

THE END OF BANK SECRECY? AN EVALUATION OF THE G20 TAX HAVEN CRACKDOWN*

Niels JOHANNESSEN
University of Copenhagen

Gabriel ZUCMAN
Paris School of Economics

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Abstract

During the financial crisis, G20 countries compelled tax havens to sign bilateral treaties providing for exchange of bank information. Policymakers have celebrated this global initiative as the end of bank secrecy. Exploiting a unique panel dataset, we study how the treaties affected bank deposits in tax havens. Most tax evaders, our results suggest, did not respond to the treaties. A minority responded by transferring deposits to havens not covered by a treaty. Overall, the G20 tax haven crackdown caused a modest relocation of deposits between havens but no significant repatriation of funds: the era of bank secrecy is not over.

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JEL classifications: H26, H87, G21, K42.

*A Data Appendix is available online (<http://www.parisschoolofeconomics.eu/en/zucman-gabriel/>). All comments are welcome (niels.johannesen@econ.ku.dk and zucman@pse.ens.fr).

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1 Introduction

In August 2009, France and Switzerland amended their tax treaty. The new treaty stated that the two countries would from now on exchange upon request all information necessary for tax enforcement, including bank information otherwise protected by Swiss bank secrecy laws. In the following months, one of France's richest persons and her wealth manager were taped discussing what to do with two undeclared Swiss bank accounts, worth \$160 millions. After a visit to Switzerland, the wealth manager concluded that keeping the funds in Swiss banks or bringing them back to France would be too risky. He suggested that the funds be transferred to Hong-Kong, Singapore, or Uruguay, three tax havens which had not committed to exchange information with France. After the tapes were made public, they were widely commented in French newspapers and eventually the funds were repatriated to France.¹

The amendment to the French-Swiss tax treaty was part of a global initiative to combat tax evasion. Since the end of the 1990s, the OECD has encouraged tax havens to exchange information with other countries on the basis of bilateral tax treaties, but until 2008 most tax havens declined to sign such treaties. During the financial crisis, the fight against tax evasion became a political priority in rich countries and the pressure on tax havens mounted. At the summit held in April 2009, G20 countries urged tax havens to sign at least 12 treaties under the threat of economic sanctions. Between the summit and the end of 2009, tax havens signed more than 300 treaties. This is the largest coordinated action against tax evasion the world has ever seen.

The effectiveness of the G20 tax haven crackdown is highly contested. A positive view asserts that treaties significantly raise the probability of detecting tax evasion and greatly improve tax collection (OECD, 2011). According to policy makers, "the era of bank secrecy is over" (G20, 2009). A negative view, on the contrary, asserts that the G20 initiative leaves considerable scope for bank secrecy and brings negligible benefits (Shaxson and Christensen, 2011). Whether the positive or the negative view is closer to

¹For a summary of this evasion case, see "Affaire Bettencourt: ce que disent les enregistrements," *Le Monde*, 30 June 2010.

reality is the question we address in this paper.

The question is important for two reasons. First, the fight against offshore tax evasion is a crucial policy issue. Globalization and the information technology revolution have made it easier for tax evaders to move funds to offshore tax havens. Absent information exchange between countries, personal capital income taxes cannot be properly enforced, giving rise to substantial revenue losses and putting severe constraints on the design of tax systems. Against the backdrop of the large public deficits faced by most countries since the financial crisis, curbing tax evasion is high on the policy agenda.

Second, although treaties have prevailed as the key policy instrument in the fight against tax evasion, surprisingly little is known about their effectiveness. The G20 tax haven crackdown has stirred considerable discussion in the media and in policy circles but there is little fact-based evidence and no academic evaluation. The OECD has launched an ambitious peer-review evaluation to assess whether treaties are properly drafted and enforced. While this legal assessment is necessary, it is not sufficient: if the information exchange mechanism advocated by the OECD has fundamental shortcomings, then even properly drafted and enforced treaties may be ineffective.

We study how the owners of bank deposits in tax havens have responded to the G20 tax haven crackdown and thus provide the first assessment of the effects of the more than 800 treaties signed by tax havens. The analysis uses a unique dataset on cross-border bank deposits from the Bank for International Settlements (BIS). Of the around 50 jurisdictions commonly considered to be tax havens, we have access to bilateral bank deposits for 14 major tax havens, including Switzerland, Luxembourg, and the Cayman Islands. That is, we observe the deposits held by French residents in Switzerland, by German residents in Luxembourg, by U.S. residents in the Cayman Islands and so on, on a quarterly basis from the end of 2003 to the middle of 2011. Stating our research questions with specific country names for the sake of concreteness, we ask: Did French holders of Swiss deposits respond to the new French-Swiss treaty by repatriating funds to France? Did they relocate their funds to other tax havens? Or did they simply leave the funds in Switzerland?

The answers to these questions are key to evaluate the effectiveness of the G20 initiative. They also shed new light on tax evasion. Providing compelling empirical evidence on tax evasion is notoriously difficult, and it is even harder in the complex area of international tax evasion. Our study breaks new ground on this issue by documenting how households evade taxes through tax havens and how they have responded to the largest policy initiative so far.

We report two main results. First, tax evaders responded moderately to the signature of treaties. A treaty between say France and Switzerland caused a modest drop in Swiss deposits held by French residents. This result suggests that after treaties were signed some tax evaders perceived an increase in the probability to be detected, but that most did not. Second, the tax evaders who responded did not repatriate their funds but transferred them to havens not covered by a treaty. We observe this pattern in the aggregate data: the global value of deposits held in tax havens is the same two years after the G20 tax haven crackdown as before, but havens that have signed many treaties have lost deposits at the expense of havens that have signed few treaties. We also observe this pattern in the panel regressions: after say France and Switzerland sign a treaty, French deposits increase in havens that have no treaty with France. Thus, the G20 initiative has so far led to a modest relocation of deposits between tax havens. The era of bank secrecy is not over, contrary to the view of the OECD and of the G20.

The results illustrate the pitfalls of the current approach to the fight against tax evasion. Tax havens are whitelisted after signing 12 treaties, leaving considerable scope for tax evaders to transfer their funds to havens that have no treaty with their home country. Tax evaders exploit this possibility, providing strong incentives for tax havens to keep their treaty networks at the minimum. From a normative viewpoint, our results thus lend support to the idea developed theoretically by Elsayyad and Konrad (2011) that a “big bang” multilateral agreement should be preferred to the current sequential approach: the G20 should urge tax havens to sign treaties with all countries. The modest response of tax evaders to treaties suggests, however, that even a comprehensive agreement based on the current standard of information exchange would not be enough. After a treaty is

signed, most tax evaders do not seem to perceive a big increase in the probability to be detected, presumably reflecting that treaties do not increase the true probability to detect tax evasion a lot. The OECD should strengthen the standard of information exchange, for instance by promoting automatic rather than upon request information exchange.

Our study relates to three strands of the literature. First, it adds to the literature on the determinants of cross-border bank deposits initiated by Alworth and Andresen (1992). Huizinga and Nicodème (2004) find no effect of information exchange treaties between OECD countries on cross-border deposits. Hemmelgarn and Nicodème (2009) and Johannesen (2010) study the effects of a European policy initiative that imposes a tax on interest income earned by European Union residents in a number of tax havens. We add to this literature by evaluating how the first global initiative to limit bank secrecy through information exchange treaties has affected bank deposits in tax havens.

The paper also sheds new light on the activities taking place in tax havens, a topic which is attracting increasing interest (Desai et al., 2006; Dharmapala, 2008; Dharmapala and Hines, 2009; Palan et al., 2010). Tax havens provide corporations and individuals with opportunities to avoid or evade taxes. The bulk of the literature focuses on the use of tax havens by corporations, following Hines and Rice (1994). By contrast, we focus on the use of tax havens by individuals, which is still little studied.

Finally, our paper contributes to the empirical literature on tax evasion and the informal economy.² We add to this literature by exploiting new traces of tax evasion. In particular, we provide compelling evidence that tax evaders use sham corporations domiciled in Panama or the British Virgin Islands as the nominal holders of their bank accounts in Switzerland or Luxembourg, thus explaining the large sums recorded in international investment statistics as “belonging” to Panama or the British Virgin Islands. The deposits recorded as belonging to tax havens are one of the purest form of household wealth evading taxes that can be observed directly in macroeconomic statistics.

The rest of the paper proceeds as follows. In Section 2, we describe the context and present the data. In Section 3, we provide graphical evidence on the effects of tax treaties.

²See for instance Pissarides and Weber (1989), Fisman and Wei (2004) and Marion and Muehlegger (2008). Slemrod and Weber (2011) provide a survey.

