential Tax Regimes (PTRs). While "OFC" can be described as a less pejorative designation than "tax haven", though in reality very similar, "PTR" is commonly used to describe jurisdictions with a low tax burden, but not necessarily secrecy (Palan et. al. 2010). The latter will not be used throughout this thesis.

In 1998, the OECD developed four criteria for tax havens. These were (1) No or only very low taxes; "the starting point to classify a jurisdiction as a tax haven", (2) lack of effective exchange of information; through "strict secrecy rules and other protections against scrutiny by tax authorities", (3) lack of transparency "in the operation of the legislative, legal or administrative provisions", and (4) no substantial economic activities; which OECD states an important criteria as it "suggest that a jurisdiction may be attempting to attract investment or transactions that are purely tax driven" (OECD 1998, p 23). It is important to note that the term "tax haven" implies more than just low tax rates; equally important is secrecy. Thus Ronen Palan et. al. (2010) have offered an extended version of OECDs list of criteria, to further distinguish tax havens from PTRs. This definition states that tax havens are jurisdictions which *deliberately* facilitate transactions from individuals in other countries, with the purpose of avoiding taxes and/or regulations. This is made possible through "a legally backed veil of secrecy". (Palan et. al. 2010, p. 45). Unless stated otherwise, this extended definition is used throughout this thesis.

It is a difficult task to identify an actual country as a tax haven, as the classification above inevitably must involve some degree of subjectivity. According to Dharmapala and Hines (2009, p. 1065), tax havens are small countries, and they have high quality governance institutions - poorly governed countries "virtually never appear as tax havens". Another commonly used source is Tax Justice Network's Financial Secrecy Index (FSI). As the name implies, this rating is based on the secrecy part alone. Here, as in Dharmapala and Hines (2009), assumed well-governed countries dominate the upper part of the rank-

ing. Some of them are also small, like Luxembourg (2nd), Hong Kong (3rd) and Cayman Island (4th), but some stand out as quite the contrary: They are huge. Note for instance USA (6th), Germany (8th) and Japan (10th) (FSI 2013). This is important to have in mind; tax havens are not necessarily remote island states.[2]

A categorization of tax havens is used for practical purposes in the empirical section, and an actual sorting is needed. I thus categorize countries as tax havens according to IMFs (2000) list of OFCs, ignoring the theoretical difference between the two terms. This list includes 42 countries, and is the very same categorization as Gabriel Zucman (2013; 2014) uses in his empirical work, which I will return to below.[3]

## 2.2 Modeling tax havens

Intuitively, it makes perfect sense that non-haven countries are trying to prevent tax havens from operating: The tax havens facilitate tax avoidance, which directly causes less tax revenue for non-havens. However, to fully understand how - and through which channels - tax havens are harmful, Joel Slemrod and John D. Wilson (2009) have extended a simple tax competition framework to include havens. Their model has been widely cited and, especially in terms of their conclusions, it might be considered a benchmark model for tax haven modeling.

In the model, we look at an economy with a large number of countries. The agents of this economy have preferences over private and public consumption that can be represented by the utility function $u(x, g)$, which is increasing and concave in the arguments $x$; private consumption, and $g$; a publicly provided good.

The firms pay a tax rate $t$ and decide whether to shift their income to tax havens. Firms are identical with one exception; the cost of participating in a tax haven, $\theta$. This parameter captures "the legal and accounting fees needed to research the relevant tax laws, research the available tax havens, and implement the chosen income-shifting strategy" (Slemrod and Wilson 2009, p. 1263).

[2]City of London and the American states Nevada and Delaware are for instance frequently described as important havens

[3]The 42 countries are Dublin (Ireland), Guernsey, Hong Kong, Isle of Man, Jersey, Luxembourg, Singapore, Switzerland, Andorra, Bahrain, Barbados, Bermuda, Gibraltar, Labuan (Malaysia), Macao, Anguilla, Antigua and Barbuda, Aruba, Bahamas, Belize, British Virgin Islands, Cayman Islands, Cook Islands, Costa Rica, Cyprus, Lebanon, Liechtenstein, Marshall Islands, Mauritius, Nauru, Netherlands Antilles, Niue, Panama, Samoa, Seychelles, St. Kitts and Nevis, St. Lucia, St. Vincent and Grenadines, Turks and Caicos, and Vanuatu (IMF 2000, table 2)

The firms also face a unit price, $p$, of concealment services $c$ offered by the tax havens.[4] The firms decide the amount of concealing services to buy, taking two things into account: The price $p$ and the amount of money, $s(c, b)$, possible to shield from taxes. It is assumed that $s(c, b)$ is increasing and strictly concave in $c$, and declining and convex in $b$, which represents the governments enforcement expenditures per unit of capital.[5]

Eventually, and I refer to Slemrod and Wilson's (2009) original article for further details of solving the model, the optimality conditions for the firms becomes

$$t\frac{\partial s}{\partial c} = p. \tag{1}$$

In words, the firms choose $c$ such that the potential gains from increasing $s$ through buying one more unit of $c$, is equal to the price of $c$. Their participation in tax havens is determined by the cost $\theta$ and the gains, denoted $\Theta$:

$$\Theta = ts(c, b) - pc. \tag{2}$$

All firms with $\theta < \Theta$ participates in a haven, while firms with $\theta \geq \Theta$ do not.

After solving the model, Slemrod and Wilson (2009) arrive at the following optimality condition for the government:

$$\frac{u_g}{u_x} = \frac{1 + D_T}{1 - \frac{T}{R}\varepsilon(1 + D_T)} \equiv MC. \tag{3}$$

Where $D_T$ is the derivative of $D(r, T, b, p)$, which denotes the social cost of capital taxation per unit of capital.[6] $D_T$ is assumed positive.

With this condition in hand, we can show that an elimination of tax havens would leave the non-haven countries better off, which is the first proposition in Slemrod and Wilson's (2009) paper. They argue that welfare increases for two reasons: (1) The resources previously used to pay for concealment services can now be used productively, and (2) the marginal cost for the public good provision declines, inducing an increase in the countries' level of public good. They prove this by stating that the factor prices $R$ and $W(R)$ remain unaffected, while the private consumption $x$ increases due to the efficiency gains. With $x$ rising, the marginal benefit of the normal good $g$ rises, while the marginal cost

[4] $p$ is assumed to be an increasing function of the worldwide purchases of concealment services, $C$

[5] We also assume $s(0, b) = 0, 1 > s(c, b) > 0$ for all positive $c$ and $\frac{\partial^2 s}{\partial c \partial b} < 0$.

[6] $r$ denotes the firm's expected income and $T$ denotes the effective tax rate (Slemrod and Wilson 2009).

declines as $D_T$ can be eliminated from (3), yielding

$$\frac{u_g}{u_x} = \frac{1}{1 - \frac{T}{R}\varepsilon} \equiv MC'. \tag{4}$$

In this new situation, the marginal benefit of $g$ exceeds the marginal cost. Thus, equilibrium will be restored with a higher level of $g$ (in every country).

A complete elimination of all havens, however, is rather unrealistic, at least in the short run. This statement will be backed up in the empirical part of the thesis. Fortunately, Slemrod and Wilson address also the partial elimination of havens. In their second proposition, they state that "a reduction in the number of havens causes all countries to increase their public good provision. Provided that tax competition leads to under-provision of the public good, this reduction must raise welfare" (Slemrod and Wilson 2009, p. 1266).

To prove this, they manipulate the income shifting function $s(c, b)$ a bit, and wind up with a income shifting function $s(c/B)$ which is homogeneous of degree zero in both $c$ and $B$.[7]

The first order condition of a firm's optimal choice of $c$ – recall Equation (1) – thus becomes:

$$t\frac{\partial s}{\partial (c/B)} = pB \tag{5}$$

A critical assumption in Slemrod and Wilson's (2009) paper is that a reduction in the supply of concealment services leads to a higher equilibrium price $p$, that is, the supply curve is upward-sloping. Taking the above equation into account, this increase in $p$ due to a decrease in the number of operating havens, makes it possible for the governments to spend less on enforcement, $b$, and more on public good provision, without stimulating more income shifting by the firms. To be able to conclude that this increases welfare, we must assume that the public good is under-provided when tax havens are operating, so that the public good provision do not get inefficiently high (Slemrod and Wilson 2009).[8]

The model is quite clear. Under a certain set of assumptions, both a total and partial elimination of tax havens increases welfare for non-haven countries. These propositions hold, with a few minor modifications not particularly

[7]The added assumptions and manipulations are: (1) Assume that $s(c, b)$ can be written as $s(c/(\gamma + b)$, (2) add restrictions $s(0) = 0$, $s'(.) > 0$, (3) $\gamma \geq 0$ and (4) define $B = \gamma + b$

[8]The three conditions stated in Proposition 2 are: Homogeneous income-shifting function, $b > 0$ and under-provision of the public good.

relevant for this thesis, true also when the number of havens is endogenously determined, which Slemrod and Wilson (2009) prove in the last part of their paper. Especially one key point is worth noting: The higher the population of a country, the higher concealment price $p$ is required for that country to become a tax haven. This implies that in the case of partial elimination of tax havens, the largest havens will give up their practice because of a higher $p$ (this also applies for any rise in $p$, no matter the cause). As I will return to later in the thesis, it is difficult to support this predicted turn of events empirically.

Slemrod and Wilson (2009) represent what Dhammika Dharmapala (2008, p. 662) describes as a "traditional 'negative' view of tax havens". Scholars like Qing Hong and Michael Smart (2009) represent the opposite. They praise the tax havens, arguing that income shifting and tax planning also may reduce the tax burdens on mobile capital and facilitate investment. Particularly the fourth proposition in their paper stands out in contrast to Slemrod and Wilson's (2009) analysis, as Hong and Smart (2009, p. 90) claim that "an increase in international tax planning (...) causes social welfare to rise".

Hong and Smart, among others, represent what Dharmapala labels "the emerging 'positive' view of havens". The main point in this research is that tax havens enable high-tax countries to impose lower effective tax rates on mobile firms, while still imposing a relatively high rate on immobile firms. Thus, the existence of tax havens can enhance efficiency and mitigate tax competition, and, consequently, fears of a "race to the bottom" in corporate tax rates could be misplaced (Dharmapala p. 662; Hong Smart p. 82).

Some empirical data lend support to the latter view. Despite substantial foreign direct investment (FDI) flows to tax havens, corporate tax revenue in the US, the UK, and other countries has actually increased, not fallen. The "generally robust" growth of corporate tax revenues, which OECD (2011) also points out clearly, thus suggests that the concerns expressed about the damaging effects may be exaggerated (Dharmapala 2008, p. 662).

## 2.3 Applying the model to recent events

There is no doubt, however, that tax havens are treated as hostiles by OECD and other non-haven countries. I will now return to the model developed by Slemrod and Wilson (2009), where tax havens are definitely harmful to other countries' welfare, and try to fit the recent developments into its framework. Here, the non-havens are better off without the havens, and they are better

off if some of them disappear. The partial elimination is treated as something exogenous, although the OECD efforts often is referred to as a fight to eliminate the tax havens.[9] In this model, even with endogenous tax haven activity, the governments have no means to affect the unit price $p$, which is the determining factor if a country decides to engage in tax haven activities. However, the fight is not against *tax havens* per se, but against *tax evasion*.

The 2009-2011 rush of bilateral tax exchange treaties (recall Figure 1) can, and should, be interpreted as a series of efforts made by the non-haven countries. This is captured by an increase in $b$ in Slemrod and Wilson's (2009) model. There is no corresponding increase in tax rates $t$ to my knowledge, so in this simple framework the increased $b$ will lead to an immediate welfare loss. If we look at several periods, it *could* still be a rational move.

The objective of the governments is to stop firms from participating in tax havens. Recall the participation condition, Equation (2):

$$\theta < ts(c, b) - pc = \Theta$$

As the countries have no power to influence $p$ directly, they have two options to shift incentives: Decrease $t$ or increase $b$ (which will decrease $s(c, b)$, as this function is declining and convex in $b$). Taking the enormous increase in treaties (and sharpened rhetoric, I might add) into account, it is reasonable to interpret the efforts over the past few years as the latter. Strictly speaking, however, I would find it even more reasonable to interpret this as an increase in the initial cost $\theta$, that is, redefine this to a function of $b$. $\theta$ is to be interpreted "as the legal and accounting fees needed to research the relevant tax laws, research the available tax havens, and implement the chosen income-shifting strategy" (Slemrod and Wilson 2009, p. 1263). I would expect that the mass-signing of tax treaties forces the firms to create new income-shifting strategies, where they shift away from treaty-signing havens. This assumption has support in the empirical data, which I will discuss more thoroughly in Section 2.5. After this is new strategy is implemented, they should be able to hide away as much income as before, assuming that all havens offer somewhat equal terms. As $s(c, b)$ denotes the share of income possible to hide from taxes, I find an increase in $\theta$ as a more realistic effect. However, I proceed in interpreting the efforts as an increase in $b$, as $\theta$ is exogenous in this particular model.

[9] See for instance president Francois Hollande's call for "eradication" of tax havens, as referred to by BBC, at http://www.bbc.com/news/world-europe-22094194

Now, the decreased $s(c, b)$ contributes to a smaller benefit from participating in a haven, $\Theta$. The only counter-measure to be taken by the firms is to increase purchases of $c$, but according to the optimality condition for the firms, Equation (5), where the term $\frac{\partial s}{\partial(c/B)}$ will lead to an increase in the left hand side, and $B$ will lead to an increase in the right hand side, it is hard to tell how exactly the firms will adjust. Thus, I assume $c$ is not significantly changed.

In the end, what determines whether the efforts are successful, is the value of the parameters and the elasticity of $s(c, b)$ with regards to $b$. Still, if the increase in $b$ is sufficiently large, $\theta$ will eventually become larger than $\Theta$, and firms will change their strategy into not evading taxes. Then, a sufficiently large share of the firms have to start paying their taxes to compensate for the loss in welfare due to the increased $b$. In a long run perspective, it could be possible to gain from inducing anti-haven efforts.

## 2.4 Eliminating the havens

So far, we have dealt with models estimating the welfare effects of tax havens. May Elsayyad and Kai A. Konrad (2012) address the process of eliminating them. They set up a simplified game with three players: Two havens $H_i$ and one large non-haven $S$, possibly representing a larger group, like the OECD. Albeit simplified, the game played yields quite clear policy implications. One important take-away is that in a sequential fight against tax havens, the first ones are the easiest to eliminate. This is because the competition among the remaining havens eases as other havens close down, thus giving the remaining havens the opportunity to increase their prices on concealment services. Ultimately, if all but one haven are eradicated, it could be nearly impossible, or at least very expensive, to convince the last, monopolistic haven to quit. In short: Initial success don't necessarily mean it will end successfully.

The second important point from this model, is that closure of a few havens may lead to a situation which is worse than the initial situation with a high number of active havens. The reasoning is somewhat similar as the first point: Few havens mean less competition, less competition means higher unit price for concealment services. Thus, argues the authors, tax revenues in the non-havens remain low, while a large share of the capital returns is allocated to the tax havens (Elsayyad and Konrad 2012). Here, the model differs from the Slemrod and Wilson (2009) model, where higher price of concealment would decrease demand and possibly stop havens from evading taxes. An alterna-

tive interpretation is that Elsayyad and Konrad (2012) consider the benefits of evading so high that the firms still gain from using tax havens after a significant increase in the unit price. In the framework of Slemrod and Wilson (2009), this is assuming a large gap between $\theta$ and $\Theta = ts - pc$, which will not be equalized by an increase in $p$. With this assumption, Elsayyad and Konrad (2012) do not have to focus on the decision-making by firms, and the demand for concealment services will always be high. In this framework, in contrast to Slemrod and Wilson (2009), the countries must focus on removing tax havens, not on shifting incentives for the tax-avoiding firms.

## 2.5 Introducing empirics

As seen, there is a relatively wide range of theories of the tax havens' impact on the global economy generally and non-haven countries specifically. In the recent years, these matters have also been studied more extensively empirically.

Two of the pioneers in this new approach are Philip R. Lane and Gian Maria Milesi-Ferretti. In 2001, they constructed estimates of foreign assets and liabilities for 67 countries - stocks that one knew "surprisingly little" about at the time. The dataset created (EWNI) was described by the authors as "an initial step in investigating the determinants of countries' external wealth", and it has been continuously updated (Lane and Milesi-Ferretti (2001), p. 263 and 290). In 2007, the second, revised and significantly extended version of the dataset, abbreviated EWNII, was published. Gabriel Zucman (2013) built further upon this work, when he (mainly) used the aggregate liabilities estimated in EWNII to map the total amount of global missing wealth.[10] By estimating the total hidden wealth and applying this to global statistics, he shows that the eurozone, officially the world's second largest net debtor, is actually a net creditor, while the United States has a lot smaller debt burden than reported. In other words, he proves that unrecorded assets cause severe bias in international statistics and hence he emphasizes the importance of unveiling the global hidden wealth (Zucman 2013). What he does not do, is to look at the developments in hidden wealth and its allocation over the years. In the latter part of this thesis, I adopt Zucman's methods to estimate hidden wealth for the years 2009, 2010 and 2011, aiming to do just that.

While the OECD has expressed great optimism, to say the least, regarding the fight against tax havens, Gabriel Zucman and Niels Johannesen (2014) re-

[10]His methods will be thoroughly discussed in the next section

cently published research that tells an entirely different story. By using undisclosed, bilateral data on bank deposits from the Bank of International Settlements (BIS), they show that bilateral information exchange treaties have a significant negative effect on bank deposits. In particular: A non-haven's savings in a tax haven decrease with 11.5 percent relative to all non-haven's deposits in tax havens when a treaty is signed. Further, Zucman and Johannesen (2014) extend their analysis and run a number of robustness tests, ending up suggesting that at this point, tax treaties have only caused relocation of bank deposits between tax havens, not triggering significant repatriations of funds. Their results are in line with the assumptions in Elsayyad and Konrad's (2012) model of tax haven elimination – if a tax haven signs a treaty which could reveal hidden wealth, capital owners relocate their money to a tax haven who has not signed a similar treaty.

A joint implication from Zucman and Johannesen's (2014) empirical work and Elsayyad and Konrad's (2012) theoretical work, is that we can not expect any decline in the total hidden wealth, despite the increasing efforts and that tax treaties evidently have a desired effect on tax evaders.[11] In the following section, I address this very question and investigate if we can find a similar effect on asset holdings as Zucman and Johannesen (2014) find on bank deposits.

# 3 Empirical strategy

## 3.1 Main objective

In the existing research, total hidden wealth until 2008 and bank deposits in a selection of tax havens until 2012 is mapped and discussed. In this section, I create a complete dataset on bilateral holdings of assets, from 2001 to 2011, and use this to estimate hidden wealth in terms of unrecorded assets. I expand Gabriel Zucman's (2013) dataset by nearly 40 percent, gaining a total of twenty-two 241 x 241 matrices over bilateral debt and equity holdings.[12] As I construct six matrices on my own, and add them to the 16 created by Zucman, I strive to proceed exactly like he did to preserve internal consistency in the set of estimates. The main data source is the Coordinated Portfolio Investment Survey

[11] Tax evaders apparently relocate their money away from treaty-signing tax havens, which is exactly what the treaty is designed to cause. Thus, in a hypothetical scenario where all country-pairs have signed tax treaties, tax evading would not be possible.