In Section 4 we turn to regression-based evidence. We conclude in Section 5.

2 Context and Data

2.1 Context

Tax havens such as Switzerland, Singapore, or the Cayman Islands host an important wealth management industry which provides foreigners with an opportunity to evade taxes. If a French household entrusts assets to a French bank, there is automatic reporting of capital income to the French tax authorities: evasion of the personal income tax is impossible. But if a French household entrusts assets to a Swiss bank, there is no automatic reporting by the bank. French tax authorities rely on self-reporting of capital income to enforce the personal income tax: evasion is possible.³ Using anomalies in international investment statistics, Zucman (2011) estimates that 8% of households' financial wealth is held globally in tax havens. The figure implies substantial tax revenue losses due to outright fraud.

Missing information on income earned through bank accounts in tax havens is the key problem for enforcing personal capital income taxes. Exchange of information between countries is the obvious solution. There are two main ways countries can exchange information: automatically or upon request (Keen and Ligthart, 2006). Automatic exchange of information is widely acknowledged to be the most effective solution because it allows tax authorities to obtain comprehensive data about income earned by domestic residents in foreign banks. German tax authorities, for instance, automatically provide information to French tax authorities about interest income earned by French residents in German banks. Information exchange upon request, however, is more common. It is the standard promoted by the OECD and embedded in the treaties signed by tax havens. Under the amended French-Swiss treaty, French authorities can request information from Swiss authorities to enforce French tax laws. Requests must concern specific taxpayers. French authorities cannot ask for a list of all French residents with funds in Switzerland.

³ Kleven et al. (2011) document the importance of third-party reporting to prevent tax evasion.

Moreover, the requested information must be “foreseeably relevant” (OECD, 2008, p. 38). French authorities can only obtain information if they have well documented suspicion that a French taxpayer is evading taxes.

The usefulness of the OECD standard of information exchange is the object of much controversy. Critics argue that since placing a request for information requires prior knowledge, which is extremely hard to come about, the volume of information that can be obtained is limited. Indeed, the U.S. Government Accountability Office (2011) revealed that during the 2006-2010 period, the U.S. placed no more than 894 requests for information under its more than 80 tax treaties. Since a single Swiss bank admitted in 2008 to have more than 19,000 U.S. clients with undeclared bank accounts (U.S. Senate, 2008), information exchange upon request is clearly associated with a small probability of detecting tax evasion. Advocates of the OECD standard, on the other hand, stress that even a small probability of detection may be sufficient to deter tax evasion and that information exchange upon request is a major step forward from no information exchange.

Since the end of the 1990s, the OECD has tried to convince tax havens to sign treaties providing for information exchange upon request but most havens declined to sign treaties until the financial crisis. The turning point occurred in April 2009. The OECD specified that tax havens should conclude at least 12 treaties to be in compliance and drew up a list of 42 non-compliant havens. The G20 threatened to impose economic sanctions on non-compliant havens. In just five days, all havens committed to sign 12 treaties, and the G20 declared the era of bank secrecy over (G20, 2009).

As a result of G20 pressure, treaty signature effectively surged in 2009 and 2010, as Figure 1 shows. But the pace of treaty signature slowed down markedly after 2010: the number of treaties concluded in the first six months of 2011 was only half the number of treaties concluded in the last six months of 2010. Moreover, tax havens signed many treaties with other havens: in 2009, haven-haven treaties accounted for almost one third of all treaties concluded by tax havens. Haven-haven treaties have no economic meaning and in all likelihood reflect the desire of some tax havens to reach the 12 treaties threshold without giving substantial concessions.

2.2 Data on Tax Treaties

To study the effects of the G20 tax haven crackdown, we have compiled a complete dataset on the treaties concluded by tax havens. The dataset covers 52 tax havens (see the Online Data Appendix), more than 220 potential partner countries, and includes information until the end of 2011q2.

Tax havens can start exchanging information with partner countries on the basis of two types of legal events: new treaties or amendments to existing treaties on the one hand (for instance, the amendment to the French-Swiss tax treaty in August 2009), and changes in domestic laws allowing for information exchange with existing treaty partners on the other (Cyprus passed such a law in July 2008). The two types of events are legally equivalent, but new treaties may be more salient than subtle changes in the banking laws of tax havens. Distinguishing between the two kinds of legal events allows us to investigate whether depositors respond differently to more salient events.⁴

The main data source is the Exchange of Tax Information Portal, which represents the best effort of the OECD to gather accurate information on tax treaties.⁵ In some cases, we have added information from official government websites. The Online Data Appendix describes step-by-step how we compiled the treaty dataset from readily available sources. The final dataset includes 1,025 events: 861 new treaties or amendments to existing treaties, and 164 changes in domestic laws. Note that since there are 52 tax havens and around 220 countries and territories in the world, a full network of treaties would include around 11,000 treaties. Through a peer-review evaluation, the OECD assesses whether the treaties signed by tax havens are properly drafted and enforced. Out of the 861 new treaties signed from 2004 to mid-2011, 68% were deemed compliant, 13% were deemed not compliant, and 19% were still unreviewed in November 2011.

⁴ Chetty et al. (2009) provide evidence of the importance of salience for the response to taxes.

⁵See <http://eoi-tax.org/>. We have also benefited from discussions with Jeremy Maddison and Sanjeev Sharma from the OECD.

2.3 Data on Deposits in Tax Havens

Our second data source is the BIS locational banking statistics, which contains information on foreign bank deposits in 41 countries. The BIS publishes quarterly data aggregated at the country level, for instance total deposits held by French residents in foreign banks and total deposits held by foreign residents in Swiss banks. For our study and on the condition that we do not disclose bilateral information, the BIS has given us access to deposit data at the bilateral level, for instance deposits held by French residents in Swiss banks. There are 19 tax havens reporting to the BIS. We have access to bilateral deposit data for 14 of these havens: Austria, Belgium, Bermuda, the Cayman Islands, Chile, Cyprus, Guernsey, the Isle of Man, Jersey, Luxembourg, Macao, Malaysia, Panama, and Switzerland. We also have bilateral data for the aggregate of the remaining 5 havens: Bahamas, Bahrain, Hong-Kong, the Netherlands Antilles, and Singapore.⁶

The BIS locational banking statistics are widely used in international economics and are a key input to statistics on balance of payments. The most important financial centers (havens and non-havens) report to the BIS and within each financial center there is almost full coverage of deposits (BIS, 2006).⁷

The BIS data, however, have three limitations. First, it is impossible to distinguish deposits owned by households from deposits owned by non-financial corporations, mutual funds, and insurance companies. The only available sectoral decomposition is between deposits owned by banks and deposits owned by non-banks. Since interbank deposits do not play a role in tax evasion, we only study the deposits owned by non-banks.

Second, deposit data are based on immediate ownership rather than beneficial ownership. If a French individual owns a Swiss deposit through a sham entity incorporated in Panama, the funds are registered as belonging to Panama. Almost 25% of all deposits in tax havens are registered as belonging to other havens reflecting the widespread use of

⁶The secession of the Netherlands Antilles in October 2010 resulted in two new countries, Curaçao and Sint Maarten. Curaçao took over the reporting obligation to the BIS.

⁷The reporting of Bermuda, however, seems problematic. Only 4 banks from Bermuda report to the BIS (see <http://www.bis.org/statistics/locbankstatguide/bermuda.htm>). These banks are local banks that are owned by Bermudian capital; branches of foreign banks located in Bermuda are excluded from the BIS statistics. The data for Bermuda do not seem to reflect Bermuda's tax haven activities, so we have excluded Bermuda from our sample for the regressions. All the results are robust to the inclusion of Bermuda.

sham corporations by clients of banks in tax havens. Part of our analysis will explicitly address the existence of deposits held through sham corporations.

Third, the BIS data relate to only one form of wealth held by households in tax havens: bank deposits. They do not provide information on the equity and bond portfolios entrusted to tax haven banks. Zucman (2011) estimates that bank deposits account for around 25% of household wealth in tax havens. We assume that the response of bank deposits to treaties is a good proxy for the response of the overall stock of household offshore wealth.

3 Graphical Evidence

3.1 The Effects of the G20 Initiative on Aggregate Deposits

As a starting point for the empirical analysis, Figure 2 shows the evolution of the bank deposits held on aggregate in the 19 tax havens reporting to the BIS. Despite the wave of treaties signed in 2009-2010, deposits in tax havens remained stable over the 2007-2011 period at around \$2,700 billion. For comparison, the figure shows the evolution of the deposits held on aggregate in the non-haven countries reporting to the BIS. This group includes financial centers that have a large treaty network and have not been affected by the G20 initiative, such as the U.S. or Germany. Deposits in havens and non-havens have followed a similar trend over the 2004-2011 period. The evolution of deposits in non-havens might be an imperfect counterfactual for the evolution of deposits in tax havens, but we can at least exclude that the G20 initiative has considerably affected the aggregate deposits in tax havens.

Next, we compare the deposits that have become covered by a treaty to the deposits that have not. We consider all country-haven combinations (e.g., France-Switzerland) among the 14 havens for which we have bilateral deposit data and the more than 200 countries holding deposits in these havens. From this universe, we construct two groups: a “treaty” group including all country-haven pairs that signed a compliant treaty between

1 January 2008 and 30 June 2011, and a “no-treaty” group including all other pairs.⁸ Figure 3 shows that deposits decreased moderately in the “treaty” group but remained roughly stable in the “no-treaty” group. If the deposits in the “treaty” group had followed the same trend as the deposits in the “no-treaty” group, they would have been around 15% bigger in 2011. Figure 3 suggests that at least some tax evaders responded to treaty signatures, although it does not reveal the nature of this response.

3.2 The Effects of the G20 Initiative on the Deposits in Each Tax Haven

To investigate how tax evaders responded to treaties, we examine the evolution of deposits in each tax haven between 2007 and 2011. Figure 4 reveals that the globally stable level of deposits in tax havens conceals significant differences across havens. For instance, banks in Jersey lost \$110 billion of deposits, around 4% of all the deposits held in tax havens in 2007, while banks in Hong-Kong gained \$65 billion, around 2.5% of all the deposits held in tax havens in 2007.

Crucially, the deposit gains and losses correlate strongly with the number of treaties signed by each haven. Figure 5 plots the percentage change of each haven’s deposits between 2007 and 2011 against the number of compliant treaties signed over the same period. In the north-western corner of the scatterplot, Cyprus signed only 2 compliant treaties and experienced a 60% increase in its deposits, whereas in the south-eastern corner Guernsey signed 19 compliant treaties and experienced a 15% decrease. A simple bivariate regression suggests that an additional treaty signed by a haven is associated with a decrease of 3.8% of the deposits in its banks (with a standard error of 1.4%).⁹

The graphical evidence presented so far suggests that a minority of tax evaders responded to the signature of treaties (Figure 3), and that their response was mostly to transfer deposits to other tax havens (Figures 4 and 5), leaving roughly unchanged the funds held globally in tax havens (Figure 2). Figure 6 lends additional support to this

⁸We exclude haven-haven pairs and refer the reader to Section 4.3 for an analysis of haven-haven deposits.

⁹This correlation remains when we consider cumulated exchange rate adjusted net flows in each haven as a percentage of end-2007 stocks rather than the simple growth rate of deposits, or when we consider all treaties signed, whether complying with the OECD standard, unreviewed, or not complying.

conjecture. It shows that there is no correlation between the number of treaties signed by OECD countries with tax havens between 2007 and 2011 and the growth of the deposits held by OECD countries' residents in tax havens. In the western end of the scatterplot, Israel signed no treaty and experienced a 28% decrease of its deposits in BIS-reporting tax havens, whereas in the eastern end France signed 15 treaties and experienced a 26% increase.

While the graphical evidence suggests a consistent scenario, it aggregates treaties signed at different dates and does not exploit fully the bilateral nature of our data. To address these issues, we now turn to panel regression analysis.

4 Regression-Based Evidence

4.1 Baseline Specification (Table 1)

Table 1 reports the results of our baseline specification:

$$\log(\text{Deposits}_{ijq}) = \alpha + \beta \times \text{Signed}_{ijq} + \gamma_{ij} + \theta_q + \epsilon_{ijq} \quad (1)$$

where Deposits_{ijq} denotes the deposits held by residents of country i with banks of haven j at the end of quarter q , Signed_{ijq} is a dummy equal to 1 if a treaty allowing for information exchange between i and j exists in quarter q , γ_{ij} denotes country-pair fixed effects, and θ_q time fixed effects. The country-pair fixed effects control for all time invariant characteristics of country-haven pairs, such as distance or common language. The time fixed effects control for all common time-varying factors, such as the financial crisis. All the regressions use the sample period 2003q4-2011q2 and have robust standard errors clustered at the country-pair level.

The baseline specification simply tests the hypothesis that treaties have no effect on deposits in tax havens against the alternative that treaties do have an effect, in which case β should be statistically different from zero.

In column (1) of Table 1, we investigate the average effect of treaties on bank deposits

in the complete universe of country-haven pairs for which we have bilateral bank deposit data. We find that the deposits of the “treaty” country-haven pairs are smaller after treaty signature than before relative to the deposits of the “no treaty” country-haven pairs. The coefficient is borderline significant.

We then run the same regression but excluding the deposits registered by the BIS as belonging to tax havens. When we exclude haven-haven pairs in col. (2), treaties have a bigger effect; the coefficient on *Signed* is different from zero at the 5% level. We also run the baseline model on the sample of haven-haven pairs only in col. (3). Consistent with our notion that treaties between two havens have no economic meaning, the results show that haven-haven treaties do not affect deposits. We continue the analysis with the sample that excludes haven-haven pairs and refer the reader to Section 4.3 for a detailed analysis of haven-haven deposits.

In col. (4), we investigate whether depositors respond differently to new treaties and to changes in the domestic laws of tax havens. Since new treaties are more salient to tax evaders, we conjecture that evaders should respond more to new treaties. We interact the dummy variable *Signed* with dummy variables indicating whether the legal event establishing information exchange is a new treaty or a change in domestic law. The results show that new treaties affect deposits but changes in domestic laws do not.

In col. (5), we investigate the timing of the response to treaty signature. We include a dummy equal to one in the quarter q of the legal event establishing information exchange (*Contemp*), three dummies equal to one in $q+1$, $q+2$, and $q+3$ respectively, and a dummy equal to one in all quarters after $q+3$. We find that the bulk of the response occurs two quarters and more after treaty signature. A plausible explanation is that treaties do not enter into force immediately after they are signed. For instance, the amendment to the French-Swiss treaty signed in August 2009 entered into force in November 2010. Typically, there is a time lag of 3-5 quarters between treaty signature and entry into force.

Table 1 confirms that there is a correlation between treaties and deposits in tax havens. On average, the deposits in the “treaty” country-haven pairs decrease after treaty sig-

nature relative to the deposits in the “no treaty” pairs. The difference is statistically significant. To conclude that treaties had a causal effect on deposits requires the assumption that in a counterfactual world without treaties, the deposits in the “treaty” and “no treaty” pairs would have grown similarly. Now, maybe the deposits in the “treaty” pairs would have grown less than the global trend even in the absence of treaties. To support our identifying assumption, we want to rule out that tax havens systematically signed treaties with countries that were placing less and less deposits in their banks relative to the global trend.

We have tested this possibility by running probit models that investigate what determines treaty signature.¹⁰ The dependent variable is a dummy equal to one in the quarter when a treaty is signed, and the independent variables include the level of bilateral deposits at the time of treaty signature and deposit growth rates in preceding years. While the level of bilateral deposits has a significant positive effect on the probability to sign a treaty, past growth rates do not. On average, treaties were not concluded by country-haven pairs where deposits were growing less than the global trend, which lends support to our identification strategy. We conclude that treaties caused a modest drop in bilateral deposits.

Although Table 1 shows that treaties had a causal effect on deposits, our estimated β should not be interpreted as the true response. A first concern is that our deposit measure includes deposits owned by mutual funds and non financial corporations. These deposits play no role in tax evasion and are therefore unlikely to respond to treaties, implying that our estimated β is biased towards zero. Moreover if tax evaders respond to treaties by shifting deposits to other tax havens, β suffers from an omitted variable bias. We now turn to a model that addresses the latter issue.

¹⁰See Supplementary Table. The determinants of treaty signature have been studied theoretically by Bacchetta and Espinosa (2000), Eggert and Kolmar (2002), and Huizinga and Nielsen (2003), and empirically by Ligthart et al. (2011).

4.2 Deposit Shifting (Table 2)

Table 2 augments the baseline model to capture the main incentives faced by tax evaders when choosing where to place their deposits. We add two elements to the model: we account for shifting behavior and for the other major policy innovation in the field of international taxation, the European Union Savings Tax Directive.

Since 2005, 18 tax havens have cooperated with EU countries in combatting tax evasion under the Savings Tax Directive. When a Swiss bank pays interest to a French resident, it withholds 35% of the interest payment as a tax and remits 75% of the proceeds to France without disclosing the identity of the French taxpayer. Some important tax havens, however, do not participate in the Savings Tax Directive, most notably Singapore, Hong-Kong, the Bahamas, and Bahrain.¹¹ To account for the EU Savings Tax Directive, we introduce a dummy variable (*STD*) equal to one if a country-haven pair applies it.