[12] For the last three years, the matrices are 243 x 243, because of Kosovo and South Sudan's gained independence.

(CPIS), conducted by the International Monetary Fund (IMF), which collects holdings of debt and equity assets from 74 participating countries, in up to 243 host countries. The survey data is not flawless, however, so it is necessary to do a few adjustments. I will account for them below, and extensively in Section A.2 in the appendix.

The aim with this procedure is to see if there has been any developments in the amount of hidden wealth, as well as to identify possible shifts in where the hidden wealth is located. As the number of treaties has skyrocketed after the financial crisis, this complete overview could give key insights to whether they have had any effect.

To estimate the total hidden wealth, I start with the reported bilateral holdings of equities and debt, denoted $E_{ij}$ and $D_{ij}$. For a lot of countries these data are missing. I estimate and make a few manual corrections to fill in the gaps, and get a complete set of $\hat{E}_{ij}$ and $\hat{D}_{ij}$. The sum of these,

$$\sum_i \sum_{i \neq j} [\hat{E}_{ij} + \hat{D}_{ij}] = \sum_i \sum_{j \neq i} \hat{A}_{ij} \tag{6}$$

denotes all assets reportedly held by all countries, $i$. To get an estimate of the missing wealth, that is, the unrecorded assets, I subtract this sum from the sum of all liabilities in host countries $j$, individually denoted $\hat{L}_j$. The latter is mainly collected from the updated and extended version of the External Wealth of Nations data set (EWNII) constructed by Lane and Milesi-Ferretti (2007), but I provide certain additions for missing countries. Unfortunately, there is no bilateral breakdown of liabilities. That means we can not derive how much wealth is hidden away by each country. The opposite is possible, however – we can estimate how much hidden wealth is located *in* each country. In a given year, I estimate the unrecorded assets located in country $j$, denoted $\Omega_j$, by calculating

$$\hat{L}_j - \sum_{i \neq j} \hat{A}_{ij} = \Omega_j. \tag{7}$$

The total sum of unrecorded assets, denoted $\Omega$ follows as

$$\sum_j \hat{L}_j - \sum_i \sum_{j \neq i} \hat{A}_{ij} = \Omega. \tag{8}$$

In the following of this section, I will specify the regression model used to calculate $\hat{A}_{ij}$, as well as present and discuss my various data sources used to improve estimations of both $\hat{A}_{ij}$ and $\hat{L}_j$. For simplicity, I denote $\hat{A}_i = \sum_j \hat{A}_{ij}$,

$\hat{E}_i = \sum_j \hat{E}_{ij}$ and $\hat{D}_i = \sum_j \hat{D}_{ij}$, where $\hat{E}_i + \hat{D}_i = \hat{A}_i$.

## 3.2 Asset data

### 3.2.1 The Coordinated Portfolio Investment Survey (CPIS) and the gravity-like model

The CPIS has been conducted yearly since 2001 (twice per year since 2013), and the purpose is to "improve statistics of holdings of portfolio investment assets in the form of equity, long-term debt, and short-term debt" (CPIS Guide, p. 1). It consists of 75 countries' reported holdings of equity and debt assets in (up to) 243 host countries. The survey treats offshore territories, like the havens Jersey, Guernsey and Netherlands Antilles, as separate countries.

These data are freely available from IMF's database. I use the following empirical specification adopted from Zucman (2013) to estimate the linear regression parameters explaining the bilateral asset holdings:

$$log(1 + A_{ijt}) = \phi_j + \theta_t + \beta Z_{ijt} + \gamma X_{it} + \varepsilon_{ijt} \tag{9}$$

where $\phi_j$ denotes host-country fixed effects, $\theta_t$ denotes year fixed effects, $Z_{ijt}$ denotes a vector of bilateral control variables and $X_{it}$ denotes a vector of source-country control variables.

I collect data from the World Bank and Zucman's dataset (2013), and include the following control variables in the bilateral control vector $Z_{ijt}$:

$$Z_{ijt} = [\, log(Distance)_{ij},\ log(GDP\ gap)_{ijt},\ (GDP\ per\ capita\ gap)_{ijt},\ (Longitude\ gap)_{ij},\ (Common\ language)_{ij},\ (Colonial\ relationship)_{ij},\ (Both\ countries\ industrial)_{ij},\ OFC_i \times \phi_j \,]$$

As the values we want to predict is source-country data, only year fixed effects and host country fixed effects is included. If we were to use source country fixed effects, they would absorb all the source-country variation, and our estimates would be biased (Lane and Shambaugh 2010). Instead, I include the following source-level controls, collected from World Bank data (WDI 2015) and Gabriel Zucman (2013):

$$X_{it} = [\, Population_{it},\ Latitude_i,\ GDP\ per\ capita_{it},\ Landlocked_i,\ OFC_i \,].$$

As I use host country fixed effects, all variation from similar host country controls is already captured by the model.

This model has previously been used by several scholars to estimate CPIS data. It was first used by Lane and Milesi-Ferretti (2008) and later modified and used by Lane and Shambaugh (2010) and Gabriel Zucman (2013), from which the notation is taken. As I will discuss later, the model has a high explanatory power: The $R^2$-value is around 0,7, which is "high enough to generate sensible predicted values", according to Lane and Slambaugh (2010, p 118).

I proceed like Zucman (2013), by collecting observables and predicting the missing values of $\hat{E}_{ij}$ and $\hat{D}_{ij}$ using the estimated coefficients from the empirical specification outlined in Equation (9). From these predicted values, I calculate the share of each host country $j$ in each source country $i$'s portfolio, denoted $\hat{\sigma}_{ij}$, which equals $\frac{\hat{A}_{ij}}{\sum_j \hat{A}_{ij}}$. I do this separately for equity and debt assets, yielding $\hat{\sigma}^E_{ij}$ for equities and $\hat{\sigma}^D_{ij}$ for debt.

For the countries participating in the CPIS, I use the reported values $D_{ij}$ and $E_{ij}$ without adjustments, except in the cases of Netherlands and Cayman Islands, which I will account for below. For other countries, I collect information about the true values of each source-country's total asset holdings, $E_i$ and $D_i$, or at least $A_i$ when a debt/equity breakdown is not available. Next, I adjust $\hat{E}_{ij}$ and $\hat{D}_{ij}$ to match what we know about the true values of $E_i$ and $D_i$. The procedure is as follows:

For countries not participating in the CPIS, I collect the value of the total investments $\hat{E}_i$ and $\hat{D}_i$ from the EWNII dataset constructed by Lane and Milesi-Ferretti (2007) and distribute the sum over the various host countries $j$ using the calculated shares $\hat{\sigma}^E_{ij}$ and $\hat{\sigma}^D_{ij}$. Where only $\hat{A}_i$ is available, I estimate the country's $debt/equity$ ratio using the estimated values, and then distribute the resulting estimates $\hat{E}_i$ and $\hat{D}_i$ like the previous case. Where no reliable $\hat{A}_i$ is available, I estimate it by first computing $i$'s holdings of US securities using the Treasury International Capital (TIC) survey of US portfolio liabilities, before using the shares of US in $i$'s portfolio, $\hat{\sigma}^E_{i,US}$ and $\hat{\sigma}^D_{i,US}$, to obtain $\hat{E}_i$ and $\hat{D}_i$. From there I follow the same routine by distributing these estimated total portfolio holdings across host-countries using the predicted shares.

This method is only suitable when most assets are privately held. In the opposite case, where the majority of foreign securities are publicly held, the method cannot be applied, because public investment patterns differ significantly from private patterns (Zucman 2013). This is the case for China and

Middle Eastern oil exporters, for which I have to compute estimated asset holdings separately. I explain the procedures for these calculations carefully in the appendix.

The Cayman Islands and Netherlands *do* report to the CPIS, but with known flaws in the figures. While Cayman Islands excludes their enormous fund sector, Netherlands do not include their Special Financial Institutions (SFIs), which account for asset holdings to a significant extent. This, along with a few other adjustments, is also thoroughly explained in the appendix. These discussions and calculations, however, is not of secondary importance, but they are delegated to the appendix to improve the reading flow, as they are rather detailed and extensive.

In every analysis with a high degree of estimation there are some uncertainties. The method I have adopted from Gabriel Zucman is "indirect and relies on data with known imperfections", and is indeed subject to a certain margin of error (Zucman 2013, p 1324). The results in this thesis must therefore be interpreted as results in the framework of Zucman's method, but I will not repeat his robustness and consistency checks. For a mere discussion of these topics, I refer the reader to Section V in his article (2013).

For the possible inconsistencies which are unique in my dataset, I must take precautions. Thus, before I complete the calculations of hidden wealth, I run a benchmark regression to control for possible bias caused by the financial crisis and a possible shift in investment behavior.

### 3.2.2 Benchmark regression and comparison of periods

The topic of the financial crisis and its possible effect on international investments has been studied by, among others, Kathleen M. Kahle and René M. Stulz (2013), and there seems to be no doubt that the crisis caused a decline in corporate borrowing and capital expenditure and sparked counter-measures by firms (Kahle and Stulz, 2013; Campello et. al. 2011). What I am interested in, is if, and in that case why, the crisis has caused a change in international investment behavior. If, for instance, Norwegian asset holders were strictly cost-minimizing before the crisis, but were somewhat shocked by the crisis, and suddenly puts more weight on neighboring countries (which they might trust more), relative to distant countries, when they choose their investments. In other words: If the gravity-like regression model fits well over all 11 years, or if I should apply some sort of regression discontinuity design. According to Arvid O.I. Hoff-

mann, Thomas Post and Joost M.E. Pennings (2013), investors' behavior did indeed change *during* the 2008-2009 financial crisis:

> Investor perceptions exhibit significant fluctuation over the course of the crisis, with risk tolerance and risk perceptions being less volatile than return expectations. In the worst months of the crisis, investors' return expectations and risk tolerance decrease, while their risk perceptions increase. (...) We find substantial swings in trading and risk-taking behavior during the crisis that are driven by changes in investor perceptions.
>
> (Hoffmann et. al. 2013, p. 72)

It is not as clear how this change could have affected asset holdings over time, but the authors does point out that "return expectations, risk tolerance, and risk perceptions recover" towards the end of the crisis, implying that no permanent change in the pattern of asset holdings has occurred (Hoffmann et. al. 2013, p. 72). Also, any linear variation, for instance a 10 % decrease in short term debt holdings, is captured by the time fixed effects, and the GDP control variables should capture the variation caused by how severely the different economies were affected by the crisis. Still, to check for inconsistencies, I start by running a benchmark regression, excluding OFCs, and compare the coefficients (reported in Table 1). I run the regression separately on the periods 2009-2011 (columns 1 and 2) , 2001-2008 (columns 3 and 4) and 2001-2011 (columns 5 and 6) .

I find that there are some differences between the sets. The "latitude of source country"-variable, most significantly, changes sign for equities. This implies that the further north a country is located, the higher is its equity holdings in the period 2009-2011, in contrast to 2001-2008, where the opposite apparently was the case. When including all periods, the coefficient is also negative, illustrating my concern very clearly: If the true value of the coefficient is positive for 2009-2011, the predicted values for these years will be biased when they are based on a regression over the entire period. The same logic applies to other variables where the coefficients are varying across the different regressions.

Overall, however, things do not look so alarming. When tested, over 50 percent of the coefficients in the 2001-2011 regression are *not* significantly different (at the 1 % level) from the corresponding coefficients in the 2001-2008 and 2009-2011 regressions. I get this result by performing Wald tests on the 2001-2011-coefficients, comparing them to the exact value on the coefficients from the period-specific regressions. I do not include the standard errors of the coefficients in the period-specific regressions, which could cause some significantly

not different coefficients to appear significantly different, but not the other way around. The full set of p-values are reported in Section A.1 the appendix, Table 3.

The different regressions all have high explanatory power, with $R^2$-values spanning from 0.702 to 0.739. Also, the final output, that is the estimates on hidden wealth, for the years 2001-2008 are very similar to Gabriel Zucman's (2013) estimates, regardless of which periods I use as source data for the predictions. All in all, I do not consider the implications above as sufficient evidence of a significant and permanent change in the investment behavior after the financial crisis, at least not enough to cause any non-negligible bias in my final output. I proceed by predicting missing values from the entire 2001-2011 set, but I leave $(Longitude\ gap)_{ij}$ out, as the coefficient has the wrong sign.[13]

[13]This is also consistent with Zucman (2013).

Table 1: Benchmark regression

| | 2009-2011 | | 2001-2008 | | 2001-2011 | |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| | Log equities | Log debt | Log equities | Log debt | Log equities | Log debt |
| Log distance | -0.621*** | -0.850*** | -0.561*** | -0.733*** | -0.580*** | -0.769*** |
| | (-24.63) | (-33.55) | (-33.76) | (-41.46) | (-41.62) | (-52.90) |
| Longitude gap | 0.00473*** | 0.00394*** | 0.00338*** | 0.00294*** | 0.00383*** | 0.00320*** |
| | (12.11) | (10.22) | (13.17) | (10.78) | (17.76) | (14.31) |
| Common language | 0.677*** | 0.0301 | 0.394*** | -0.110*** | 0.470*** | -0.0692* |
| | (13.59) | (0.59) | (13.27) | (-3.49) | (18.30) | (-2.55) |
| Colony dummy | 0.681*** | 0.713*** | 0.251*** | 0.447*** | 0.384*** | 0.526*** |
| | (7.32) | (7.13) | (4.53) | (7.44) | (8.02) | (10.15) |
| Industrial pair dummy | 2.741*** | 2.646*** | 2.739*** | 2.806*** | 2.762*** | 2.752*** |
| | (43.68) | (40.62) | (63.16) | (61.20) | (77.48) | (73.54) |
| Log of GDP gap | -0.287*** | -0.156*** | -0.307*** | -0.159*** | -0.292*** | -0.157*** |
| | (-23.72) | (-12.55) | (-33.57) | (-16.57) | (-40.20) | (-20.79) |
| Log of GDP p.c. gap | -0.197*** | -0.167*** | -0.250*** | -0.149*** | -0.230*** | -0.152*** |
| | (-14.60) | (-12.14) | (-27.28) | (-15.43) | (-30.23) | (-19.25) |
| Latitude of source country | 0.00230*** | 0.000608 | -0.00251*** | -0.00296*** | -0.00109*** | -0.00174*** |
| | (4.63) | (1.23) | (-7.78) | (-8.62) | (-4.05) | (-6.19) |
| Source country landlocked | -0.0136 | 0.294*** | -0.0870*** | 0.208*** | -0.0695*** | 0.226*** |
| | (-0.40) | (8.30) | (-3.61) | (8.11) | (-3.52) | (10.88) |
| Log of source country population | 0.451*** | 0.486*** | 0.517*** | 0.518*** | 0.480*** | 0.499*** |
| | (35.90) | (37.10) | (52.63) | (49.64) | (62.26) | (61.33) |
| Log of source country GDP p.c. | 1.136*** | 1.058*** | 1.123*** | 0.969*** | 1.106*** | 0.989*** |
| | (54.18) | (49.35) | (74.35) | (61.03) | (90.70) | (77.95) |
| Constant term | -2.110*** | -1.232** | -1.505*** | -3.519*** | -1.722*** | -1.314*** |
| | (-5.79) | (-2.75) | (-8.02) | (-18.32) | (-5.79) | (-4.41) |
| Observations | 16045 | 17629 | 33746 | 34037 | 49785 | 51658 |
| $R^2$ | 0.709 | 0.705 | 0.735 | 0.741 | 0.723 | 0.725 |
| Adjusted $R^2$ | 0.706 | 0.702 | 0.734 | 0.739 | 0.722 | 0.724 |

$t$ statistics in parentheses
$^{*}$ $p < 0.05$, $^{**}$ $p < 0.01$, $^{***}$ $p < 0.001$
(1) and (2): 2009-2011: My own collection of data
(3) and (4): 2001-2008: Gabriel Zucman's data
(5) and (6): Full set, 2001-2011: Both datasets combined

### 3.3 Liability data

While the procedure for asset data is quite complicated, things are easier for liabilites. Just like with the assets, I proceed similarly to Zucman (2013). The main source is the updated and extended version of the *External Wealth of Nations* (EWNII) dataset constructed by Lane and Milesi-Ferretti (2007). The database contains data for 188 countries, from 1970 to 2011. I take the values for total liabilites, $L_j$, directly from the EWNII-set, using its estimates on "Portfolio equity liabilites" and "Portfolio debt liabilities". As no bilateral data on liabilities is available, there is no distribution across host countries.

The EWNII-set is extensive, but there is still a few gaps left to fill in – mostly small offshore financial centers. I provide a brief overview of the corrections made in the appendix, but in contrast to the asset side, very few deviations from Gabriel Zucman's procedure is made.[14]

## 4 Results and Discussion

In this section I present my estimates of hidden wealth. I compute total amount of unrecorded assets, $\Omega$, as the aggregate of unrecorded equity assets, $\Omega^E$, and unrecorded debt assets, $\Omega^D$. Full bilateral breakdowns of both debt and equities, are attached in the appendix' Section A.5, Table 6 and Table 7. The estimates on unrecorded assets should be interpreted as assets with no reported owners, and technically, if a country is estimated to host a large amount of unrecorded assets, it does not necessarily mean that the money is located in that country, as the funds could be reinvested. Hence, some unrecorded assets are estimated to be in the country where their owners no longer were traceable. In this thesis, however, it is of secondary importance where the actual money is, as the main point is to identify the countries which make the assets unrecordable and not subject for taxation.

As with all estimations, my calculations are subject to a certain degree of uncertainty; asset holdings may be underreported, liabilities could be overestimated. Especially for international organizations, which hosts a huge *negative* amount of unrecorded assets, the figures look strange. This could mean that some of the claims on international organizations are wrong, and should be accounted as asset holdings in another country with positive numbers for unrecorded assets. There could be various reasons for this; countries may be

[14] Again, I refer the reader to Zucman's online appendix (section B, pages 36-50) for details.

more sloppy when reporting assets to organizations, or it is the result of complex ownership structures. Either way, I address this by including the negative numbers when summarizing unrecorded assets, thus controlling for misplaced claims globally.