To account for shifting behavior, we add a time-varying variable that captures the extent of countries' treaty coverage with tax havens. We consider two measures of treaty coverage. In col. (1)-(3) of Table 2, we use the simplest possible measure: for a given country-haven pair, the treaty coverage variable counts the number of treaties signed by the country with the world's other 51 tax havens. Col. (1) shows that a treaty between say France and Switzerland increases the deposits held by French residents in say Singapore by 0.6%. As col. (2) shows, this shifting only occurs when there is no treaty between France and Singapore (i.e., when *Signed* = 0). In this case, a treaty between France and Switzerland is associated with 1.2% more French deposits in Singapore. By contrast, there is no effect on French deposits in Singapore if France and Singapore have a treaty (i.e., when *Signed* = 1). When accounting for shifting, the signature of a treaty between say France and Switzerland still significantly decreases French deposits in Switzerland – by around 17% on average.¹² As col. (3) shows, shifting occurs only to the benefit of the

¹¹In addition, some tax havens such as the Isle of Man have opted for an alternative regime whereby they automatically exchange information with EU countries instead of withholding a tax. We refer to Johannesen (2010) for a thorough analysis of the Directive.

¹²In col. (2), *Signed* appears in three places, all of which need to be accounted for when computing the total effect of an additional treaty on bilateral deposit. Assuming that treaty coverage=10, the total coefficient on *Signed* is $-0.0498 + 10 \times (0.0001 - 0.0120) = -0.17$ which is comparable to the coefficient in col. (1).

havens that do not participate in the EU Savings Directive. An additional treaty signed by France does not affect the deposits in havens that apply the Directive, but it increases deposits by 1.8% in havens that do not apply the Directive and do not have a treaty with France. To put it simply, deposits go to the least compliant havens.

The number of treaties signed by France is a crude measure of treaty coverage. Treaties with Switzerland and Luxembourg are much more important for France in fighting tax evasion than treaties with Vanuatu and Saint Lucia. We therefore construct a second measure of treaty coverage that weighs treaties according to their importance.

For each country i and haven j for which we have bilateral deposit data, we compute the share of i 's deposits in tax havens which were placed in j during the first year of our sample. In 2004, the location of deposits was unaffected by the European Savings Directive which was not yet implemented, and largely unaffected by treaties which were still few in numbers. The shares, therefore, measure the relative importance of haven j to tax evaders of country i and are exogenous to recent policy developments. For each country-haven pair (i, j) , we use the shares to weigh each treaty concluded by i with havens other than j . The resulting measure of treaty coverage takes values between zero (no treaty) and one (full coverage). By construction, this measure only takes into account treaty coverage over the 14 havens for which we have bilateral deposit data.

As col. (4) to (6) show, with this measure of treaty coverage the results are similar to the results obtained with the simpler measure that merely counts the number of treaties signed. Consider a treaty between France and a haven which, in 2004, attracted 10% of the deposits owned by French residents in tax havens. According to col. (4), such a treaty causes a 1.3% average increase of French deposits in each other BIS-reporting tax haven. As col. (5) and (6) suggest, only the havens that have no treaty with France and that are not covered by the EU Savings Tax Directive benefit from an increase in French deposits.

4.3 Deposits Held Through Sham Corporations (Table 3)

In Table 3, we investigate the response of the deposits registered in the BIS statistics as belonging to tax havens. Haven-haven deposits are important in absolute terms: in the first half of 2011, they accounted for around \$550 billion, almost 25% of all deposits in tax havens. Deposits from the British Virgin Islands and Panama were particularly important. Both jurisdictions have flexible corporate laws that make it simple to set up sham corporations. Neither the British Virgin Islands nor Panama host large financial sectors which could explain the staggering amounts of deposits assigned to them by the BIS statistics. By contrast, anecdotal evidence suggests that bankers in tax havens routinely create sham corporations on behalf of their European and U.S. clients.¹³ Using a sham corporation with an address in a tax haven adds a layer of secrecy between an account and its owner: essentially, accounts held through sham corporations are equivalent to numbered accounts, which are prohibited by anti-money laundering regulations. Sham corporations also help avoid taxes: the EU Savings Tax Directive does not apply to the deposits held by European residents through sham corporations.

Sham corporations, however, do not protect from information exchange treaties. If France and Switzerland have a treaty and the French tax authorities suspect a French resident of hiding funds in Switzerland, they can ask Switzerland to provide the relevant information, even if the funds are held through a sham corporation. Hence, if tax evaders respond to treaty signature – and the above analysis suggests that they do – then treaties concluded between Switzerland and countries like France should affect the deposits in Switzerland registered as belonging to the British Virgin Islands, Panama, and other havens.

To investigate this question, we turn to the sample of haven-haven deposits. In col. (1) of Table 3, we regress haven-haven deposits on the number of treaties concluded by banking havens (e.g., Switzerland) with non-haven countries (e.g., France). A treaty between France and Switzerland reduces the deposits in Switzerland registered as belonging

¹³Zaki (2010) for instance describe how Swiss bankers created sham corporations to help their European clients avoid the European Union Savings Tax Directive in 2005. The IRS provides case studies of tax evasion by U.S. residents through a big Swiss bank (<http://www.irs.gov/newsroom/article/0,,id=110092,00.html>) which reveal a systematic use of sham corporations.

to each tax haven (e.g., Panama) by 0.7% on average.

In col. (2), we investigate whether haven-haven treaties matter for the pattern of haven-haven deposits. Neither a treaty between Switzerland and Panama nor treaties between Switzerland and other havens affect the value of the Swiss deposits assigned to Panama in the BIS statistics, which is fully consistent with our interpretation of what haven-haven deposits represent. Indeed, there is no reason why information exchange between Panama and Switzerland should affect the French residents who use sham corporations in Panama as nominal owners of their Swiss accounts.

In col. (3) and (4), we run the same regressions as in col. (1) and (2) but with a measure of treaty coverage that weighs treaties by the importance of the deposits covered in the same way as in col. (4)-(6) of Table 2. The estimated effects are statistically and economically significant. Consider a treaty between France and Switzerland and assume that French residents hold 10% of all Swiss deposits belonging to non-haven countries. Col. (3) suggests that such a treaty reduces the bank deposits in Switzerland registered as belonging to tax havens (e.g., Panama) by 4.5%.¹⁴ Now assume that French residents are also the ultimate owners of 10% of the Swiss deposits registered as belonging to tax havens. Under this assumption, a treaty between France and Switzerland causes a 45% reduction of the deposits held in Switzerland by French residents through sham corporations. By contrast, a treaty between France and Switzerland causes a 17% reduction of the deposits held in Switzerland by French residents directly (Table 2, col. 1). Under plausible assumptions, the evaders who use sham corporations have responded strongly to the G20 tax haven crackdown.

There is one caveat, however: since we cannot identify the ultimate owners of the deposits held through sham corporations, the results in Table 3 rely on variation at the haven level rather than variation at the country-haven-pair level. It is an unfortunate feature of cross-border bank deposits statistics that they are based on immediate rather than beneficial ownership. If deposit data were established on a beneficial ownership basis, almost no deposits would be assigned to the British Virgin Islands or Panama;

¹⁴ $(\exp(-0.59) - 1) \times 10 = 4.5\%$.

more deposits would be assigned to the U.S., Italy, or France, and it would be easier to track the progress made in the fight against tax evasion.

4.4 Robustness Tests (Table 4)

Table 4 presents four robustness tests. For each, we estimate our two core specifications, that is the baseline model (Table 1, col. 2) and a basic model of deposit shifting (Table 2, col. 2).

First, OECD countries have concluded many more treaties than developing countries. Our results, one could fear, might be driven by asymmetric shocks reducing the deposits of developed countries relative to those of developing countries, such as the 2008-2009 financial crisis. To address this concern, we restrict the sample to OECD countries only. Col. (1)-(2) of Table 4 show that the response to treaties is slightly larger in the OECD sample than in the full sample, though qualitatively similar.

Second, we run the regressions with exchange rate adjusted deposit stocks. So far, we have used deposit data that convert deposits in pounds, euros or Swiss francs into U.S. dollars using end of quarter exchange rates. If a large share of bank deposits in Switzerland are denominated in Swiss francs and if Switzerland signed most of its treaties during a period when the Swiss franc depreciated, there is a risk that we capture a spurious effect of treaties on deposit. To address this issue, we construct an exchange rate adjusted measure of deposit stocks using the currency decomposition of deposits provided by the BIS. We hold exchange rates fixed at their end-of-2003 level. The results are reported in col. (3)-(4). The estimated effects are slightly smaller but qualitatively identical to the core specifications.

Third, we sequentially add country-year dummies and haven-year dummies to the core specifications. Country-year dummies control for all time-varying factors at the country level, such as changes in compliance efforts, capital tax rates or the incomes of top earners who are most likely to hold assets in tax havens. Haven-year dummies control for all time-varying factors at the haven level, such as bank crises or changes in political environment. The results are reported in col. (5)-(8). The estimated effects are robust to

the inclusion of country-year dummies. When we include both country-year dummies and haven-year dummies, we still find a modest effect of treaties on deposits in the baseline model but are unable to identify a deposit shifting effect.

Finally, we conduct an important placebo check. We run the regressions on the cross-border bank deposits owned by banks. Interbank deposits do not play a role in individual tax evasion and should therefore not respond to treaties. But interbank deposits might have been affected by some confounding factors, for instance exchange rate changes. Col. (9)-(10) show that treaties did not have any effect on interbank deposits.

4.5 Alternative Interpretations of the Data

The G20 initiative caused a modest relocation of deposits between tax havens. We interpret this small relocation as evidence that a minority of tax evaders responded to treaties but that a majority did not. While we believe that this interpretation is the most plausible, there exist other possible interpretations. A few words on their plausibility are in order.

First, it is possible that most individuals holding deposits in tax havens before the G20 initiative self-reported the interest income in their home country. There exist legitimate motives to hold offshore deposits: for instance, offshore banks may offer better financial services than domestic banks.¹⁵ If most depositors paid their taxes before the G20 initiative, the small relocation of deposits we observe reflects the response of the minority of depositors who evaded taxes. In this case, our results are consistent with a strong response of tax evaders. While this interpretation is possible, it is not plausible: the assumption that most depositors paid their taxes is strongly at odds with anecdotal evidence.¹⁶

Second, depositors may have responded to the G20 initiative by complying more with

¹⁵Brown et al. (2011) provide evidence that residents of countries with weak political governance have more Swiss deposits.

¹⁶For instance, over the 20,000 accounts held by U.S. residents with UBS Switzerland in 2007, only 1,000 or so were declared to the IRS (U.S. Senate, 2008, p. 84). In a testimony to the U.S. Senate, a former Cayman Islands banker says: “The one thing I learned very quickly, after having a bank in the islands, was that clients opening an offshore account were doing so for tax evasion; otherwise, they never would have paid the fees that were charged to them for offshore banking.” (U.S. Senate, 2001, p. 12).

tax laws while keeping their funds in tax havens. The OECD (2011) has gathered a list of the voluntary disclosure initiatives that have taken place since the end of 2008. For Italy, Mexico, and the UK, the OECD provides data on both assets disclosed and additional tax revenues. Tax evaders paid an amount equivalent to 5% of their assets in taxes and penalties, a remarkably low figure due to exceptional tax amnesties. If the same holds in all other countries, then up to \$350bn of offshore assets may have been disclosed to tax authorities against the backdrop of the G20 tax haven crackdown. This figure is an upper-bound for the response of tax evaders to treaties, since the tax evaders who disclosed their holdings most likely responded to tax amnesties rather than to the treaties themselves. Now, even this upper bound is negligible compared to the \$7,000bn or so likely held by households in tax havens.¹⁷ Moreover, Switzerland publishes the number of declarations made by Swiss bankers to European Union tax authorities on behalf of their clients.¹⁸ In 2007, Swiss bankers made 64,516 declarations; in 2010, they made 38,179 declarations. A significant increase in compliance does not look plausible.

Finally, bank deposits might be an imperfect proxy for the reaction of the fortunes held by households in tax havens, which also include portfolio assets (equities and bonds). Maybe portfolio assets have responded much more to the G20 initiative. However, standard portfolio choice theory suggests that more risk-averse persons hold more safe bank deposits, while more risk-loving persons hold more portfolio assets. Since more risk-loving persons should respond less to an increase in the probability to be detected, the G20 initiative might have affected portfolio assets even less than bank deposits.

5 Concluding Remarks

Conventional wisdom among policy makers is that the G20 tax haven crackdown is a success (OECD, 2011). The evidence presented in this paper challenges this view. It suggests that, so far, treaties have led to a modest relocation of bank deposits between

¹⁷Based on anomalies in international investment statistics, Zucman (2011) estimates that 8% of households' financial wealth is held in tax havens, which is around \$7,000bn in 2010. Based on interviews with wealth managers, the Boston Consulting Group (2010) puts the amount of offshore wealth at \$7,400bn in 2009.

¹⁸<http://www.estv.admin.ch/euzinsbesteuerung/themen/00703/index.html?lang=fr>

tax havens but have not triggered significant flows of funds out of tax havens. The least compliant havens have attracted new clients, while the most compliant have lost some, leaving roughly unchanged the total amount of wealth managed in tax havens. A minority of tax evaders has responded to treaties; a majority has not. The most sophisticated evaders who use sham corporations in the British Virgin Islands or Panama as nominal owners of their accounts seem to have responded strongly.

Our results suggest a concrete policy agenda to make the fight against tax evasion through information exchange treaties more effective. First, the G20 should urge tax havens to sign treaties with all countries: a comprehensive multilateral agreement would prevent tax evaders from transferring their funds from haven to haven. Second, the OECD should strengthen its information exchange standard. The modest overall response to the G20 initiative suggests that only a minority of tax evaders perceives an increase in the probability to be detected after a treaty is signed. Presumably, this reflects that treaties do not increase the true probability to detect tax evasion a lot. Treaties should be much more demanding.

The G20 tax haven crackdown is the biggest coordinated initiative against tax evasion the world has ever seen. The second biggest one is the European Union Savings Tax Directive. The G20 initiative relies on information exchange treaties; the EU Savings Tax Directive imposes a withholding tax on interest income earned by European residents in a number of cooperating tax havens. So far, both policies have big loopholes and have therefore largely failed: treaties because they are not demanding enough; the EU withholding tax because it exempts equities, derivatives, and does not look through sham corporations that tax evaders use to hold their offshore assets (Johannesen, 2010; Zucman, 2011). Therefore, what is the best tool – treaty or tax – to combat offshore tax evasion remains an open question.

Treaties are not fundamentally a bad tool, but their content matters crucially. Withholding taxes are not fundamentally a bad tool either, but their base matters crucially. Treaties providing for automatic exchange of information could put an end to bank secrecy and make tax evasion impossible. Comprehensive taxes withheld on all incomes

earned by foreign residents in all tax havens could also make tax evasion impossible, while maintaining some form of bank secrecy. Which of the two instruments would maximize tax revenues while minimizing administrative costs, including the costs of negotiating with tax havens? There is an urgent need for more research on this key question. Policy-makers have sharply diverging views: the European Union Commission pushes for automatic exchange of information, while some countries such as Germany and the U.K. are currently negotiating a comprehensive withholding tax with Switzerland.

Another question raised by our study is why some havens cooperate more than others. Tax havens have a strong economic interest in bank secrecy. But maybe abandoning bank secrecy has a positive effect on a haven's reputation, which may help it attract other financial activity, such as the incorporation of investment funds. Why some havens cooperate more than others in the frame of the fight against tax evasion by households would deserve to be further analyzed.

To evaluate the effects of the G20 tax haven crackdown, we have exploited a rich dataset maintained by the Bank for International Settlements. We have constructed simple quantitative indicators that can be used transparently by policy makers to follow the progress of the fight against tax evasion. Although access to part of the BIS dataset is restricted, two important indicators are publicly available, and one can be approximated using publicly available data. First, the BIS publishes on a quarterly basis the total value of bank deposits held in tax haven. This indicator is the broadest piece of official data available. Any quantitative assessment of the global fight against tax evasion should start from there. Second, the BIS publishes the total value of bank deposits held in each reporting tax haven. This makes it possible to assess which havens attract deposits and which lose – and how this correlates with their compliance efforts. Finally, we have produced compelling quantitative evidence – in addition to the existing anecdotal evidence – that tax evaders use sham corporations in Panama, the British Virgin Islands, and similar territories extensively as nominal holders of their deposits in tax havens. The value of bank deposits registered as belonging to tax havens is the purest form of household wealth evading taxes that can be observed directly in international investment

statistics. Imperfect as they may be, these three quantitative indicators deserve more attention than they attract today from policy makers.