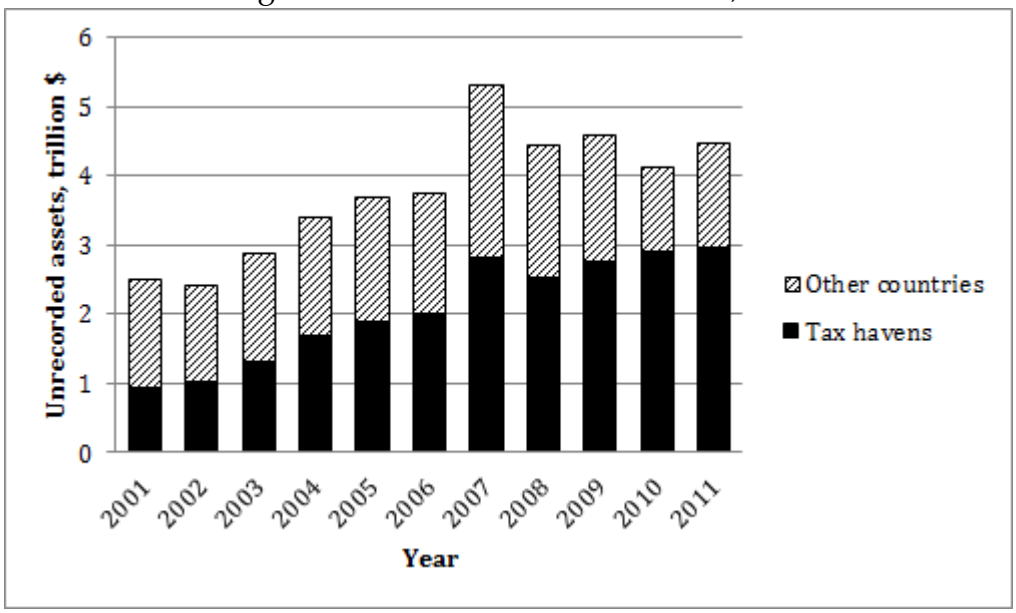
## 4.1 Developments in total hidden wealth

In the OECD report "The Era of Bank Secrecy is Over", it refers to an increase in tax revenue of 14 billion euros and states that "there is far more to come", implicitly concluding that the measures taken over the previous years have been successful (OECD 2011, p 2). Looking at the estimated values for $\Omega$, there are certain implications that give reasons for further optimism.

The total amount of unrecorded asset holdings, that is, the gap between all assets and liabilities $\hat{L}_{total} - \hat{A}_{total}$, has fluctuated some after it's peak in 2007, but has been pretty stable well below the 2007 figure of \$5.3 trillion. Still, there is no clear trend in the absolute data indicating any significant decline, especially not if we treat 2007 as an out-lier. If anything, the trend seems to be increasing over the entire period, stabilizing at a high level in the latter years. The total sum of unrecorded assets in 2011 amounted to \$4.5 trillion, of which \$3.0 trillion were located in tax havens, as illustrated in Figure 2. If we assume that securities only account for 75% of household's total offshore wealth (the remaining 25% are bank deposits), as Gabriel Zucman (2013) does, the rough estimate of total offshore wealth in 2011 amounts to \$6 trillion, of which \$4 trillion is located in tax havens. This is to be considered rather conservative, at least compared to figures such as Tax Justice Network's "\$7.3 to \$9.3 trillion"-estimate from 2012 (Henry 2012, p 5). Still, in absolute terms, there is no clear evidence backing up OECD's claims of an ending bank secrecy-era.

If we look at growth-adjusted numbers, however, things get a bit more optimistic from OECD's point of view. In 2008, unrecorded assets represented 7.1% of the total global gross domestic product (GDP), after dropping down from 9.3% in 2007. Later, it first increased slightly to 7.7% in 2009, before decreasing again to 6.4% in 2010 and 6.2% in 2011 - completing a quite significant negative trend over the last four years in the sample (see Figure 3). The variation may be a little biased by the fact that the financial market data seem to have been affected by the crisis earlier than the GDP figures. For the latter, the crisis makes its mark on GDP figures for 2009, while capital expenditures fell sharply immediately during the crisis, causing a drop in asset holdings figures for year-end

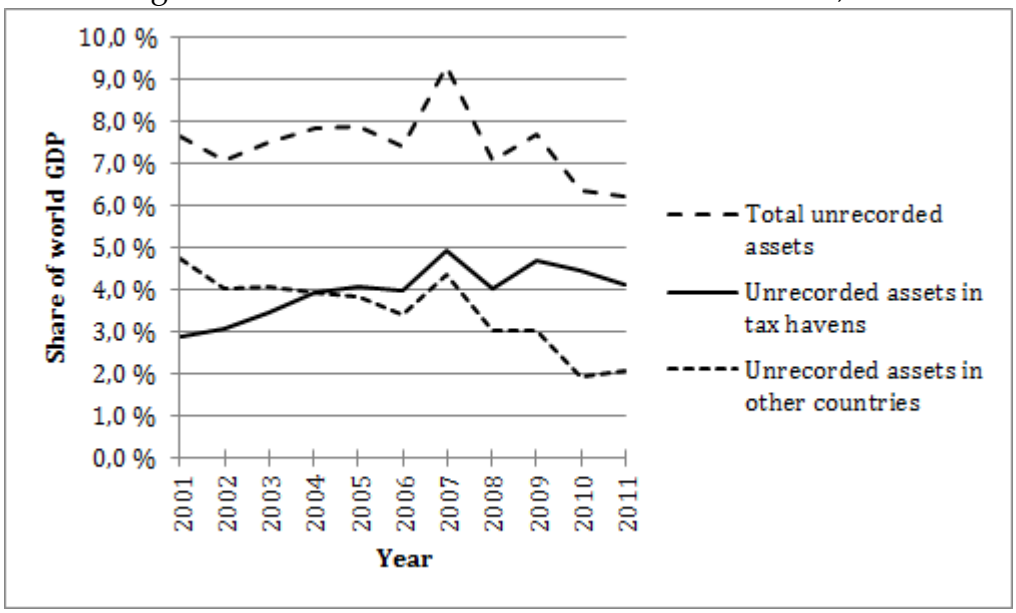
Figure 2: Total unrecorded assets Ω, 2001-2011




2008 (Kahle and Stulz 2013). To investigate this just a little bit further, I calculate the share of year-end unrecorded assets in the *next year's* world GDP, yielding more smooth negative trend from 2007 to 2010, but a slight increase in the last period. However, the overall trend seems to be more or less similar (see Figure 9 in the appendix' Section A.4).

Either way, the total amount of hidden wealth is still huge, and the "era of bank secrecy" is certainly not over yet. When adding bank deposits, wealth worth over 8% of the total global GDP went unrecorded in 2011. To put this into context: 8% of the global GDP is roughly similar to the size of the entire Japanese economy (measured by GDP), and while the research may differ on the total beneficial effects of tax havens, this undoubtedly represent a severe erosion of countries' tax bases. Further, the wealth is not likely to be uniformly owned by the entire world's population. On the contrary, James S. Henry (2012) estimates that less than 100 000 people controls over 30 percent of the total financial wealth. Applying this to the hidden wealth figures, I get that 0,001 % of the world's population controls hidden wealth similar to the size of Canada's GDP. As these holdings go unrecorded, the (now-so-famous) global inequality is likely to be underestimated. According to Nicholas Shaxson, John Christensen and Nick Mathiason (2012, p 6), hidden wealth of this size would have "a major impact on the Gini coefficient for each country", and James S. Henry adds that this conclusion also applies to "most of our conventional measures of inequality" (Henry 2012, p. 40).

Figure 3: Unrecorded assets as share of world GDP, 2001-2011

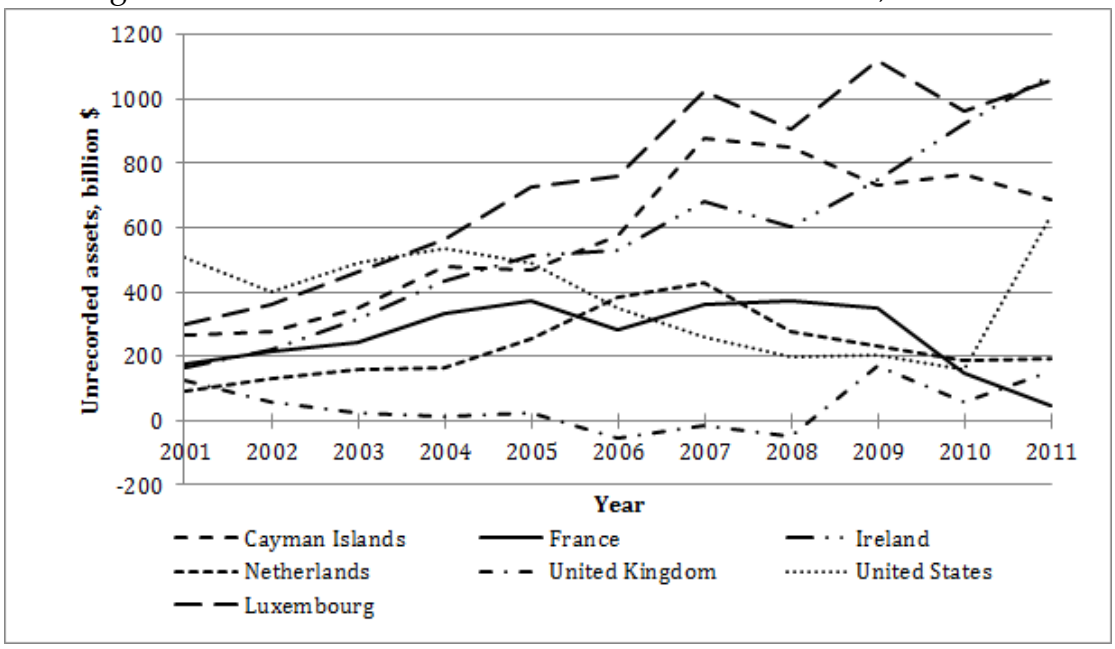



## 4.2 Allocation of hidden wealth

While the last section could shed only a little light on recent developments, the data is much clearer when it comes to the *allocation* of hidden wealth. From Figure 2 in the last section, we see that the total amount of unrecorded assets located in tax havens are increasing for all years except 2008, when the financial crisis emerged. Adjusted for economic growth, the amount of hidden wealth – measured as percent of world GDP – in tax havens grew quite steadily until reaching its peak at 4.9% in 2007, before it dropped in 2008, only to increase again to 4.7% in 2009. From there, however, there is a steady decline of 0.3% each year. Over the entire period, the development in unrecorded assets located in tax havens is quite similar to the developments we see in the total hidden wealth, but the decline in the later years is not as significant (Figure 3).

When I break the numbers down to country-level, the changes in the allocation of unrecorded assets are a lot more conspicuous. In 2008, the biggest tax havens in terms of total hidden wealth located in the country, were Luxembourg, Cayman Islands, Ireland, France, Japan and Netherlands (in that order). In 2011, only three years later, we find Ireland at the very top, followed by Luxembourg, Cayman Islands, United States, Japan, Netherlands and United Kingdom. Despite some rotation, the top three countries hosting the most unrecorded assets, remain the same. These three countries, Ireland, Luxembourg and Cayman Islands, all host large mutual fund industries, which means that

Figure 4: Unrecorded assets located in selected countries, 2001-2011




a lot of this wealth is in turn reinvested elsewhere (Zucman 2013). This further implies that we have not come any closer to identify who owns a large fraction of the world's fund-held asset holdings. The fact that the largest tax havens have maintained their position could also serve as a supporting argument for the scenario modeled by Elsayyad and Konrad (2012), where the tax havens with the highest revenues are most resilient.

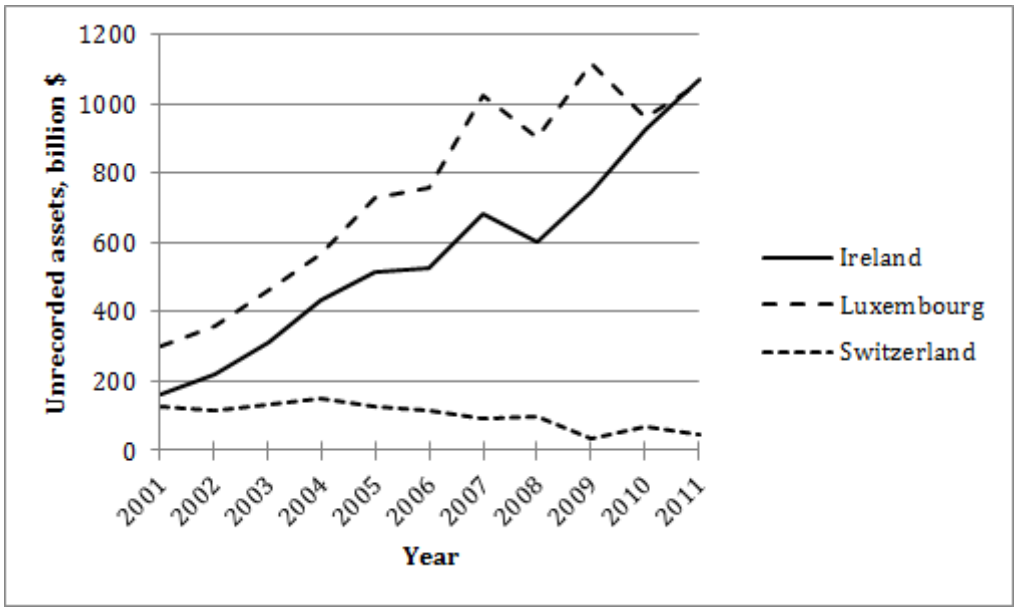
The developments for a few of these countries are remarkable, and are reported in Figure 4. In particular, United States has gone from a "market share" in hidden wealth at 4% in 2008, 2009 and 2010, to hosting 14% of the world's unrecorded assets in 2011. Ireland's growth is similarly rapid - from a share around 14% between 2005 and 2008, they have increased their share until hosting nearly a quarter of the worlds unrecorded assets in 2011. A similar, but less extreme, pattern can be observed for the United Kingdom. As we have seen in the previous section, the total amount of unrecorded assets has not increased to such an extent, so there has to be some re-allocation of hidden assets between countries. I try to investigate this by grouping countries into (1) United States and United Kingdom, (2) OECD member countries, excluded United States, United Kingdom and tax havens, (3) tax havens who are also members of the OECD, namely Switzerland, Ireland and Luxembourg, and (4) other tax havens, mostly small offshore financial centers (OFCs). Before I compare the groups, I take a brief look at the tax havens within OECD's own ranks: Switzerland, Ire-

land and Luxembourg.

Switzerland has historically been the tax haven of tax havens, at least by reputation. Consequently, the swiss wealth management has been reported to be under "intense pressure" by other countries, who are "pushing Switzerland into a financial identity crisis" (IBTimes, 2014). Switzerland has to some extent given in to the pressure. It ranks high on the list of cooperating tax havens, having signed at least 18 tax information treaties, only beaten by Malta (I will come back to these statistics in the next subsection). According to a financial leader, cited in IBTimes (2014), this has led "several foreign banks to exit the Swiss market due to increased regulation and the costs associated with it". The data supports this claim. Over the eleven years of the dataset, the unrecorded assets located in Switzerland has declined significantly both in relative and absolute terms, from hosting 5% of the total unrecorded assets in 2001, to hosting below 1% in 2011. What is curious, however, is that many of the same characterizations could apply to Luxembourg and Ireland, also in terms of cooperation, but the trend in unrecorded assets in these countries is quite the opposite of Switzerland. This is clearly illustrated in Figure 5. Being a galleon figure for bank secrecy may have turned against Switzerland, allowing other countries, apparently similar to them, to remain under the radar and attract foreign capital. While the causal effects are not analyzed in this thesis, it is still important to bear in mind that the increase in hidden wealth located in these three countries is not driven by Switzerland, but rather Luxembourg and Ireland.

I now return to the groupings made two paragraphs above. I calculate the joint share of unrecorded assets within each group to the total amount of unrecorded assets. The results are shown in Figure 6. While the United States and the United Kingdom have increased their share significantly, but bumpily, after 2008, the OECD countries have decreased their share almost accordingly to US and UK's growth. This pattern is visible throughout almost all eleven years, with the graphs more or less mirroring each other. The decline in the OECD group is not driven by one single country, as large, European economies all seem to suffer a significant decline. France alone have lost almost $330 billions worth of unrecorded assets, while Italy, Spain and Netherlands also have a large negative growth rate over the three years. For the group of non-OECD tax havens, it is hard to draw any conclusions. Since 2006, their share suffers some fluctuations, but remains within the range of 15-22%. The group of tax havens within the OECD, however, seems to be winning in the battle for unrecorded capital. Led by Ireland, the group has increased their share from about one

Figure 5: Unrecorded assets located in Switzerland, Ireland and Luxembourg




third in 2007, to nearly half of the world's unrecorded assets in 2011.

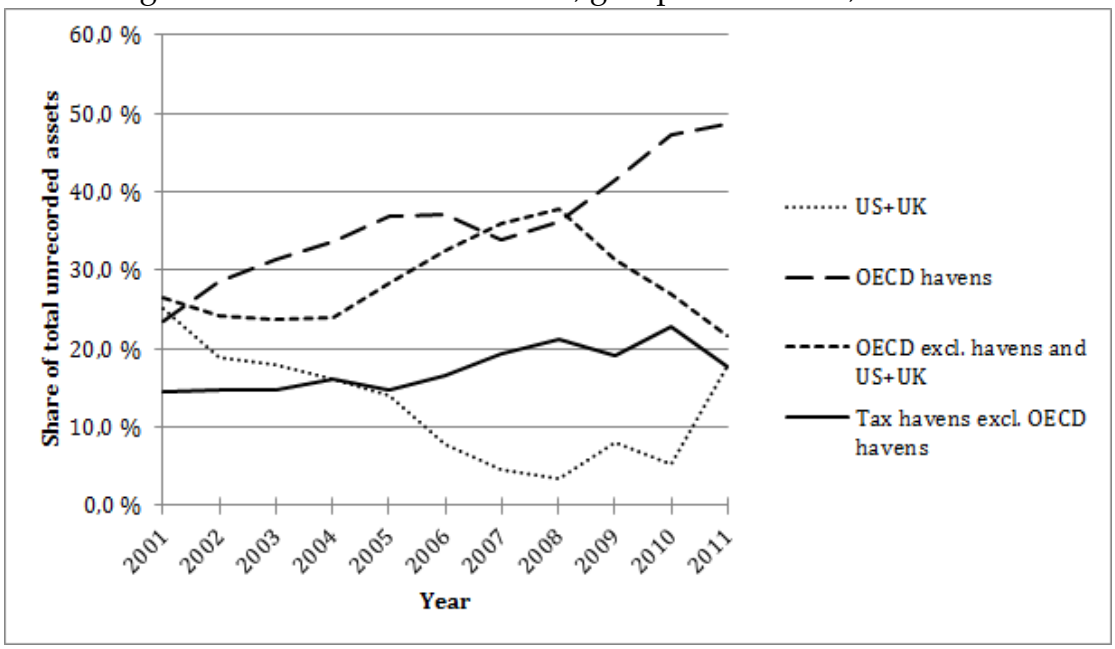
It should not come as a big surprise that these countries attract hidden wealth, both being veterans in the tax haven-business. It is baffling, however, that the hidden wealth OECD so desperately wants to unveil, is located among their own members. Even more baffling, is the increase in the figures for the United States and the United Kingdom - two outspoken opponents of tax haven practices.

First of all, the estimates for these countries are not subject to much adjustments in the estimation for hidden wealth, as they both participate in the CPIS and are included in the updated and extended version of the EWNII-dataset constructed by Lane and Milesi-Ferretti (2007). In fact, the adjustments made for other countries in Section 3, affects only the derived asset side $A_{ji}$ in the calculation of the unrecorded assets $\Omega_j = \hat{L}_j - \sum_{i \neq j} \hat{A}_{ij}$, thus making the hidden wealth estimate smaller than if no corrections were made. So, in the methodical framework used in this thesis, these particular estimates should be considered reliable.

The results stand in sharp contrast to the role especially the US has taken in the international battle against tax havens. Rhetorically, president Barack Obama has attacked the tax havens by several occasions.[15] But also in terms of

[15]See for instance Calmes and Andrews (2009) and Murphy (2014)

Figure 6: Unrecorded asset share, grouped countries, 2001-2011




actual efforts, the US has been in front. By implementing the Foreign Account Tax Compliance Act (FATCA), labeled "an outstanding piece of legislation" by the organization Tax Justice Network (TJN), USA lays pressure on foreign banks to report American citizens' holdings abroad (TJN 2012).[16] As of May 2015, a total of 112 jurisdictions have signed intergovernmental agreements (IGAs) with the United States following FATCA, implementing the act into their own legal systems (US Treasury 2015).

Making progress internationally, the United States still seems to have problems domestically which can contribute to the understanding of the hidden wealth estimates. One particular issue is the state of Delaware, which allows individuals to set up corporations without disclosing ownership. The address 1209 North Orange Street in Wilmington, Delaware, for instance, is the legal address for over 285 000 businesses, and the state has been pointed out as a thriving tax haven by both media and activists (NY Times 2012; Tax Justice Blog 2013). The New York Times quotes the Financial Crimes Enforcement Network, a division of the United States Treasury Department, when stating that Delaware, along with states Nevada, Wyoming and Oregon are "particularly appealing" for the formation of shell companies. Also, the FATCA only requires information about US citizens abroad – not the other way around, so the United States presumably has everything needed to function as a tax haven.

[16] My translation.

A similar argument can be made about the United Kingdom, where the City of London acts as the tax haven within the country (Palan et. al. 2010). Knowing this, the development in unrecorded assets may not appear so unrealistic after all.

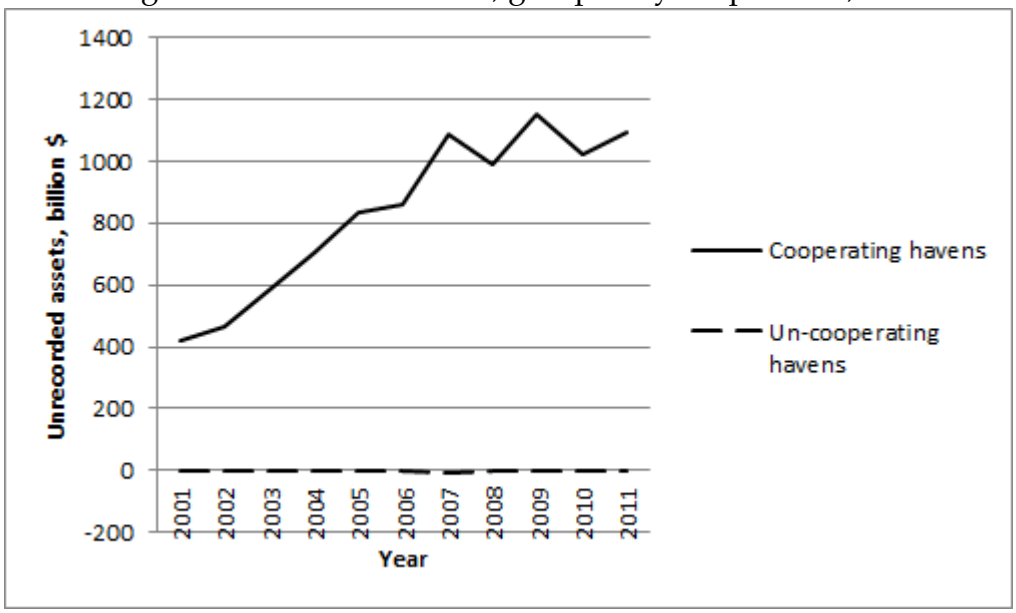
I would like to emphasize that no causal conclusions can be drawn from these estimates. Being exactly that – estimates – and given that they are quite close to the truth, they only tell us where the unrecorded assets have been located over eleven years. With that being said, I conclude this section by pointing out that in the last years, parallel to the aftermath of the financial crisis and the beginning of a collective effort to eradicate tax havens, the total amount of unrecorded assets appear to have increased less than the general economic growth. In terms of allocation, unrecorded asset levels remained roughly the same in small offshore financial centers, declined in non-haven OECD countries and Switzerland, while increasing significantly in Ireland, Luxembourg, the United States and the United Kingdom. This is hardly in line with one of the implications in Slemrod and Wilson's (2009) model presented in Section 2.2, where it is implied that in the case of partial elimination, the largest havens will give up their practice first.

## 4.3 The treaty effect

The time-series of unrecorded assets and its allocation created in the previous section is useful, but do not provide any evidence of causality. I will now look more into the treaties that have been signed, vividly illustrated in Figure 1. First, I create two groups: The most cooperative tax havens, and the least cooperative tax havens. I categorize them by counting the number of treaties signed with non-havens, based on the dataset created by Zucman and Johannesen (2014). The top five is Malta (26 treaties), San Marino (18), Cyprus (18), Luxembourg (18) and Switzerland (18). On the other side of the list, we have Macao (1), Costa Rica (1), Seychelles (2), Barbados (6) and Uruguay (6). Looking at Figure 8, bearing in mind that most treaties were signed in 2009 and 2010, it is not possible to tell whether they have had any effect, even if the increasing trend gets a bit jagged after 2007 for the cooperation countries. One reason for this, is that the least cooperative havens host very small, practically zero, amounts of unrecorded assets, making them ineligible as a comparison group. Hence, more sophisticated methods are needed.

To see which effect, if any, these treaties have had on asset holdings, I re-

Figure 7: Unrecorded asset, grouped by cooperation, 2001-2011




turn to the raw CPIS-dataset, before any adjustments or predictions were made. I add three dummy variables, namely $Treatyendorsed_{ijt}$, $Treatysigned_{ijt}$, and $Treatyenforced_{ijt}$. As the three definitively are correlated and could affect asset holdings, I include all three to avoid omitted variable bias. By including three correlated predictor variables, there will be some multicollinearity in the regression, possibly causing large standard errors. This could in turn cause that statistically significant coefficients are reported *not* significant. However, as seen in Table 2, most coefficients are significant, so I do not pursue this issue much further.

While the treaty data is broken down to quarters, the CPIS data is not. Hence, these dummies change from 0 to 1 if and only if a treaty is endorsed, signed or enforced the year before. That is, they equal 1 the first whole year when a treaty is existing and all years after. This is in line with what Zucman and Johannesen (2014) found in their analysis: The effects of a treaty are best noticed three or four quarters after the signing. I limit the analysis to holdings *by* non-havens, *in* tax havens.

I run two different regression models, and the analyses are separate for debt and equities. First, I extend the gravity-like model from section 3, by including the new dummies. The complete model reads

$$log(1 + A_{ijt}) = \phi_j + \theta_t + \beta_{ijt} Z_{ijt} + \gamma_{it} X_{it} + Endorsed_{ijt} + Signed_{ijt} + Enforced_{ijt} + \varepsilon_{ijt}. \tag{10}$$

For further details of this model, see Section 3.2.1.

The second model is taken from Zucman and Johannesen (2014). Instead of using bilateral controls, it controls for all time invariant characteristics of country-pair through country-pair fixed effects, $\lambda_{ij}$ as well as all common time trends through time fixed effects, $\mu_t$. The dependent variable is the log of assets, as in the gravity-like model. The full fixed-effects model reads

$$log(1 + A_{ijt}) = \alpha + \mu_t + \lambda_{ij} + \beta_1 Endorsed_{ijt} + \beta_2 Signed_{ijt} + \beta_3 Enforced_{ijt} + \varepsilon_{ijt}. \tag{11}$$

The results are reported in Table 2, and both models tell the opposite story of Zucman and Johannesen's (2014) analysis on bank deposits. While they show that the signing of a treaty causes capital owners to shift away from the involved tax haven, the CPIS data implies that asset owners shift *towards* a tax haven when it involves itself in a tax treaty. I find that the actual enforcement of the treaties has the biggest effect. According to the fixed effects model, enforcing a treaty causes a 40% increase in equity holdings from non-haven countries, and an increase of 34% for debt holdings. The coefficients are even larger in the gravity-like model. These positive effects are also to be found for endorsement and signing of treaties, but for debt assets the effect is ambiguous in the fixed effects model. The coefficients are slightly larger, but still quite similar both in size and significance when estimated separately for the three dummies, controlling for multicollinearity. However, these coefficients are likely to be overestimated due to omitted variable bias (see Table 8 in Section A.6 in the appendix).

There are a few possible explanations for these results. First of all, these are not effects on hidden wealth, these are effects on what might be perfectly legal cross-country asset holdings. We saw in the last section that the hidden wealth located in tax havens has not increased to an extent corresponding to the results of these regressions. This implies at least one plausible explanation: A treaty

stimulates investments by improving the particular tax haven's reputation. After all, a tax haven is rarely *only* a tax haven. For instance, the financial center of Curacao, the largest island in the former Netherlands Antilles, attracts businesses with "infrastructure, highly qualified personnel, friendly fiscal climate, multi-lingual background and strategic location" (CIFA 2015). Any business with a reputation of high moral standards, may find treaty-signing tax havens a lot more attractive than the uncooperative ones. This also has one very interesting implication: Tax havens could be better off signing treaties, even if it leads to less facilitation of tax evasion and secrecy activities, which has been their trademark so far.

Then again, these havens could still play an important role in the scheme of tax evasion, even if the actual hidden assets are located elsewhere. So-called "round-tripping" methods of tax evasion are not uncommon. In these schemes, individuals hide funds in tax havens and then reinvest those funds in stocks and bonds in their home country. As we have seen, while hidden wealth located in some tax havens has decreased, it has increased in other countries, which could match an explanation of round-tripping tax evasion. However, this is not supported in the existing research. Michelle Hanlon, Edward L. Maydew and Jacob R. Thornock (2015) have recently studied the correlation between US tax treaties and inbound portfolio investments (to USA) from the cooperating havens, concluding that engaging in a treaty with a tax haven results in a decrease in both debt and equity investment from those havens. The effect is quite significant, ranging from 20.6% to 32.6% for equities and zero to 32.5% for debt (Hanlon et. al. 2015). Taking this into consideration, the results of the regressions might actually imply a shift towards more legal activities for tax havens, and if we assume that more asset holdings within the entities yields increased utility, they could be better off signing than not signing.

Another possible explanation is that these treaties cause a shift in the countries' *reporting*, causing that the variation captured in the models is not entirely from the actual asset holdings. As the data is from the CPIS, all figures are reported by the source-countries, which in this sample means non-haven countries. Signing a treaty could improve the preciseness of the reported figures, and if the assets previously were consistently underreported, it could explain some of the apparent, and thus exaggerated, positive effect of tax treaties. It sounds fairly reasonable that some tax havens would want to under-report the foreign holdings in their banks, and if the non-havens' reporting is a result of cooperation with the tax havens, signing a tax treaty is very likely to improve this

Table 2:

| | Fixed effects model | | Gravity-like model | |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| | Equity assets, log | Debt assets, log | Equity assets, log | Debt assets, log |
| Treaty endorsed | 0.205*** | 0.118** | 0.155*** | 0.195*** |
| | (4.80) | (2.63) | (3.30) | (4.24) |
| Treaty signed | 0.195*** | 0.0593 | 0.427*** | 0.292*** |
| | (3.94) | (1.15) | (4.63) | (3.19) |
| Treaty enforced | 0.403*** | 0.341*** | 0.601*** | 0.374** |
| | (5.29) | (4.22) | (4.54) | (2.85) |
| Constant term | -193.4*** | -139.2*** | -7.073*** | -3.036*** |
| | (-23.56) | (-16.45) | (-19.92) | (-8.82) |
| Source country controls | No | No | Yes | Yes |
| Bilateral controls | No | No | Yes | Yes |
| Host country fixed effects | No | No | Yes | Yes |
| Country-pair fixed effects | Yes | Yes | No | No |
| Year fixed effects | Yes | Yes | Yes | Yes |
| $N$ | 12980 | 13075 | 12491 | 12556 |
| $R^2$ | 0.927 | 0.915 | 0.654 | 0.637 |
| adj. $R^2$ | 0.914 | 0.900 | 0.653 | 0.636 |

$t$ statistics in parentheses
$^{*}$ $p < 0.05$, $^{**}$ $p < 0.01$, $^{***}$ $p < 0.001$

cooperation. However, if the non-havens reporting is based solely on their own controlling of outgoing money flows, the reported figures may not be affected to the same extent. All in all, I do not find this possibility evident enough – as far as I know, the source-countries could also have over-reported prior to the tax treaty – but one should keep in mind that these regressions strictly speaking only show significant effects on the *reported* asset holdings.

# 5 Concluding remarks

In the introduction, I presented my three research questions. These were: How the massive efforts against tax havens have affected the total amount of hidden wealth, how the allocation of hidden wealth has been affected, and how do the treaties signed affect asset holdings in tax havens. I have estimated figures of unrecorded assets to answer the two first questions, and used two different regression models to answer the last.

My estimates for total hidden wealth lend some support to OECD's claim that we are approaching the end of the era of bank secrecy. While the absolute value of unrecorded assets has stabilized, albeit on a high level, the

growth-adjusted numbers have a quite significant negative trend. A smaller and smaller share of the world's GDP goes unrecorded.

The allocation of unrecorded assets appear to undergo some changes. While Ireland has increased their share of hidden wealth constantly since 2007, the OECD countries not listed as tax havens and not including the United States and the United Kingdom, have lost shares constantly since 2008. The US and the UK seem to attract a lot of unrecorded assets in the very last period, 2011, while the share of tax havens fluctuates, but does not seem to change significantly. For the OECD, this could be both good and bad news. The growth of hidden wealth in tax havens has halted, which could imply that their efforts have had an impact. What must be addressed further, is the wealth hidden within the OECD's own ranks. It seems to have some success with Switzerland, where the unrecorded asset holdings have decreased for many years, but there are still enormous amounts hidden in Ireland, Luxembourg, the US and the UK, implying that only a partial elimination seems realistic in the short run. However, we have seen in Slemrod and Wilson's (2009) model, that this could be sufficient to increase welfare.

To summarize, there are certainly some good news for the OECD in its battle against tax evasion, even if new challenges arise. But in theory, initial success does not necessarily mean ultimate success, as the model created by Elsayyad and Konrad (2012) and presented in Section 2, evidently shows. However, the asset holdings in tax havens, regardless of their legal status, appear to increase when a tax treaty is signed. I discussed the possible reasons for this in the previous section. This means that tax havens can actually profit from signing a tax treaty, attracting more legal capital. If this holds true, tax havens may not be as resilient as Elsayyad and Konrad (2012) assume – even if the largest tax havens do not appear to be eradicated any time soon.

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# A Appendix

## A.1 Additional figure to section 3.2.2: Benchmark regression, comparison of periods

Table 3: P-values from the Wald tests

| Variable | Equities | | Debt | |
|---|---|---|---|---|
| Period compared to | 2001-08 | 2009-11 | 2001-08 | 2009-11 |
| Log distance | 0,1677 | 0,0035* | 0,0123 | 0,0000* |
| Longitude gap | 0,0362 | 0,0126 | 0,2520 | 0,0009* |
| Common language | 0,0031* | 0,0000* | 0,1321 | Not sign. |
| Colony dummy | 0,0056* | 0,0000* | 0,1261 | 0,0003* |
| Industrial pair dummy | 0,5248 | 0,5620 | 0,1456 | 0,0048* |
| Log of GDP gap | 0,0374 | 0,5013 | 0,8021 | 0,8836 |
| Log of GDP p.c. gap | 0,0073* | 0,0000* | 0,6859 | 0,0612 |
| Latitude of source country | 0,0000* | 0,0000* | 0,0000* | Not sign. |
| Source country landlocked | 0,3745 | Not sign. | 0,3839 | 0,0011* |
| Log of source country population | 0,0000* | 0,0002* | 0,0165 | 0,1236 |
| Log of source country GDP p.c. | 0,1572 | 0,0131 | 0,1092 | 0,0000* |

* = Significantly different at the 1% level.
Not sign. = The coefficient compared is not significant at the 5% level.

## A.2 Detailed discussion of the collection of asset data

### A.2.1 Netherlands Antilles

The Netherlands Antilles was dissolved in October 2010, which resulted in a new constitutional grouping. The islands of Curacao and Sint Maarten gained autonomy under the Kingdom of The Netherlands, while Bonaire, Sint Eustatius and Saba became special municipalities of the Netherlands. Because of this, CPIS-reporting of assets in the Netherlands Antilles is discontinued in 2009. After that the dataset is rather inconsistent; some CPIS-participants have reported assets held in Curacao, some in Sint Maarten, and some in Curacao & Sint Maarten, as well as Bonaire, Sint Eustatius and Saba. As I want to look at developments in hidden wealth, and the Netherlands Antilles being an important tax haven (both before and after the disintegration), I still want to obtain figures for the Netherlands Antilles as a whole. Thus, I sum the assets for all host countries that formerly were a part of the Netherlands Antilles, and treat them as if it never was dissolved.

In some cases, when a source country reports some value of assets in all the relevant jurisdictions, this is straight forward and unproblematic. However, in most cases some of the entries are missing, and by using this method I implicitly assume that all missing values are equal to zero, which may not necessarily be true. Ideally I would collect values for all control variables and predict the missing values, and add the values together afterwards. Unfortunately, this would be a rather complicated exercise, as countries report inconsequently to Curacao, Sint Maarten and them both combined. In addition, the US TIC survey, which I use for to estimates liabilities for the Netherlands Antilles, do not provide any breakdown to Curacao, Sint Maarten or the others.

I choose to proceed by adding together the values before any predictions were made, knowing that the asset holdings of Netherlands Antilles may be somewhat underestimated.

### A.2.2 Cayman Islands and the TIC data

The Cayman Islands participate in the CPIS, but unfortunately they do not include their non-bank sector, which is very large. According to the German paper *Der Spiegel*, paraphrased by the Norwegian online newspaper *E24*, 89 percent of the worlds hedge funds are located in the Cayman Islands. In other words, this should not be neglected (Sjoelie and Ekeberg 2009).

Gabriel Zucman (2013) addresses the same problem, and I follow his procedure almost every step of the way. First, I collect data on Cayman holdings in the USA from the TIC survey. Unlike Zucman (2013), who takes his TIC data from a set of monthly estimates conducted by Bertaut and Tryon (2007), I use data directly from the TIC database, which is conducted in June each year. To obtain year-end data, like in the CPIS, I simply take the average of June in the same year and June in the following year.