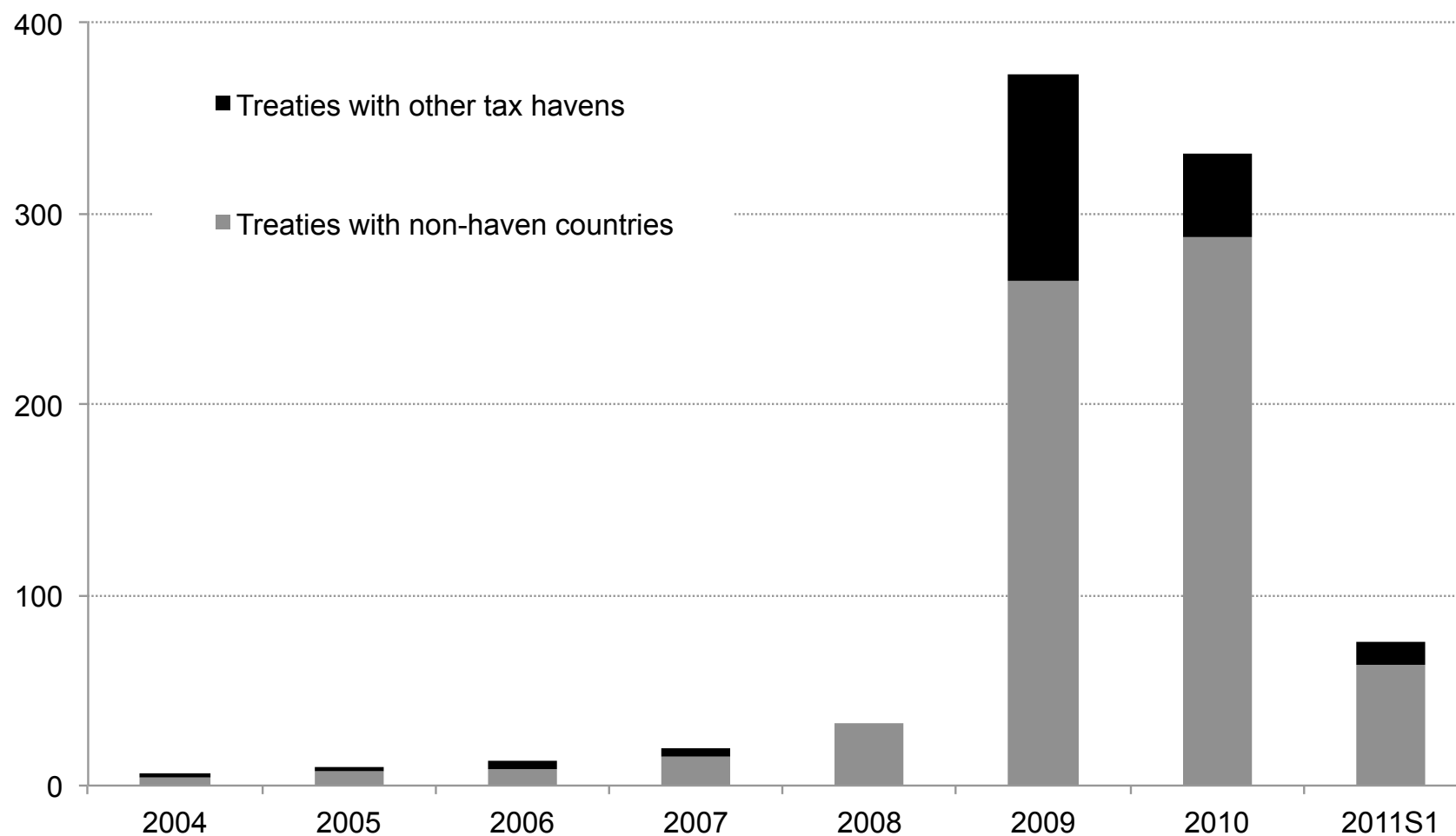
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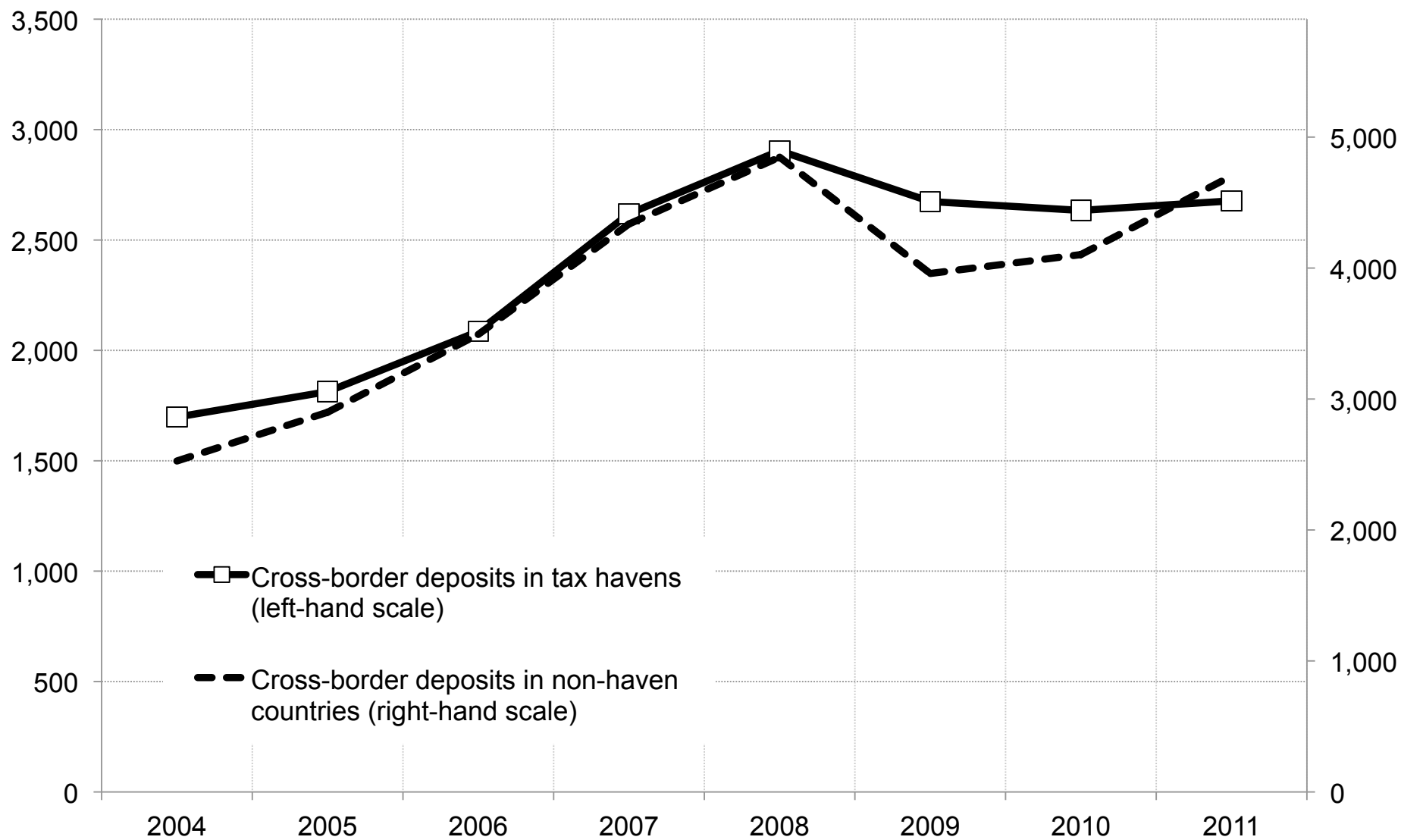
Figure 1: Treaty Signature Surged During the Crisis Under G20 Pressure



Note: The figure charts the the number of new treaties or amendment to existing treaties allowing for information exchange signed each year by the world's 52 tax havens (see list in the Online Data Appendix).

Source: www.eoi-tax.org and authors' research (see Online Data Appendix).