I check the consistency of this method by calculating estimates for 2006, 2007 and 2008 and comparing them with the estimates used by Gabriel Zucman (2013). The two estimates are not exactly similar, but the deviations are not alarming and they follow the same pattern over the years. For instance, Zucman's estimates for debt assets are 426 billion dollars in 2006, 523 in 2007 and 493 in 2008. My corresponding estimates are 389 billion dollars in 2006, 494 in 2007 and 487 in 2008, which is consistently a bit below Zucman's (2013) numbers, but overall it seems like they follow the same trend. Either way, as the monthly estimates by Bertaut and Tryon (2007) do not cover all needed periods, I consider these estimates best guesses and use them to correct the reported asset holdings by the Cayman Islands.

To distribute the holdings across host countries, I first calculate the total asset holdings, $E_{CI}$ and $D_{CI}$ of Cayman Islands, using the shares $\sigma^{E}_{CI,US}$ and $\sigma^{D}_{CI,US}$ (I implicitly assume that the investments from the non-bank sector follows the same pattern as the bank sector investment reported to the CPIS). Next, I distribute the calculated sum of assets across host countries using the calculated shares.[17]

### A.2.3 China

China do not participate in either the CPIS or the Survey of Securities Held as Foreign Exchange Reserves (SEFER), which is included as one entry in the CPIS. Thus, China's holdings of foreign assets are not in the dataset at all, and because of the large share of public investments in the Chinese portfolio, this must be carefully accounted for. Again I follow Gabriel Zucman's (2013) lead in correcting the numbers, but encounter some problems that need to be addressed.

For public holdings, I collect data on official foreign exchange assets from

[17] This procedure is the exact same as Gabriel Zucman (2013) uses. For Cayman Islands, the only deviation from the method in his paper is the collection of TIC data

the International Foreign Statistics (IFS), available from the IMF database. For consistency, I use Zucman's "best-guess" and assume that 85 percent of China's foreign exchange reserves are invested in securities. This 85 percent figure "tries to catch a balance" between a scenario presented by Philip D. Wooldridge (2006), where a share of 97 percent is shown using BIS data, and a thought scenario where the BIS data is somewhat biased and the share is much smaller (Zucman 2013a, p. 22-23).

For non-reserve assets, I collect data on both equity and debt holdings from IMF's International Investment Position (IIP). Additionally, I collect data on Chinese debt and equity holdings in USA from the TIC survey data, and use this to derive the share of equity holdings in the US. I apply this share on the sum of all foreign holdings (public + private), to obtain estimates for total Chinese equity holdings and total Chinese debt holdings (that is $\hat{E}_{China}$ and $\hat{D}_{China}$).

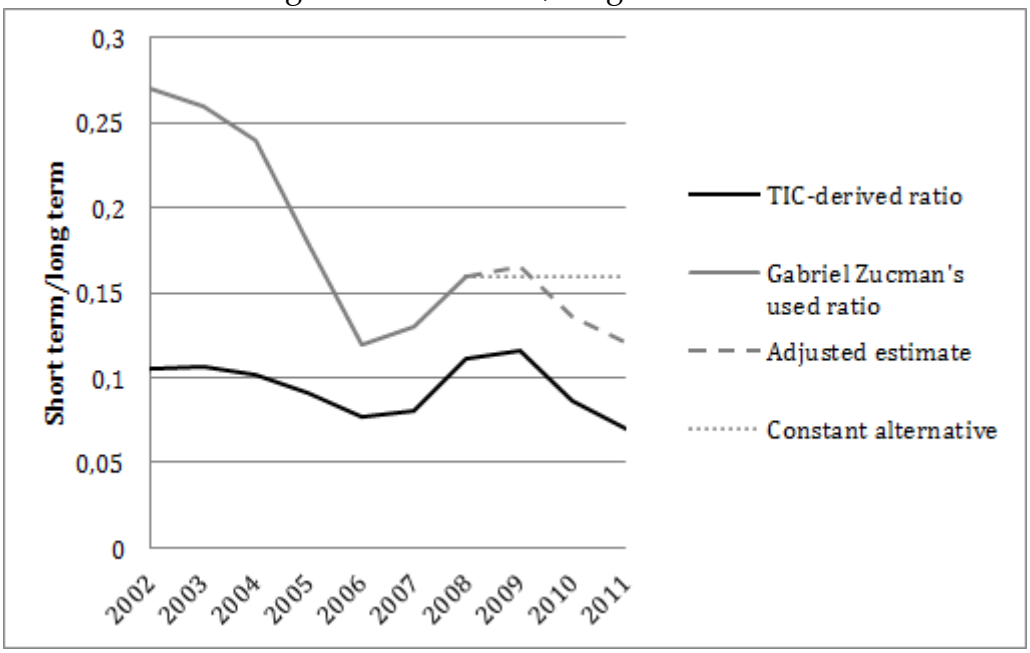
There is one concern connected to setting the US share of equities equal to the global share of equities, namely that China dropped around 97 percent of its holdings of short-term US debt from December 2008 to December 2010. This has in turn led to an increase in the equity share from 5 percent in 2008 to 11 percent in 2011 (see Table 4). Now, the key question is how China has reinvested their funds after they dropped US short term debt: Have they bought short term debt issued by another country, yielding an unchanged global equity share, or have they invested more or less equally in debt and equities? Or is the divestment of US debt simply a sign of a change in investment strategy towards more equity investment, away from debt? I have no clear answer, but looking into the IIP figures may give some hints. For non-reserve assets, the share of equity holdings has skyrocketed from 7 percent in 2007 to 42 percent in 2011. Looking at the estimates provided in Lane and Milesi-Ferrettis EWNII-dataset, I observe the same pattern; an increase from 21 to 56 percent. So, it looks like an increase in the Chinese total share of equity holdings could make sense.

Assuming the opposite – an unchanged equity/debt-ratio at 6 percent (the approximate average before the Chinese dumping of US debt holdings) – I get nonsensical figures, with a higher figure for Chinese equity holdings in USA than the total sum of Chinese equity holdings in USA and the rest of the world combined (compare lines 16 and 12 in Table 4). All things considered, I stick with Zucman's (2013) recipe and apply the TIC-derived share of equities to the global sum of Chinese assets.

Table 4: Collected data, China

| | | 2007 | 2008 | 2009 | 2010 | 2011 |
|---|---|---|---|---|---|---|
| | Public assets | | | | | |
| 1 | Foreign exchange reserves, IFP | *1528000* | *1946030* | 2399152 | 2847338 | 3181148 |
| 2 | x 85% (assumed share in securities) | *1298800* | *1654126* | 2039279 | 2420237 | 2703976 |
| | Private assets | | | | | |
| 3 | IIP equity | *19643* | *21389* | 54575 | 63004 | 86430 |
| 4 | IIP debt | *264978* | *231120* | 188199 | 194108 | 117984 |
| 5 | Total IIP assets | *284620* | *252509* | 242774 | 257112 | 204414 |
| 6 | EWN II equity | *72075* | *71720* | 142936 | 167140 | 150386 |
| 7 | EWN II debt | *264978* | *231120* | 188200 | 194110 | 117984 |
| 8 | Total EWN II | *337053* | *302840* | 331136 | 361250 | 268370 |
| | Total assets | | | | | |
| 9 | Total foreign sec by China | *1583420* | *1906635* | 2282054 | 2677349 | 2908390 |
| 10 | **...of which equities** | ***104020*** | ***95068*** | **151570** | **228884** | **332731** |
| 11 | **...of which debt** | ***1479400*** | ***1811567*** | **2130484** | **2448466** | **2575659** |
| | Figures using constant equity share of 6 % | | | | | |
| 12 | ...of which equities | *95005* | *114398* | 136923 | 160641 | 174503 |
| 13 | ...of which debt | *1488415* | *1792237* | 2145130 | 2516708 | 2733887 |
| 14 | Public assets/total assets | *82 %* | *87 %* | 89 % | 90 % | 93 % |
| | US assets | | | | | |
| 15 | US long term sec. by China, TIC | *1030000* | *1275000* | 1454966 | 1663774 | 1652681 |
| 16 | **...of which equities** | ***72000*** | ***72000*** | **102110** | **142654** | **189845** |
| 17 | US short term sec. by China, TIC | *66000* | *169000* | 82417 | 4905 | 6747 |
| 18 | Total US holdings by China | *1096000* | *1444000* | 1537383 | 1668679 | 1659428 |
| 19 | **US debt holdings by China** | ***1024000*** | ***1372000*** | **1435273** | **1526025** | **1469583** |
| 20 | Equity share of Chinese holdings in USA | *7 %* | *5 %* | 7 % | 9 % | 11 % |
| 21 | US share in China's portfolio | *69 %* | *76 %* | 67 % | 62 % | 57 % |
| 22 | Alternative equity share | *6 %* | *6 %* | 6 % | 6 % | 6 % |
| 23 | Equity share from IIP | *7 %* | *8 %* | 22 % | 25 % | 42 % |
| 24 | Equity share from EWNII | *21 %* | *24 %* | 43 % | 46 % | 56 % |

Figure 8: Short term/long term ratio




### A.2.4 Middle eastern oil exporters (MEOE)

Out of the oil exporters in the Middle East, namely Bahrain, Iran, Iraq, Kuwait, Oman Qatar, Saudi Arabia and the United Arab Emirates, only Bahrain and Kuwait participate in the CPIS. In MEOE's accumulation of foreign claims, Sovereign Wealth Funds (SWFs) plays an important role. SWFs are publicly controlled funds investing budgetary and extra-budgetary savings (The Norwegian Pension Fund is the worlds biggest SWF), and thus the general method can not be used. I use TIC data to correct this, but unfortunately, there is no national breakdown other than "Middle Eastern Oil Exporters" available. As other data on Middle Eastern Oil Exporters are scarce, I proceed by treating them all as one unit. The method are pretty straight forward as described in section 3.2.1.; that is, I estimate MEOE's total asset holdings using (1) TIC data on assets held in the US and (2) the expected share of holdings in the US in MEOE's portfolio.

The TIC data provides us with data on both equity holdings and long-term debt holdings, but the values on short-term holdings cannot be used, as it don't disentangle between different kinds of claims (Zucman 2013a). I deal with this the same way as Gabriel Zucman (2013), by assuming a short-term/long-term ratio equal to the average short-term/long-term ratio for all foreign holdings of US securities. However, as I use a different TIC source than Zucman, I get a consistently lower ratio than he does also when I calculate it for the years

in his data. Which estimate that is the right one I leave unanswered, but as he uses an adjusted version of the TIC survey, I expect that the discrepancy is due to some adjustments made by Bertaut and Tryon (2007). Nevertheless, the different estimates seem to follow the same trend, especially for the latter years. To maintain internal consistency in the dataset, I adjust my estimate slightly upwards to match Zucman's (2013), as seen in Figure 8.

To get from the estimate on MEOE's asset holdings in USA to MEOE's total asset holdings, I need to estimate the share of US holdings in MEOE's international portfolio. Zucman (2013) derives this from existing literature. He assumes a 70 percent share in 2001, and then a annual decline of 2 percent. I do not challenge this, hence I assume a share of 54 percent in 2009, 52 percent in 2010 and 50 percent in 2011. According to Zucman (2013a, p 27), assuming that only half of the MEOE portfolio is invested in the US in the recent years "matches the most recent estimates and various back-of-the-envelope computations". Now, I have all the data needed to compute $\hat{E}_{MEOE}$ and $\hat{D}_{MEOE}$ (numbers reported in line 18, 19 and 20 in Table 5). I subtract the numbers reported by Kuwait and Bahrain, and distribute the holdings across host countries using the predicted shares $\sigma_{MEOE,j}$.

Table 5: Collected data, Middle Eastern Oil Exporters

| | | *2007* | *2008* | 2009 | 2010 | 2011 |
|---|---|---|---|---|---|---|
| 1 | US long term securities held by MEOE, total | *289214* | *299576* | 281159 | 307609 | 368001 |
| 2 | Of which: equities | *140007* | *125074* | 118874 | 158118 | 207109 |
| 3 | Of which: long term debt | *149207* | *174502* | 162285 | 149491 | 160892 |
| 4 | US short term debt held by MEOE, estimate | *37598* | *47932* | 46521 | 41872 | 44287 |
| 5 | Total US debt securities held by MEOE, estimat | *186805* | *222434* | 208806 | 191363 | 205179 |
| 6 | Total US securities helt by MEOE, estimate | *326812* | *347508* | 327679 | 349481 | 412288 |
| 7 | Assumed US share | *58 %* | *56 %* | 54 % | 52 % | 50 % |
| 8 | Implied total securities helt onshore by MEOE | *563469* | *620549* | 606813 | 672080 | 824575 |
| 9 | Of which: equities | *241391* | *223346* | 220136 | 304073 | 414217 |
| 10 | Portfolio held as reserve assets (75%) | *181044* | *167509* | 165102 | 228055 | 310663 |
| 11 | Impl. portfolio held onshore by SWFs + private | *382425* | *453040* | 441711 | 444025 | 513912 |
| | Assets reported in the CPIS | | | | | |
| 12 | Total assets, Bahrain | *47084* | *33485* | 31739 | 30550 | 28930 |
| 13 | Of which: equities | *9508* | *6129* | 3584 | 3780 | 2428 |
| 14 | Total assets, Kuwait | *32130* | *40113* | 37051 | 37081 | 34944 |
| 15 | Of which: equities | *23889* | *32977* | 30862 | 30863 | 29460 |
| 16 | Total assets, Kuwait + Bahrain | *79214* | *73598* | 68790 | 67631 | 63874 |
| 17 | Of which: equities | *33397* | *39106* | 34446 | 34643 | 31888 |
| 18 | **Implied onshore portfolio missed by CPIS** | ***484254*** | ***546952*** | **538024** | **604449** | **760701** |
| 19 | **Of which: equities** | ***207995*** | ***184239*** | **185690** | **269430** | **382329** |
| 20 | **Of which: debt** | ***276259*** | ***362712*** | **352334** | **335019** | **378372** |

### A.2.5 Netherlands

A simple correction must also be done in the case of the Netherlands. They report to the CPIS, but do not include their Special Financial Institutions (SFIs). These are "resident Dutch enterprises or institutions, fully owned by foreign direct investors, that act as financial intermediary between other parts of the group to which they belong" (De Nederlandsche Bank (DNB), 2014). Data on both debt holdings and equity holdings for the Netherlands SFIs are available from DNB – in euros. I convert the values to US dollars using the year-end currency rate from each year, and obtain values that seem consistent with Gabriel Zucman's (2013) numbers; my method yields SFI equity holdings of 18731 million USD in 2008, while Zucman (2013) reports 21706 million USD. For debt holdings, I get 62497 mill. USD in 2008, while Zucman (2013) reports 62910 mill. USD. As the difference between the equity figures are a lot bigger than between the debt figures, the differences can not entirely be explained by different currency rates (I don't know which rate Zucman has used), so my best guess is that the numbers have been slightly adjusted over the years.

I consider the differences negligible, and use my numbers as they are. The procedure is nevertheless similar to what Zucman (2013) describes in his Online Appendix, and as with every issue, I strive to replicate his method for the dataset to be consistent over all 11 years (Zucman 2013a). Hence, I add the SFI holdings to the Netherlands total asset holdings, and distribute the sum across host countries using the predicted shares (as usual).

### A.2.6 Others

Some countries do not participate in the CPIS all years. For the years Zucman (2013) estimates, 2001-2008, this applies to Bahrain, Barbados, Gibraltar, India, Kuwait , Latvia and Mexico, and is nothing I need to worry about as it is already corrected. In the years I estimate, 2009-2011, Bolivia (2011), Mongolia (2011), Lithuania (2009) and Slovenia (2008) joined the CPIS. This gives me the opportunity to estimate their holdings more precisely than the gravity-like model. I fill in the gaps by calculating the different countries' share in the total sum of CPIS-reported assets for the *first year* they participate. I then obtain their estimated total asset holdings by applying this share to the total sum of CPIS-reported assets the years they *do not* participate.

For those countries not participating in the CPIS at all, total asset holdings are estimated individually for private assets and public assets (reserve hold-

ings). The data source are mainly the updated and extended version of the dataset (EWNII) constructed by Lane and Milesi-Ferretti (2007) for private assets, supplemented by raw CPIS-derived numbers. For public assets, the main data source is the International Financial Statistics (IFS) reported to the IMF.

As I don't deviate from Gabriel Zucman's procedure at all on this point, but simply collect the relevant data, I refer the reader to Zucman's (2013a) excellent Online Appendix for further details on the calculations.[18]

### A.2.7 Unallocated claims and the residual

Just as Zucman (2013), I allocate unallocated and confidential claims (which is an independent entry in the CPIS) across the bilateral entries which is either equal to zero or missing in the original CPIS set. They are distributed according to the predicted shares. I also use this method to allocate the residual from the predicted values, which I obtain by taking the difference between the source-level aggregates and the total claims plus the unallocated claims. For further details, see Zucman's online appendix (2013a).

## A.3 Detailed discussion of the collection of liability data

In the collection of liability data, I follow Gabriel Zucman's (2013) methods without deviations. Thus, the process described below is entirely adopted from him.

### A.3.1 Small offshore financial centers (OFCs)

To obtain estimates on the small OFC's liabilities, I collect data individually for fund-sector and non-fund-sector equities. For the latter, I use data from the TIC survey. This only gives a lower bound, which is hard to tell whether is close to the truth or not. Gabriel Zucman assumes that the "Cayman non-fund liabilities are simply equal to the US non-fund equity assets on the Caymans", so for the time series to be consistent, so do I (Zucman 2013a, p. 43).

For data on fund-sector equities, I use various sources. For Cayman Islands, I use *Investment Digests*, published by Cayman Islands Monetary Authority (CIMA) yearly. For Bermuda, I use various issues of Bermuda Monetary Authority's (BMA) *Reports and Accounts*, and for Liechtenstein I use the 2012 edition of the *Annual Report of Liechtenstein's Financial Market Authority* (FMA 2013).

[18] More precisely: Pages 31-34 in the Online Appendix (Zucman 2013a)

For Jersey, Guernsey and the Netherlands Antilles, I collect data on fund-sector equities from the sectoral breakdown of portfolio assets reported in Table 3 of the CPIS (2015).

The final estimate of the small OFC's equity liabilities, is computed as max(fund liabilities plus non-fund liabilities; creditor-derived equity liabilities), whereas the second argument is the sum of all source countries' equity holdings in the particular country, derived from the CPIS dataset.

For debt liabilities, I use data from the Bank of International Settlements' (BIS) *Quarterly Review* (June 2012, Table 11). As with equities, the final estimate for debt liabilities is calculated as max (BIS-derived debt liabilities; creditor-derived debt liabilities from the CPIS).

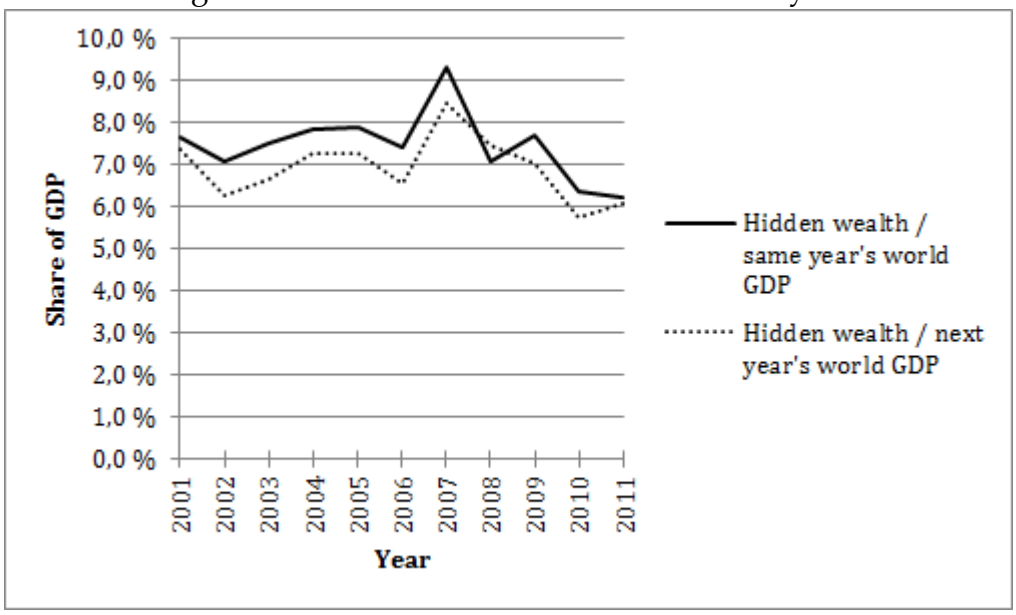
### A.3.2 International organizations and Netherlands SFIs

International organizations are also missing in the EWNII-dataset. I collect data on debt liabilites from BIS, as in the previous section, and use creditor-derived figures for equity liabilities.

As for the asset data, the Special Financial Institutions (SFIs) are excluded when estimates for Netherlands are calculated. I correct this just as I did with the assets: I go to De Nederlandsche Bank (DNB), which provides SFI breakdown in its International Investment Position (IIP) data, and add these numbers to the figures in the CPIS.

## A.4 Additional figure to Section 4.1: Developments in hidden wealth

Figure 9: Unrecorded assets as share of next year's GDP



## A.5 Additional tables to Section 4.2: Allocation of hidden wealth

### A.5.1 Total breakdown of unrecorded equity assets, $\Omega_j^E$, in million USD

Table 6: Unrecorded equity assets by country

| Country | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Afghanistan, Islamic State of | 0 | -146 | -76 | -87 | -191 | -344 | -727 | -355 | -501 | -394 | -412 |
| Albania | -200 | -283 | -131 | -100 | -288 | -479 | -352 | -200 | -255 | -567 | -475 |
| Algeria | -317 | -275 | -266 | -185 | -534 | -404 | -860 | -654 | -432 | -682 | -472 |
| American Samoa | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Andorra | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Angola | -108 | -361 | -88 | -82 | -164 | -425 | -934 | -444 | -502 | -418 | -471 |
| Anguilla | -549 | -284 | -302 | -546 | -677 | -1,268 | -564 | -1,107 | -1,631 | -702 | -1,373 |
| Antigua and Barbuda | -409 | -218 | -272 | -475 | -284 | -1,208 | -2,799 | -987 | -574 | -741 | -1,596 |
| Argentina | -307 | -279 | -404 | -369 | -311 | 327 | 669 | -207 | -1,434 | -717 | -1,802 |
| Armenia | -95 | -121 | -77 | -78 | -195 | -352 | -714 | -325 | -477 | -426 | -440 |
| Aruba | -188 | -140 | -139 | -166 | -246 | -410 | -764 | -197 | -504 | -797 | -1,182 |
| Australia | 19,221 | 11,557 | 24,244 | 12,550 | 11,039 | 11,659 | 10,802 | 3,382 | 37,537 | 46,365 | 17,972 |
| Austria | 8,429 | -4,461 | 11,706 | 14,842 | 18,936 | 24,780 | 28,076 | 13,775 | 16,550 | 9,480 | 11,038 |
| Azerbaijan | -69 | -165 | -59 | -68 | -178 | -314 | -670 | -312 | -423 | -398 | -415 |
| Bahamas, The | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Bahrain | -827 | -151 | -655 | -875 | -1,343 | -1,129 | -1,520 | -1,193 | -1,099 | -2,282 | -2,132 |
| Bangladesh | -247 | -624 | -143 | -224 | -316 | -300 | -893 | -428 | -228 | -151 | -122 |
| Barbados | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Belarus | -114 | -383 | -78 | -85 | -236 | -385 | -841 | -350 | -540 | -445 | -451 |
| Belgium | -625 | -609 | -1,058 | -1,472 | -2,241 | -2,413 | -3,593 | -2,146 | -7,752 | -4,645 | -6,491 |
| Belize | -345 | -238 | -326 | -588 | -684 | -1,151 | -2,056 | -1,003 | -2,461 | -2,080 | -3,371 |
| Benin | -217 | -328 | -151 | -43 | -273 | -393 | -811 | -395 | -602 | -550 | -531 |
| Bermuda | 0 | 0 | 0 | 0 | 11,950 | 0 | 0 | 10,370 | 0 | 0 | 0 |
| Bhutan | -64 | -87 | -65 | -84 | -173 | -338 | -696 | -357 | -506 | -523 | -543 |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Bolivia | -58 | -136 | -13 | -43 | -144 | -282 | -130 | -113 | -375 | -571 | -582 |
| Bosnia and Herzegovina | -229 | -443 | -145 | -111 | -280 | -517 | -980 | -500 | -487 | -75 | -456 |
| Botswana | -304 | -161 | 306 | 147 | -141 | -778 | -1,833 | -921 | -541 | -552 | -447 |
| Brazil | -677 | 1,349 | -5,784 | 1,093 | 14,236 | 17,697 | 60,930 | 15,288 | 49,046 | 67,599 | 58,909 |
| British Indian Ocean Territory | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Brunei Darussalam | -193 | -122 | -136 | -228 | -374 | -800 | -570 | -827 | -863 | -592 | -2,399 |
| Bulgaria | -423 | -442 | -392 | -233 | -374 | -333 | -385 | -896 | -242 | -677 | -277 |
| Burkina Faso | -236 | -150 | -162 | -102 | -290 | -407 | -823 | -385 | -626 | -540 | -550 |
| Burundi | -194 | -350 | -145 | -63 | -264 | -380 | -781 | -395 | -979 | -1,167 | -1,597 |
| Cambodia | -92 | -111 | -106 | -127 | -247 | -462 | -883 | -517 | -533 | -498 | -472 |
| Cameroon | -321 | -187 | -195 | -230 | -243 | -578 | -1,510 | -545 | -897 | -513 | -791 |
| Canada | 13,118 | -10,702 | -35,639 | 15,010 | -10,347 | -10,345 | -15,600 | -9,636 | -14,310 | -26,272 | -33,268 |
| Cape Verde | -120 | -166 | -85 | -99 | -228 | -422 | -845 | -367 | -803 | -768 | -883 |
| Cayman Islands | 203,521 | 253,192 | 347,992 | 478,009 | 465,413 | 572,591 | 808,406 | 602,205 | 478,215 | 524,856 | 491,606 |
| Central African Republic | -210 | -384 | -161 | -102 | -279 | -396 | -813 | -392 | -897 | -980 | -1,201 |
| Chad | -223 | -356 | -199 | -61 | -309 | -438 | -868 | -424 | -590 | -528 | -606 |
| Chile | -649 | -860 | -1,269 | -1,706 | -2,032 | -3,585 | -6,768 | -4,630 | -3,370 | -2,004 | -4,768 |
| China, P.R. | -6,300 | -6,548 | -9,043 | -10,422 | -14,089 | -14,775 | 27,203 | 845 | -11,692 | 692 | -32,719 |
| Christmas Island | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Cocos (Keeling) Islands | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Colombia | 33 | 57 | 24 | 1,415 | 3,000 | 3,091 | 3,586 | 2,170 | 4,621 | 7,347 | 5,552 |
| Comoros | -192 | -379 | -153 | -66 | -293 | -419 | -837 | -429 | -735 | -796 | -1,215 |
| Congo, Dem. Rep. of | -269 | -180 | -195 | -144 | -332 | -491 | -941 | -499 | -477 | -683 | -426 |
| Congo, Rep. of | -202 | -406 | -137 | -86 | -255 | -365 | -759 | -367 | -445 | -399 | -450 |
| Cook Islands | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Costa Rica | -125 | -538 | -231 | -239 | -332 | -479 | -873 | -389 | -946 | -988 | -1,738 |
| Croatia | -140 | 11 | -56 | -32 | -24 | 782 | 1,502 | 1,685 | 446 | 674 | 60 |
| Cuba | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Cyprus | -549 | -970 | -1,196 | -2,602 | -1,300 | -1,866 | -2,429 | -2,168 | -1,513 | -2,468 | -2,729 |
| Czech Republic | 1,455 | 1,830 | 860 | 1,864 | 337 | 163 | -3,767 | -3,095 | -483 | -3,894 | -2,906 |
| Cote d'Ivoire | -336 | -245 | -234 | -2 | -93 | -266 | -302 | -51 | -567 | -774 | -459 |
| Denmark | 5,508 | 1,707 | 2,510 | 10,633 | 6,635 | 2,882 | 7,770 | 758 | 4,106 | 695 | 2,475 |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Djibouti | -199 | -403 | -163 | -77 | -313 | -439 | -856 | -436 | -682 | -744 | -800 |
| Dominica | -313 | -195 | -138 | -285 | -347 | -797 | -1,579 | -709 | -1,319 | -727 | -1,318 |
| Dominican Republic | -53 | 1 | -31 | -43 | -107 | -236 | -558 | -194 | -469 | -396 | -567 |
| Ecuador | -99 | -88 | -20 | -61 | -163 | -169 | -307 | -20 | -589 | -574 | -797 |
| Egypt | 729 | 877 | 151 | -1,419 | -1,889 | -2,684 | -4,121 | -4,233 | -3,492 | -5,020 | -5,848 |
| El Salvador | -64 | -154 | -82 | -118 | -191 | -262 | -194 | -62 | -460 | -741 | -864 |
| Equatorial Guinea | -163 | -278 | -125 | -54 | -296 | -439 | -824 | -457 | -474 | -307 | -381 |
| Eritrea | -241 | -117 | -119 | -287 | -453 | -839 | -1,678 | -790 | -1,798 | -1,404 | -3,036 |
| Estonia | 124 | -26 | -112 | -132 | -614 | -1,277 | -649 | -504 | -549 | -1,008 | -611 |
| Ethiopia | -157 | -129 | -93 | -185 | -295 | -580 | -341 | -225 | -357 | -669 | -926 |
| Falkland Islands (Malvinas) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Faroe Islands | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Fiji | -159 | -67 | -103 | -390 | -365 | -662 | -1,312 | -592 | -1,411 | -817 | -1,189 |
| Finland | 15,678 | 7,326 | 5,897 | -1,219 | 533 | 10,659 | 8,798 | -4,602 | -94 | -9,202 | -13,726 |
| France | 19,908 | 48,171 | 68,127 | 51,627 | 67,865 | 115,996 | 80,596 | 31,033 | 55,854 | 16,601 | -26,504 |
| French Guiana | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| French Polynesia | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| French Southern Territories | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Gabon | -31 | -29 | -71 | -183 | -183 | -426 | -235 | -143 | -155 | -288 | -504 |
| Gambia, The | -257 | -114 | -119 | -289 | -405 | -820 | -1,681 | -758 | -1,671 | -1,040 | -1,810 |
| Georgia | -235 | -184 | -173 | -171 | -365 | -346 | -177 | 178 | 7 | -130 | -281 |
| Germany | 16,970 | 12,260 | 26,605 | -6,985 | -9,387 | -13,288 | -21,660 | -13,954 | -18,193 | -31,653 | -41,029 |
| Ghana | -390 | -99 | -139 | -198 | -832 | -1,555 | -701 | -1,492 | -669 | -319 | -511 |
| Gibraltar | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Greece | 920 | 2,731 | 4,389 | 7,065 | 8,285 | 9,702 | 20,042 | 561 | 191 | -1,323 | -4,521 |
| Greenland | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Grenada | -253 | -120 | -163 | -332 | -384 | -770 | -1,548 | -666 | -1,316 | -823 | -1,418 |
| Guadeloupe | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Guam | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Guatemala | -69 | -389 | -89 | -116 | -187 | -306 | -626 | -256 | -731 | -758 | -911 |
| Guernsey | 20,728 | 23,730 | 34,886 | 53,551 | 67,628 | 89,928 | 124,697 | 67,525 | 82,584 | 105,231 | 86,723 |
| Guinea | -231 | -352 | -165 | -56 | -272 | -408 | -821 | -390 | -827 | -796 | -881 |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Guinea-Bissau | -121 | -147 | -88 | -97 | -213 | -376 | -780 | -345 | -866 | -879 | -1,022 |
| Guyana | -271 | -125 | -159 | -88 | -440 | -215 | -400 | -296 | -847 | -1,332 | -2,079 |
| Haiti | -193 | -266 | -246 | -133 | -307 | -419 | -371 | -184 | -1,157 | -1,314 | -1,516 |
| Honduras | -110 | -219 | -160 | -201 | -262 | -406 | -793 | -333 | -1,108 | -1,317 | -1,568 |
| Hong Kong SAR of China | 13,331 | 9,157 | 3,298 | 15,217 | 11,789 | -2,508 | 67,607 | 17,153 | 73,352 | 70,633 | 44,772 |
| Hungary | -1,083 | -777 | -1,159 | -1,668 | -1,925 | -2,568 | -4,752 | -803 | 1,284 | -1,158 | -2,172 |
| Iceland | -1,532 | -2,318 | -1,626 | -1,966 | 2,121 | 4,309 | 956 | -814 | -978 | -1,643 | -1,302 |
| India | 1,681 | -3,560 | -1,406 | -4,110 | -6,141 | 1,208 | 795 | -7,972 | -18,319 | -21,310 | -30,327 |
| Indonesia | -165 | -2,292 | -1,719 | -4,620 | -5,336 | 7,220 | 34,712 | 6,952 | 24,572 | 32,014 | 33,007 |
| International Organizations | 0 | -4,413 | -1,276 | -8,084 | -398 | -604 | -27 | -1,019 | -26 | -2,155 | -3,240 |
| Iran, Islamic Republic of | -148 | -137 | -125 | -180 | -317 | -603 | -645 | -675 | -367 | -605 | -861 |
| Iraq | 0 | 0 | 0 | 0 | -289 | -381 | -884 | -334 | -552 | -591 | -427 |
| Ireland | 174,554 | 225,180 | 315,667 | 384,367 | 439,838 | 522,297 | 710,438 | 635,098 | 778,152 | 918,407 | 939,206 |
| Isle of Man | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Israel | 2,791 | 1,197 | 2,256 | 4,696 | 1,504 | 2,379 | 5,589 | 2,351 | 8,993 | 6,282 | 2,707 |
| Italy | 44,442 | 34,695 | 43,375 | 56,987 | 38,948 | 57,037 | 53,284 | 6,247 | -10,107 | -13,571 | -13,235 |
| Jamaica | -307 | -178 | -263 | -453 | -368 | -92 | -449 | -59 | -649 | -1,015 | -1,597 |
| Japan | 37,777 | 28,355 | 55,196 | 76,308 | 138,445 | 129,231 | 155,458 | 57,578 | 103,064 | 122,960 | 81,169 |
| Jersey | 54,524 | 31,487 | 30,545 | 22,297 | 38,075 | 49,688 | 87,526 | 34,092 | 36,804 | 102,243 | 56,916 |
| Jordan | 1,858 | 1,235 | 1,877 | 2,809 | 7,308 | 4,687 | 4,896 | 2,610 | 1,620 | 1,324 | 1,420 |
| Kazakhstan | -133 | -309 | -219 | -226 | -468 | 2,808 | 6,644 | 1,811 | 1,223 | 817 | 490 |
| Kenya | -496 | -297 | -362 | -632 | -775 | -1,359 | -2,993 | -766 | -1,152 | -1,653 | -1,997 |
| Kiribati | -195 | -82 | -101 | -263 | -342 | -720 | -1,470 | -683 | -1,336 | -798 | -1,636 |
| Korea, Democratic People's Republic of | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Korea, Republic of | 11,482 | 7,149 | 7,678 | 14,369 | 32,785 | 43,150 | 37,172 | -8,314 | 27,891 | 32,048 | 375 |
| Kosovo, Republic of | | | | | | | | | -429 | -411 | -340 |
| Kuwait | -316 | -381 | -302 | -305 | -1,087 | -1,175 | -1,584 | -360 | 1,070 | 1,165 | 1,792 |
| Kyrgyz Republic | -82 | -101 | -65 | -79 | -173 | -353 | -697 | -150 | -314 | -548 | -474 |
| Lao People's Democratic Republic | -87 | -74 | -90 | -107 | -263 | -244 | -438 | -273 | -284 | -416 | -463 |
| Latvia | -310 | -775 | -98 | -244 | -276 | -331 | -435 | -438 | -386 | -748 | -900 |
| Lebanon | -595 | -191 | -25 | 114 | 2,782 | 2,416 | 4,283 | 3,447 | 6,153 | 4,999 | 2,817 |
| Lesotho | -236 | -107 | -116 | -283 | -389 | -804 | -1,623 | -758 | -648 | -1,098 | -1,412 |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Liberia | -897 | -394 | -480 | -1,361 | -1,640 | -821 | -1,274 | -873 | -3,052 | -4,073 | -5,681 |
| Libya | -149 | -590 | -105 | -111 | -189 | -446 | -429 | -516 | -601 | -627 | -493 |
| Liechtenstein | 5,488 | 1,996 | 12,261 | 16,227 | 22,894 | 27,117 | 22,860 | 21,054 | 31,521 | 29,006 | 21,731 |
| Lithuania | -401 | -248 | -286 | -305 | -115 | -881 | -410 | -337 | -209 | -778 | -277 |
| Luxembourg | 307,532 | 365,371 | 472,400 | 577,856 | 740,890 | 773,107 | 1,048,860 | 910,275 | 1,105,172 | 1,113,470 | 1,081,373 |
| Macao SAR of China | -445 | -349 | -429 | -813 | -740 | -1,318 | -3,023 | -1,628 | -517 | -937 | -547 |
| Macedonia, FYR | -126 | -240 | -92 | 106 | 230 | 560 | 1,606 | 255 | 280 | 94 | 93 |
| Madagascar | -188 | -429 | -144 | -99 | -269 | -377 | -793 | -406 | -668 | -667 | -716 |
| Malawi | -67 | -174 | -164 | -386 | -495 | -863 | -1,691 | -781 | -1,655 | -979 | -1,732 |
| Malaysia | -2,708 | -1,476 | 583 | 3,166 | 694 | 5,581 | 4,577 | -4,836 | -4,106 | 2,377 | 105 |
| Maldives | -108 | -135 | -68 | -123 | -235 | -464 | -971 | -495 | -744 | -585 | -783 |
| Mali | -227 | -126 | -173 | -59 | -285 | -409 | -422 | -234 | -455 | -683 | -502 |
| Malta | -2,394 | -2,648 | -2,662 | -3,917 | -4,950 | -603 | -800 | -485 | -686 | -998 | -966 |
| Marshall Islands | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Martinique | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Mauritania | -142 | -113 | -101 | -97 | -240 | -590 | -1,057 | -450 | -1,243 | -1,097 | -1,091 |
| Mauritius | -1,697 | -1,278 | -1,641 | -1,535 | -3,157 | -2,100 | -2,835 | -1,762 | 3,714 | 6,076 | 10,880 |
| Mayotte | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Mexico | 12,715 | 10,700 | 12,922 | 16,927 | 23,770 | 36,471 | 29,491 | 76,573 | 33,105 | 40,490 | 30,836 |
| Micronesia, Federated States of | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Moldova | -119 | -175 | -85 | -76 | -213 | -360 | -774 | -193 | -485 | -407 | -376 |
| Monaco | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Mongolia | -98 | -134 | -88 | -109 | -218 | -404 | -352 | -379 | -617 | -424 | -184 |
| Montenegro, Republic of | 0 | 0 | 0 | 0 | 0 | 24 | 77 | 10 | 17 | 6 | 7 |
| Montserrat | -301 | -159 | -217 | -397 | -503 | -929 | -1,757 | -792 | -1,222 | -594 | -1,152 |
| Morocco | -614 | -384 | -1,212 | 115 | -89 | -641 | -1,380 | -434 | 839 | -322 | -1,640 |
| Mozambique | -122 | -207 | -97 | -109 | -228 | -433 | -853 | -430 | -605 | -664 | -535 |
| Myanmar | -100 | -83 | -64 | -130 | -229 | -498 | -994 | -521 | -567 | -376 | -559 |
| Namibia | -94 | -126 | -132 | -53 | -252 | -636 | -351 | -242 | -360 | -469 | -1,460 |
| Nauru | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Nepal | -147 | -194 | -90 | -106 | -212 | -410 | -798 | -381 | -617 | -474 | -380 |
| Netherlands | -1,747 | 27,675 | -588 | -7,157 | 179,816 | 229,700 | 259,417 | 137,360 | 152,025 | 141,101 | 160,633 |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Netherlands Antilles | 4,436 | 1,141 | 0 | 0 | 2,283 | 1,539 | 1,420 | 5,477 | 0 | 0 | 0 |
| New Caledonia | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| New Zealand | 502 | 574 | 2,164 | 2,284 | 170 | -494 | -424 | -575 | -477 | -1,126 | -1,147 |
| Nicaragua | -120 | -144 | -172 | -205 | -267 | -396 | -715 | -283 | -915 | -1,265 | -1,522 |
| Niger | -236 | -405 | -279 | -69 | -314 | -450 | -911 | -436 | -820 | -767 | -736 |
| Nigeria | -819 | -497 | -641 | 1,411 | 2,190 | 3,633 | 3,041 | 3,270 | 2,522 | 4,599 | 7,074 |
| Niue | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Norfolk Island | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Norway | -736 | -1,106 | -1,176 | -2,793 | 929 | 11,575 | 5,813 | -9,074 | -1,553 | 7,555 | -4,033 |
| Oman | -306 | -220 | -126 | -139 | 210 | 1,118 | 3,174 | 889 | 1,756 | 1,961 | 1,204 |
| Pakistan | -57 | 470 | 798 | 932 | 1,616 | 1,916 | 1,990 | -2,506 | -1,162 | -2,236 | -745 |
| Palau | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Panama | -829 | -902 | -1,893 | -1,780 | -1,959 | -2,554 | -3,489 | -2,471 | -3,774 | -4,756 | -6,023 |
| Papua New Guinea | -1,234 | -867 | -1,086 | -1,001 | -1,998 | -1,609 | -2,398 | -1,932 | -3,206 | -3,732 | -6,098 |
| Paraguay | -79 | -56 | -69 | -80 | -155 | -310 | -306 | -140 | -298 | -458 | -437 |
| Peru | 1,072 | 1,670 | 1,358 | 1,489 | 3,825 | 5,376 | 13,938 | 6,495 | 12,670 | 19,159 | 16,708 |
| Philippines | -830 | -466 | -422 | -252 | 353 | 2,770 | 4,197 | 1,313 | 622 | -313 | -1,762 |
| Pitcairn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Poland | -566 | -530 | -1,739 | 167 | -146 | -4,627 | -1,714 | -1,734 | -4,525 | -6,501 | -5,791 |
| Portugal | 2,283 | 5,434 | 18,791 | 25,994 | 27,329 | 8,376 | -1,844 | -1,269 | 790 | -3,248 | -2,591 |
| Puerto Rico | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Qatar | -1,209 | -894 | -920 | -547 | -1,448 | -1,911 | -2,045 | -991 | -827 | -889 | -392 |
| Romania | -281 | 22 | 102 | -628 | -954 | -918 | -2,884 | -1,291 | -361 | -1,839 | -1,354 |
| Russian Federation | 12,209 | 16,658 | 24,400 | 53,397 | 48,167 | 81,367 | 113,974 | 24,247 | 48,339 | 67,176 | 45,323 |
| Rwanda | -245 | -235 | -150 | -150 | -368 | -648 | -1,223 | -585 | -1,102 | -764 | -653 |
| Reunion | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Samoa | -118 | -57 | -81 | -174 | -238 | -500 | -1,026 | -499 | -935 | -713 | -1,076 |
| San Marino | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Saudi Arabia | -1,116 | -2,727 | -1,053 | -978 | -1,369 | -3,274 | -3,532 | -1,835 | 1,448 | 1,104 | -707 |
| Senegal | -369 | -173 | -177 | -185 | -192 | -510 | -1,255 | -444 | -1,140 | -1,291 | -1,236 |
| Serbia, Republic of | -363 | -998 | -262 | -225 | -560 | -854 | -1,648 | -466 | -388 | -776 | -241 |
| Seychelles | -337 | -371 | -193 | -258 | -362 | -813 | -356 | -209 | -249 | -414 | -1,010 |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Sierra Leone | -265 | -126 | -135 | -320 | -455 | -876 | -1,763 | -797 | -2,361 | -2,297 | -2,278 |
| Singapore | -4,277 | -2,410 | -924 | 1,423 | 3,115 | 3,321 | 19,770 | 62 | -9,432 | -11,350 | -14,045 |
| Slovak Republic | 623 | 992 | 1,542 | 3,281 | 3,901 | 4,261 | 4,800 | 4,539 | 3,929 | 4,040 | 4,305 |
| Slovenia | -80 | 58 | 161 | 252 | 384 | 853 | 1,753 | -55 | 507 | 85 | 15 |
| Solomon Islands | -186 | -79 | -97 | -249 | -326 | -695 | -1,422 | -692 | -1,327 | -825 | -1,435 |
| Somalia | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| South Africa | 2,533 | 3,372 | 3,808 | 3,160 | 1,107 | 13,706 | 21,921 | -3,909 | 7,558 | 7,412 | -6,157 |
| South Sudan | | | | | | | | | | | 0 |
| Spain | 11,993 | 22,206 | 39,004 | 38,400 | 30,169 | 56,344 | 97,233 | 40,492 | 49,664 | 28,591 | 24,045 |
| Sri Lanka | -208 | -117 | -270 | -161 | -446 | -266 | -317 | -212 | -562 | -916 | -900 |
| St. Helena | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| St. Kitts and Nevis | -275 | -127 | -174 | -345 | -446 | -858 | -1,667 | -745 | -1,327 | -558 | -1,237 |
| St. Lucia | -242 | -113 | -155 | -323 | -420 | -806 | -1,576 | -649 | -1,284 | -737 | -1,286 |
| St. Pierre and Miquelon | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| St. Vincent and the Grenadines | -265 | -110 | -145 | -369 | -427 | -880 | -1,735 | -758 | -1,522 | -833 | -1,562 |
| Sudan | -209 | -462 | -150 | -224 | -417 | -715 | -1,435 | -700 | -972 | -742 | -785 |
| Suriname | -50 | -63 | -74 | -95 | -169 | -308 | -665 | -291 | -561 | -531 | -585 |
| Swaziland | -300 | -218 | -187 | -405 | -623 | -1,237 | -2,114 | -396 | -891 | -1,014 | -1,014 |
| Sweden | 1,850 | 936 | 4,328 | -761 | 9,769 | 19,319 | 10,799 | -5,107 | 169 | 1,119 | 120 |
| Switzerland | 115,809 | 106,311 | 116,915 | 122,454 | 117,557 | 111,846 | 102,216 | 93,787 | 48,156 | 64,214 | 53,107 |
| Syrian Arab Republic | -126 | -561 | -116 | -111 | -276 | -446 | -875 | -424 | 0 | 0 | 0 |
| Sao Tome and Principe | -89 | -145 | -70 | -79 | -181 | -333 | -694 | -314 | -646 | -655 | -696 |
| Taiwan Province of China | -2,153 | 8,778 | 12,414 | 14,364 | 18,649 | 30,817 | 37,146 | 18,046 | 29,987 | 35,205 | 20,982 |
| Tajikistan | -76 | -85 | -63 | -74 | -170 | -339 | -670 | -306 | -539 | -494 | -462 |
| Tanzania | -241 | -236 | -125 | -255 | -370 | -830 | -1,724 | -845 | -571 | -652 | -548 |
| Thailand | 298 | 660 | -1,346 | 711 | -423 | 358 | 3,044 | -4,911 | -7,895 | 799 | -1,182 |
| Timor-Leste | 0 | 0 | 0 | 0 | -192 | -379 | -760 | -427 | -685 | -760 | -889 |
| Togo | -147 | -65 | -76 | 25 | -263 | -401 | -1,014 | -426 | -1,349 | -1,594 | -1,535 |
| Tokelau | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Tonga | -172 | -71 | -91 | -241 | -317 | -629 | -279 | -628 | -1,184 | -683 | -1,221 |
| Trinidad and Tobago | -105 | -139 | -121 | -277 | -292 | -870 | -1,865 | -805 | -1,288 | -437 | -238 |
| Tunisia | -257 | -23 | -23 | 104 | -116 | 176 | 177 | 538 | 184 | 725 | -126 |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Turkey | 709 | -791 | 392 | 661 | 4,208 | 3,049 | 13,218 | -1,004 | 3,240 | -864 | 1,346 |
| Turkmenistan | -75 | -59 | -66 | -76 | -184 | -335 | -699 | -326 | -440 | -403 | -338 |
| Turks and Caicos Islands | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Tuvalu | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Uganda | -257 | -199 | -132 | -291 | -409 | -832 | -1,766 | -840 | -1,371 | -706 | -1,266 |
| Ukraine | -148 | 97 | 70 | 141 | -99 | 18 | -1,216 | -287 | 1,041 | 463 | 1,334 |
| United Arab Emirates | -978 | -1,477 | -1,532 | -2,775 | -1,701 | -1,755 | -1,871 | -860 | -607 | -1,082 | -973 |
| United Kingdom | 113,728 | 34,990 | 14,981 | 32,120 | -47,200 | -62,555 | -78,014 | -58,931 | -22,365 | -110,338 | -149,235 |
| United States | 408,645 | 296,338 | 337,155 | 377,245 | 273,462 | 179,418 | 182,816 | 166,938 | 408,447 | 503,830 | 603,570 |
| United States Minor Outlying Islands | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Uruguay | -79 | -75 | -106 | -129 | -184 | 122 | -108 | -188 | -268 | 304 | 258 |
| Uzbekistan | -68 | -51 | -63 | -73 | -173 | -318 | -669 | -313 | -403 | -368 | -397 |
| Vanuatu | -238 | -168 | -137 | -193 | -348 | -670 | -1,358 | -678 | -1,184 | -714 | -1,221 |
| Vatican City State | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Venezuela, Republica Bolivariana de | -90 | 400 | 919 | 694 | 290 | 692 | -589 | -417 | -708 | -1,172 | -1,224 |
| Vietnam | -375 | -383 | -421 | -585 | -809 | -84 | 2,760 | 360 | -465 | 2,184 | 958 |
| Virgin Islands, British | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Virgin Islands, U.S. | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Wallis and Futuna Islands | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| West Bank and Gaza Strip | -55 | -20 | 11 | -36 | -148 | -366 | -842 | -232 | -389 | -231 | -370 |
| Western Sahara | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Yemen, Republic of | -164 | -200 | -126 | -195 | -341 | -589 | -1,077 | -539 | -278 | -509 | -723 |
| Zambia | -443 | -252 | -252 | -469 | -459 | -1,253 | -610 | -280 | -542 | -926 | -732 |
| Zimbabwe | -141 | -235 | -206 | -585 | -424 | -1,565 | -1,002 | -660 | -1,286 | -1,737 | -1,700 |