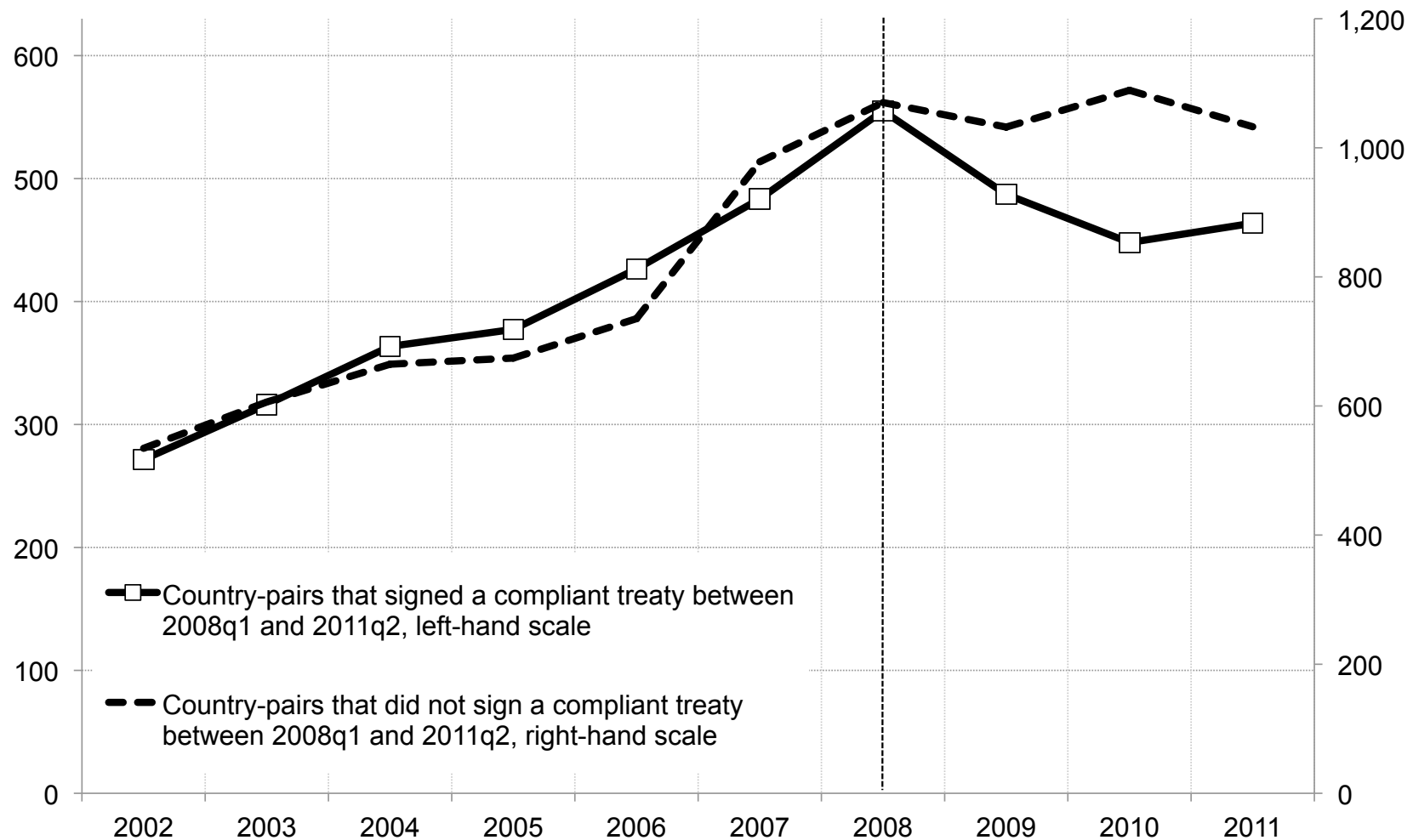
Figure 2: On Aggregate, Money Did Not Flow Out of Tax Havens



Note: The figure charts the evolution of the cross-border deposits in tax havens and in non-haven countries. All figures are yearly averages (first semester-average for 2011) and expressed in billion U.S. dollars.

Source: BIS Locational banking statistics, Table 3B, <http://www.bis.org/statistics/bankstats.htm>.

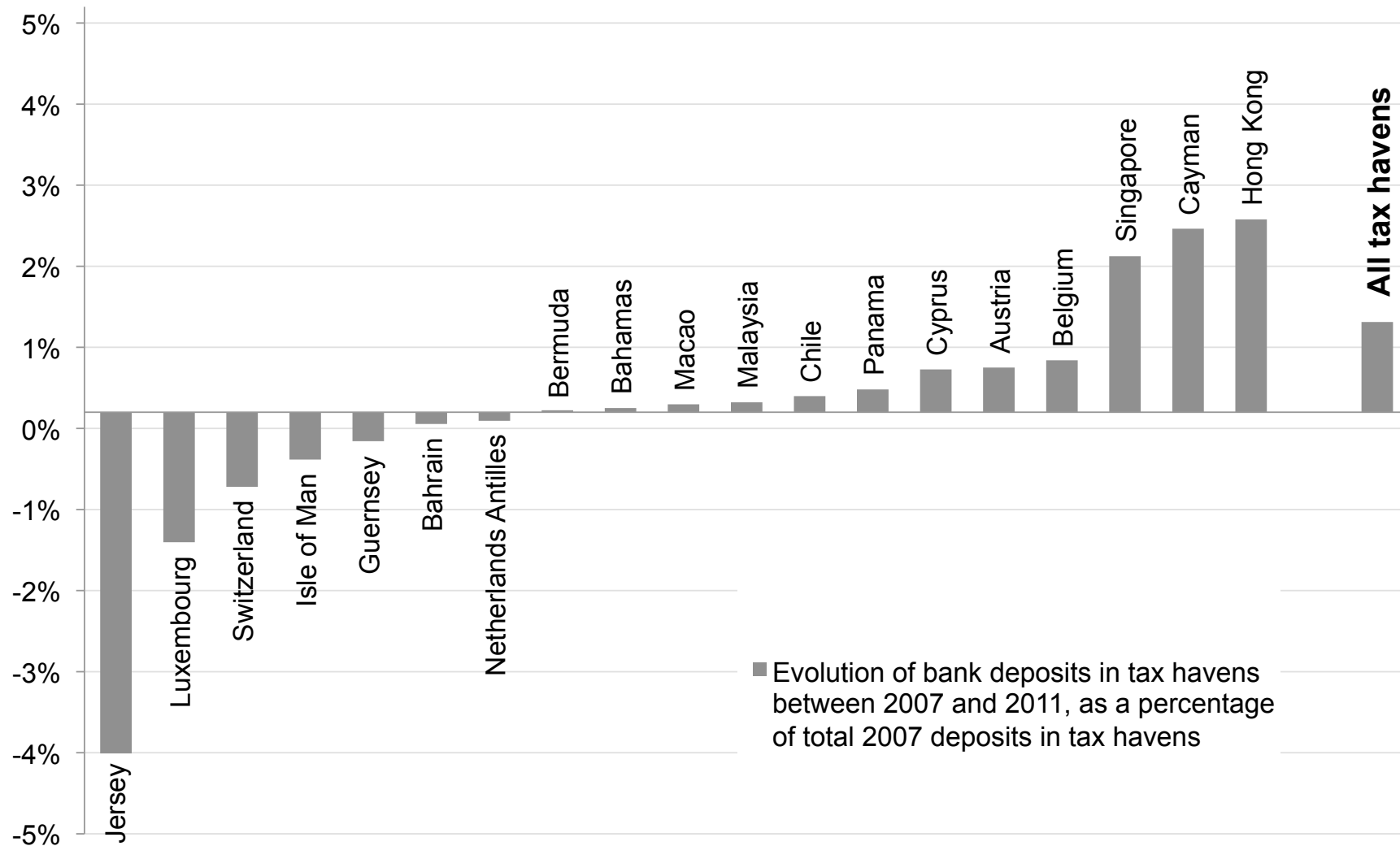
Figure 3: Deposits Decreased Moderately in Country-Pairs That Signed A Treaty



Note: The figure charts the evolution of the deposits held by savers of country i in banks of tax haven j for the set of country-haven pairs (i, j) that signed a treaty deemed compliant by the OECD between January 1st 2008 and June 30th 2011, and the set of country-haven pairs that did not. Saver countries exclude tax havens. Tax havens include Austria, Belgium, Chile, the Cayman Islands, Cyprus, Guernsey, the Isle of Man, Jersey, Luxembourg, Macao, Malaysia, Panama, and Switzerland. All figures are yearly averages (first semester-average for 2011) and expressed in billion U.S. dollars.

Source: BIS, restricted bilateral locational banking statistics.