### A.5.2 Total breakdown of unrecorded debt assets, $\Omega_j^D$, in million USD

Table 7: Unrecorded debt assets by country

| Country | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Afghanistan, Islamic State of | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Albania | 0 | 0 | 0 | 0 | 0 | 0 | -2,070 | -3,305 | -4,109 | -39 | -89 |
| Algeria | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| American Samoa | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Andorra | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Angola | 0 | 0 | -206 | -397 | -651 | -544 | -1,176 | -1,110 | -866 | -3,223 | -410 |
| Anguilla | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Antigua and Barbuda | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Argentina | 9,843 | 6,281 | 10,812 | 7,055 | 5,047 | 7,375 | 7,428 | -71 | 5,564 | 7,653 | 4,307 |
| Armenia | -62 | -75 | -130 | -292 | -487 | -701 | -835 | -760 | -813 | -2,788 | -1,016 |
| Aruba | -548 | -579 | -641 | -771 | -631 | -884 | -1,182 | -2,567 | -1,314 | -1,680 | -2,079 |
| Australia | 46,643 | 45,962 | 65,173 | 63,230 | 69,868 | 88,003 | 96,542 | 80,228 | 80,958 | 105,556 | 113,055 |
| Austria | 40,275 | 52,512 | 56,192 | 68,423 | 55,917 | 55,299 | 75,284 | 61,446 | 64,231 | 30,734 | 5,352 |
| Azerbaijan | -106 | -102 | -201 | -369 | -334 | -794 | -1,017 | -600 | 0 | 0 | 0 |
| Bahamas, The | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1,220 | 0 | 623 |
| Bahrain | -245 | 251 | -110 | -287 | -1,512 | -612 | -614 | 2,405 | 6,029 | 5,087 | 5,585 |
| Bangladesh | -115 | -218 | -289 | -436 | -608 | -603 | -873 | -386 | -243 | -1,502 | -368 |
| Barbados | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -2,432 | -1,560 | -361 | 0 |
| Belarus | -95 | -117 | -194 | -409 | -758 | -1,097 | -1,308 | -1,238 | -2,878 | -26 | 338 |
| Belgium | -4,444 | -4,630 | -7,504 | -11,426 | -13,223 | -21,225 | 24,104 | 41,619 | 10,782 | -13,539 | -16,353 |
| Belize | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -3,473 | -992 | 0 |
| Benin | -68 | -71 | -165 | -357 | -559 | -807 | -1,923 | -1,482 | -1,585 | -2,520 | -743 |
| Bermuda | 9,267 | 7,300 | 6,426 | 1,961 | 0 | 0 | 3,884 | 10,751 | 10,466 | 14,848 | 19,100 |
| Bhutan | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -972 | -1,253 | -1,893 | -811 |
| Bolivia | -71 | -90 | -145 | -266 | -447 | -692 | -1,543 | -969 | -784 | -1,589 | -486 |
| Bosnia and Herzegovina | 0 | 0 | 0 | -685 | -1,676 | -1,766 | -2,289 | -2,451 | -2,428 | -2,780 | -452 |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Botswana | -91 | -85 | 450 | 344 | -70 | -253 | -1,859 | -1,440 | -1,942 | -1,859 | -6 |
| Brazil | 11,989 | 64,562 | 50,601 | 41,298 | 37,663 | 37,968 | 60,058 | 55,408 | 57,161 | 26,075 | 21,143 |
| British Indian Ocean Territory | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Brunei Darussalam | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Bulgaria | 1,363 | 1,028 | 323 | -848 | -1,567 | -621 | -956 | -874 | -1,186 | -2,069 | -1,928 |
| Burkina Faso | -75 | -67 | -170 | -380 | -411 | -681 | -1,856 | -1,318 | -1,926 | -2,950 | 0 |
| Burundi | -71 | -79 | -146 | -294 | -503 | -736 | -1,697 | -1,309 | -1,737 | -2,723 | -1,020 |
| Cambodia | -145 | -186 | -242 | -444 | -438 | -608 | -1,450 | -1,020 | -1,289 | -1,553 | -1,057 |
| Cameroon | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Canada | 66,539 | 35,105 | 31,500 | 51,529 | 38,189 | 21,428 | -2,609 | -19,601 | 10,927 | 39,950 | 9,124 |
| Cape Verde | 0 | 0 | 0 | -306 | -372 | -634 | -1,962 | -1,506 | -1,726 | -2,411 | -1,013 |
| Cayman Islands | 63,903 | 24,030 | 0 | 0 | 0 | 0 | 68,404 | 248,599 | 255,239 | 241,024 | 193,040 |
| Central African Republic | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Chad | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Chile | 515 | 1,303 | 42 | -1,397 | -2,178 | -1,891 | -3,513 | -818 | 730 | 1,649 | 2,629 |
| China, P.R. | 0 | 0 | 0 | -419 | -2,237 | -2,997 | -4,651 | -3,780 | -3,947 | -4,103 | -4,717 |
| Christmas Island | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Cocos (Keeling) Islands | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Colombia | 5,818 | 5,493 | 4,147 | 3,032 | 1,371 | 534 | -49 | -698 | -1,876 | -2,647 | -3,961 |
| Comoros | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Congo, Dem. Rep. of | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Congo, Rep. of | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Cook Islands | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Costa Rica | 111 | 52 | -63 | -842 | -867 | -1,325 | -1,694 | -1,325 | -880 | -1,120 | -1,012 |
| Croatia | 141 | 337 | -57 | -816 | -789 | -737 | -1,015 | -351 | -1,384 | -1,329 | -116 |
| Cuba | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Cyprus | -617 | -1,428 | -2,899 | -1,560 | -1,091 | -2,265 | -2,790 | -3,139 | -2,891 | -4,792 | -4,117 |
| Czech Republic | -1,128 | -566 | -956 | -374 | -1,136 | -325 | -523 | 459 | 1,853 | 5,227 | 3,900 |
| Cote d'Ivoire | -342 | -276 | -582 | -1,029 | -1,623 | -1,865 | -3,652 | -3,330 | -3,289 | -3,724 | 0 |
| Denmark | 28,058 | 16,627 | 22,962 | 23,682 | 11,636 | 26,470 | 37,582 | 64,603 | 49,636 | 47,178 | 33,471 |
| Djibouti | 0 | 0 | -144 | -333 | -495 | -715 | -1,692 | -1,312 | -1,072 | -2,625 | -1,035 |
| Dominica | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

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|---|---|---|---|---|---|---|---|---|---|---|---|
| Dominican Republic | 0 | 86 | 163 | -389 | -1,080 | -1,325 | -2,424 | -1,691 | 16 | 427 | 406 |
| Ecuador | 2,357 | 2,483 | 1,764 | 1,342 | 1,397 | 459 | 85 | 1,011 | -3,524 | -4,107 | -1,772 |
| Egypt | 255 | -84 | -618 | -926 | -1,686 | -2,413 | -3,498 | -3,414 | 2,702 | 51 | -1,486 |
| El Salvador | -412 | 37 | -106 | -759 | -1,669 | -1,863 | -2,863 | -2,847 | -1,773 | -2,061 | -2,178 |
| Equatorial Guinea | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Eritrea | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Estonia | -348 | -65 | -320 | 80 | -735 | -640 | -1,016 | -719 | -901 | -1,133 | -1,294 |
| Ethiopia | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Falkland Islands (Malvinas) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Faroe Islands | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Fiji | 0 | 0 | 0 | 0 | 0 | -201 | -395 | -260 | -619 | -728 | -298 |
| Finland | 6,126 | 10,405 | 16,614 | 19,241 | 20,274 | 18,974 | 15,451 | 14,815 | 20,631 | 3,238 | 3,139 |
| France | 157,589 | 168,334 | 173,714 | 281,315 | 302,389 | 167,966 | 280,048 | 343,368 | 293,348 | 133,674 | 74,103 |
| French Guiana | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| French Polynesia | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| French Southern Territories | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Gabon | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Gambia, The | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Georgia | 0 | 0 | 0 | 0 | -1,140 | -1,264 | -1,728 | -956 | -233 | -254 | -275 |
| Germany | -56,788 | -70,083 | -108,308 | -144,339 | -104,773 | -244,345 | -142,476 | 6,836 | -84,271 | -153,061 | -43,616 |
| Ghana | 0 | 0 | 0 | 0 | 0 | -1,529 | -1,593 | -1,089 | -489 | -432 | -582 |
| Gibraltar | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Greece | -1,958 | -16,571 | -7,406 | -12,131 | -6,848 | -24,564 | 4,421 | 18,240 | 34,002 | 9,353 | 16,332 |
| Greenland | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Grenada | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Guadeloupe | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Guam | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Guatemala | 0 | 0 | 0 | 0 | -427 | -941 | -1,380 | -1,191 | -2,097 | -2,065 | -2,956 |
| Guernsey | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Guinea | 0 | 0 | 0 | 0 | 0 | 0 | -2,082 | -651 | -870 | -2,729 | -1,130 |
| Guinea-Bissau | -70 | -62 | -166 | -317 | -563 | -849 | -2,009 | -1,542 | -1,791 | -2,591 | 0 |
| Guyana | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Haiti | -106 | -119 | -182 | -336 | -507 | -778 | -1,709 | -1,298 | -1,945 | -2,370 | -1,371 |
| Honduras | 0 | 0 | 0 | -562 | -759 | -917 | -1,267 | -1,159 | -865 | -2,499 | -914 |
| Hong Kong SAR of China | -835 | 5,220 | -1,612 | -3,337 | -3,876 | -4,286 | 19,170 | -4,684 | -1,709 | -3,069 | -2,055 |
| Hungary | -190 | -37 | -1,039 | -3,173 | -61 | -2,166 | 2,304 | 4,642 | -2,200 | 999 | -4,478 |
| Iceland | 356 | -12,037 | -11,225 | -15,908 | -927 | 6,371 | 304 | 27,577 | 3,906 | -28,471 | -24,019 |
| India | 8,638 | 7,920 | 2,067 | 1,369 | -5,906 | -2,860 | -2,928 | -3,885 | -5,212 | -5,366 | -5,691 |
| Indonesia | 5,377 | 3,569 | 935 | -620 | 2,289 | 5,688 | 6,457 | 10,043 | 10,430 | 8,032 | 13,988 |
| International Organizations | 81,646 | 90,354 | 101,108 | 66,244 | -8,059 | -84,839 | -95,981 | -77,915 | -179,250 | -290,883 | -400,171 |
| Iran, Islamic Republic of | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Iraq | 0 | 0 | 0 | 0 | 0 | -1,147 | -1,938 | -1,557 | -787 | -1,042 | -1,083 |
| Ireland | -10,616 | -5,522 | -1,741 | 47,556 | 74,388 | 5,147 | -29,686 | -33,739 | -29,887 | 4,712 | 132,974 |
| Isle of Man | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Israel | 6,930 | 4,562 | 3,154 | 1,918 | 3,207 | 5,531 | 4,950 | 4,271 | 2,490 | 747 | -1,047 |
| Italy | 47,212 | 35,107 | 22,873 | -38,898 | -7,202 | 96,270 | 215,953 | 200,297 | 130,668 | 206,912 | 103,490 |
| Jamaica | 0 | 0 | 0 | 0 | -598 | -754 | -887 | -819 | 43 | -541 | 399 |
| Japan | 57,303 | 43,565 | 41,754 | 79,527 | 54,422 | 107,200 | 212,033 | 238,195 | 120,414 | 174,224 | 337,207 |
| Jersey | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Jordan | -13 | -42 | -324 | -700 | -975 | -910 | -1,518 | -1,138 | -592 | -712 | -674 |
| Kazakhstan | -725 | -1,349 | -1,243 | -523 | -790 | -855 | -1,740 | -4,814 | -1,789 | 5,086 | 5,869 |
| Kenya | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Kiribati | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Korea, Democratic People's Republic of | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Korea, Republic of | 7,702 | 7,718 | 9,848 | 4,151 | 5,996 | 7,860 | 22,067 | 17,052 | 17,332 | 2,630 | 19,156 |
| Kosovo, Republic of | | | | | | | | | 0 | 0 | 0 |
| Kuwait | -731 | -329 | -439 | -1,446 | -1,485 | -1,880 | -1,566 | -1,244 | -2,104 | -10,824 | -3,682 |
| Kyrgyz Republic | -107 | -117 | -201 | -367 | -539 | -607 | -1,918 | -816 | -845 | -2,090 | -1,128 |
| Lao People's Democratic Republic | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Latvia | -261 | -203 | -214 | -1,089 | -787 | -1,213 | -1,261 | -3,334 | -2,918 | -3,496 | -760 |
| Lebanon | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Lesotho | -92 | -89 | -153 | -287 | -494 | -720 | -2,261 | -1,612 | -2,292 | -2,117 | -1,524 |
| Liberia | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Libya | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

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|---|---|---|---|---|---|---|---|---|---|---|---|
| Liechtenstein | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Lithuania | -346 | -210 | -940 | -783 | -2,827 | -1,510 | -712 | -714 | -693 | -599 | -242 |
| Luxembourg | -5,767 | -6,794 | -11,235 | -12,464 | -13,761 | -15,023 | -22,164 | -6,413 | 14,313 | -150,519 | -22,033 |
| Macao SAR of China | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Macedonia, FYR | 0 | 0 | -278 | -493 | -694 | -817 | -1,261 | -1,066 | -100 | -419 | -300 |
| Madagascar | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Malawi | 0 | -81 | -163 | -320 | -544 | -512 | -752 | -1,756 | -1,981 | -2,314 | -1,551 |
| Malaysia | -2,173 | -1,809 | -3,252 | -2,591 | -3,513 | -4,070 | -5,153 | 6,811 | 5,521 | 6,492 | 9,227 |
| Maldives | -94 | -98 | -147 | -284 | -419 | -614 | -596 | -1,345 | -1,953 | -1,928 | -1,273 |
| Mali | -75 | -20 | -125 | -380 | -618 | -920 | -1,061 | -1,016 | -802 | -2,776 | -156 |
| Malta | -1,137 | -905 | -1,750 | -2,846 | -7,705 | -7,484 | -25,889 | -6,866 | -1,836 | -3,138 | -2,845 |
| Marshall Islands | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Martinique | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Mauritania | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Mauritius | -218 | -171 | -277 | -396 | -1,038 | -870 | -1,375 | -1,171 | 31,481 | 2,688 | 1,677 |
| Mayotte | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Mexico | 35,961 | 34,193 | 33,069 | 36,004 | 34,422 | 35,416 | 50,795 | 70,088 | 35,788 | 33,163 | 37,767 |
| Micronesia, Federated States of | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Moldova | -77 | -88 | -151 | -284 | -632 | -869 | -2,206 | -963 | -2,274 | -3,863 | -1,265 |
| Monaco | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Mongolia | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -167 | -284 |
| Montenegro, Republic of | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Montserrat | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Morocco | 0 | -410 | -1,240 | -439 | -475 | -806 | -6,150 | -5,588 | -742 | -897 | -972 |
| Mozambique | 0 | 0 | 0 | 0 | -416 | -630 | -1,542 | -1,143 | -657 | -2,206 | -359 |
| Myanmar | -125 | -140 | -195 | -346 | -436 | -618 | -1,897 | -1,328 | -1,878 | -1,770 | -1,259 |
| Namibia | -55 | -65 | -92 | -276 | -463 | -569 | -913 | -866 | -788 | -2,552 | -218 |
| Nauru | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Nepal | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Netherlands | 93,003 | 102,087 | 157,673 | 172,109 | 75,906 | 151,540 | 168,459 | 140,530 | 78,319 | 47,270 | 33,695 |
| Netherlands Antilles | 36,047 | 39,527 | 42,945 | 38,095 | 27,762 | 13,571 | 5,105 | 26,698 | 0 | 0 | 0 |
| New Caledonia | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

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|---|---|---|---|---|---|---|---|---|---|---|---|
| New Zealand | 4,458 | 12,019 | 14,093 | 18,277 | 18,795 | 17,128 | 27,851 | 12,210 | 21,943 | 24,451 | 23,047 |
| Nicaragua | -129 | -154 | -348 | -600 | -786 | -1,138 | -2,393 | -1,805 | -1,514 | -1,676 | -2,176 |
| Niger | -83 | -78 | -195 | -417 | -678 | -988 | -1,174 | -1,150 | -983 | -3,168 | -454 |
| Nigeria | 0 | 0 | 0 | 0 | 1,257 | -154 | -353 | 4,819 | 8,027 | 1,010 | 9,123 |
| Niue | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Norfolk Island | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Norway | 13,267 | 7,060 | 13,726 | 12,664 | 17,863 | 18,593 | 37,721 | 42,933 | 31,886 | 36,695 | 23,980 |
| Oman | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pakistan | 0 | 0 | -283 | -184 | -527 | -79 | -193 | 636 | 490 | -251 | -245 |
| Palau | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Panama | -620 | -548 | -1,653 | -2,186 | -2,363 | -2,846 | -3,541 | -1,978 | -3,868 | -5,573 | -6,192 |
| Papua New Guinea | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Paraguay | -51 | -59 | -91 | -201 | -321 | -511 | -1,265 | -904 | -1,131 | -1,561 | -189 |
| Peru | 1,243 | 1,131 | 307 | -37 | -152 | -1,086 | -754 | 40 | -2,055 | -4,217 | -4,093 |
| Philippines | 3,274 | 5,764 | 3,335 | 1,143 | -306 | -1,474 | -1,592 | 1,857 | -698 | -5,298 | -5,198 |
| Pitcairn | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Poland | 2,464 | 3,855 | 1,739 | 2,253 | -1,822 | 1,502 | 3,426 | 6,634 | 2,562 | 3,999 | 4,324 |
| Portugal | -58 | -609 | -6,442 | -6,177 | -4,646 | -137 | -181 | 2,203 | -11,312 | 17,993 | 4,675 |
| Puerto Rico | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Qatar | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Romania | -406 | 324 | 574 | -1,005 | -1,057 | -815 | -1,555 | -1,050 | -1,497 | -1,526 | -72 |
| Russian Federation | 8,343 | 11,506 | 11,997 | 11,668 | 14,651 | 13,059 | 17,206 | 3,841 | 14,825 | 14,923 | 14,199 |
| Rwanda | -71 | -77 | -139 | -287 | -486 | -713 | -1,762 | -1,334 | -1,722 | -2,539 | 0 |
| Reunion | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Samoa | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| San Marino | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Saudi Arabia | 0 | 0 | 0 | 0 | 0 | 0 | -1,377 | -1,107 | -1,752 | -10,884 | -2,526 |
| Senegal | -148 | -140 | -245 | -422 | -507 | -579 | -1,124 | -784 | 181 | 195 | 615 |
| Serbia, Republic of | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -3,640 | -3,090 | -893 | 261 |
| Seychelles | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sierra Leone | -131 | -113 | -243 | -455 | -825 | -1,188 | -3,470 | -2,594 | -1,047 | -3,224 | -594 |
| Singapore | -3,396 | -1,492 | -2,545 | -3,486 | -4,065 | -4,621 | -5,600 | -5,814 | -5,942 | -7,847 | -11,400 |

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|---|---|---|---|---|---|---|---|---|---|---|---|
| Slovak Republic | 305 | -339 | -709 | -216 | -1,889 | 332 | -5,633 | -9,618 | -12,644 | -15,059 | -1,015 |
| Slovenia | -516 | -1,134 | -1,325 | -702 | -3,610 | -2,005 | -2,152 | -1,217 | 780 | -1,149 | -2,384 |
| Solomon Islands | 0 | 0 | 0 | 0 | 0 | -635 | -2,029 | -1,422 | -530 | -1,605 | -1,350 |
| Somalia | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| South Africa | -5,636 | 2,433 | -668 | -1,746 | -1,523 | -1,561 | -210 | -3,294 | 1,283 | 968 | 3,397 |
| South Sudan | | | | | | | | | | | 0 |
| Spain | -5,143 | -250 | -5,463 | 13,878 | 11,542 | 60,015 | 95,983 | 95,073 | 124,782 | 128,717 | 79,583 |
| Sri Lanka | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -358 |
| St. Helena | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| St. Kitts and Nevis | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| St. Lucia | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| St. Pierre and Miquelon | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| St. Vincent and the Grenadines | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sudan | 0 | 0 | -180 | -465 | -793 | -783 | -1,208 | -2,379 | -1,029 | -3,523 | -569 |
| Suriname | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Swaziland | -98 | -94 | -1,417 | -335 | -575 | -840 | -2,540 | -1,835 | -2,567 | -2,387 | -1,548 |
| Sweden | 25,759 | 12,142 | 16,503 | 14,876 | 11,040 | 8,437 | 9,027 | 8,194 | 20,499 | -2,181 | 9,976 |
| Switzerland | 9,152 | 6,543 | 14,684 | 24,743 | 8,015 | 3,359 | -7,978 | 4,191 | -11,242 | 7,048 | -8,204 |
| Syrian Arab Republic | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sao Tome and Principe | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Taiwan Province of China | 2,184 | 3,446 | 7,025 | 5,798 | -741 | -1,326 | -678 | 615 | -1,750 | -1,835 | -1,404 |
| Tajikistan | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Tanzania | -110 | -107 | -182 | -377 | -623 | -590 | -853 | -545 | -778 | -2,593 | -429 |
| Thailand | 2,304 | 1,710 | -1,146 | -821 | -393 | -1,970 | 98 | 831 | -893 | -2,059 | 1,305 |
| Timor-Leste | 0 | 0 | 0 | 0 | 0 | 0 | -1,231 | -869 | -1,123 | -1,727 | -841 |
| Togo | -65 | -59 | -156 | -339 | -538 | -750 | -1,848 | -1,433 | -1,768 | -2,759 | 0 |
| Tokelau | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Tonga | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Trinidad and Tobago | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 383 |
| Tunisia | -550 | -523 | -582 | -801 | -865 | -974 | -4,295 | -5,696 | -9,319 | -9,731 | -2,664 |
| Turkey | -392 | 6,898 | 3,082 | 5,346 | 10,710 | 2,558 | 8,828 | 1,019 | -3,486 | -3,409 | -4,267 |
| Turkmenistan | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

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|---|---|---|---|---|---|---|---|---|---|---|---|
| Turks and Caicos Islands | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Tuvalu | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Uganda | -124 | -117 | -141 | -280 | -699 | -992 | -915 | -843 | -775 | -2,912 | -260 |
| Ukraine | 227 | 563 | 456 | 1,388 | 1,715 | 1,161 | 5,516 | 8,579 | 6,133 | 5,622 | 6,940 |
| United Arab Emirates | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| United Kingdom | 13,458 | 24,270 | 8,519 | -20,294 | 73,040 | 5,843 | 61,217 | 11,253 | 190,729 | 169,179 | 301,685 |
| United States | 98,795 | 103,890 | 155,653 | 158,958 | 217,190 | 173,006 | 77,622 | 31,397 | -203,534 | -344,901 | 34,722 |
| United States Minor Outlying Islands | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Uruguay | 815 | 581 | 310 | 82 | 581 | 594 | 607 | 1,750 | 1,075 | 22 | -1,051 |
| Uzbekistan | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Vanuatu | 0 | -133 | -176 | -334 | -372 | -535 | -1,736 | -1,197 | -1,816 | -1,461 | -1,276 |
| Vatican City State | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Venezuela, Reublica Bolivariana de | 4,889 | 4,377 | 5,221 | 3,329 | 1,015 | -695 | 380 | -3,220 | -6,236 | -5,068 | -436 |
| Vietnam | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Virgin Islands, British | 2,306 | 1,140 | 8,250 | 9,054 | 0 | 0 | 0 | 0 | 0 | 0 | 7,569 |
| Virgin Islands, U.S. | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Wallis and Futuna Islands | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| West Bank and Gaza Strip | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -2,623 | -3,149 | -1,658 |
| Western Sahara | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Yemen, Republic of | -101 | -99 | -126 | -351 | -437 | -847 | 0 | 0 | 0 | 0 | 0 |
| Zambia | 0 | 0 | 0 | 0 | 0 | -477 | -720 | -752 | -676 | -2,619 | -333 |
| Zimbabwe | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

## A.6 Additional table to Section 4.3: The treaty effect

Table 8: The fixed effects model estimated separately for *Treaty endorsed*, *Treaty signed* and *Treaty enforced*.

| | Debt assets, log | | | Equity assets, log | | |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Treaty endorsed | 0.145*** | | | 0.258*** | | |
| | (3.30) | | | (6.15) | | |
| Treaty signed | | 0.174*** | | | 0.344*** | |
| | | (3.77) | | | (7.74) | |
| Treaty enforced | | | 0.397*** | | | 0.555*** |
| | | | (5.43) | | | (8.01) |
| Constant term | -147.6*** | -147.0*** | -147.9*** | -209.5*** | -206.3*** | -213.0*** |
| | (-17.95) | (-17.96) | (-18.59) | (-26.26) | (-26.00) | (-27.64) |
| Country-pair fixed effects | Yes | Yes | Yes | Yes | Yes | Yes |
| Year fixed effects | Yes | Yes | Yes | Yes | Yes | Yes |
| $N$ | 13075 | 13075 | 13075 | 12980 | 12980 | 12980 |
| $R^2$ | 0.915 | 0.915 | 0.915 | 0.926 | 0.926 | 0.926 |
| adj. $R^2$ | 0.900 | 0.900 | 0.900 | 0.914 | 0.914 | 0.914 |

$t$ statistics in parentheses

$^{*}$ $p < 0.05$, $^{**}$ $p < 0.01$, $^{***}$ $p < 0.001$

## A.7 Data sets and .do-files

All calculations and analyses are performed using STATA. Data files (.dta) and .do-files used in this thesis are available upon request. Any inquiries should be directed to haakonrh@gmail.com.