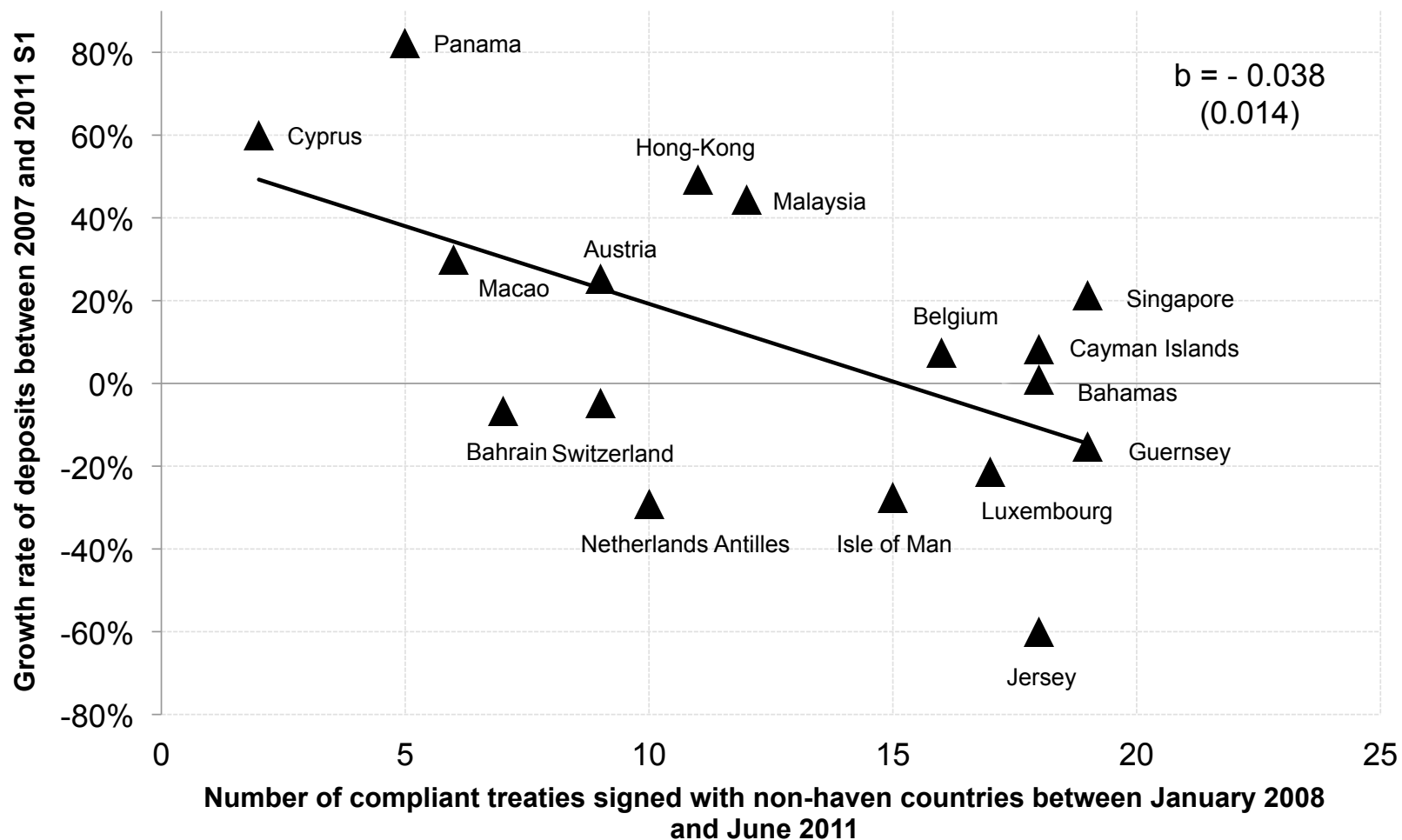
Figure 4: The G20 Initiative Caused a Modest Relocation of Deposits Between Havens



Note: The figure charts the evolution of the foreign-owned deposits in each BIS-reporting tax haven. We compare first semester of 2011 averages with 2007 averages (except for Cyprus which started reporting in 2008q4 and Malaysia which started in 2007q4), and express the difference as a fraction of the deposits held in all tax havens in 2007 (\$2,600bn).

Source: BIS Locational banking statistics, Table 3B, <http://www.bis.org/statistics/bankstats.htm>.

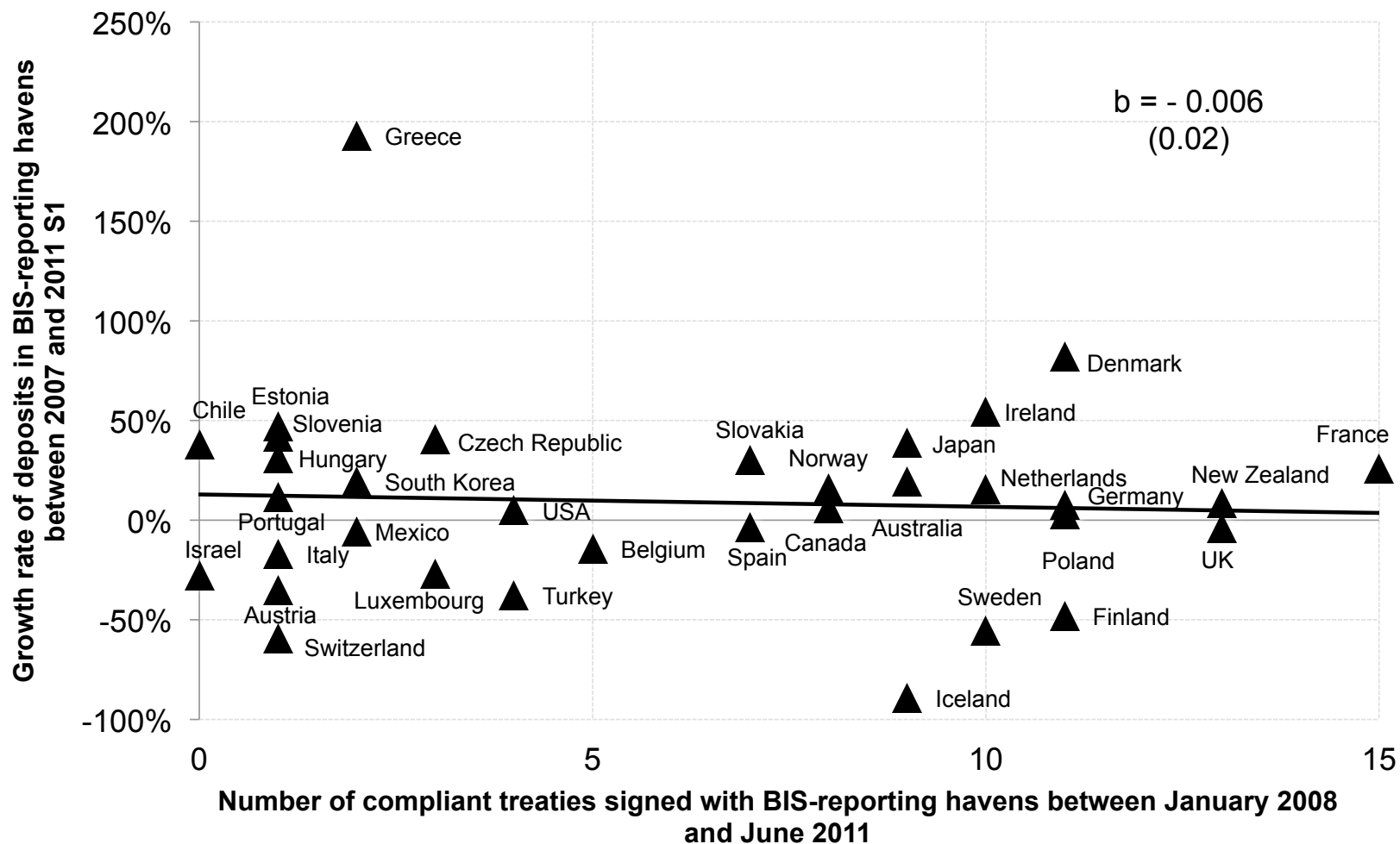
Figure 5: For Tax Havens: More Treaties Mean Less Deposits



Note: The figure charts the growth rate of the deposits in each BIS-reporting tax haven between 2007 (year average, except for Cyprus which started reporting in 2008q4 and Malaysia which started in 2007q4) and 2011 (first semester average), as a function of the number of compliant treaties signed between the beginning of 2008 and the end of the first semester 2011. b is the coefficient of the slope with standard error in parentheses.

Sources: Deposits: BIS Locational banking statistics, Table 3B, <http://www.bis.org/statistics/bankstats.htm>. Compliant treaties: www.eoi-tax.org and authors' research, see Online Data Appendix.

Figure 6: For OECD Countries: More Treaties May Not Curb Tax Evasion



Note: The figure charts the growth rate of the deposits held by each OECD country in BIS-reporting tax havens between 2007 (year average) and 2011 (first semester average), as a function of the number of compliant treaties signed between the beginning of 2008 and the end of the first semester 2011. b is the coefficient of the slope with standard error in parentheses. Sources: Deposits: BIS, restricted bilateral locational banking statistics. Compliant treaties: www.eoi-tax.org and authors' research, see Online Data Appendix.

Table 1: Depositors Responded Moderately to Treaties

VARIABLES	(1)	(2)	(3)	(4)	(5)
	BANK: havens SAVER: all	BANK: havens SAVER: non-havens	BANK: havens SAVER: havens	BANK: havens SAVER: non-havens	BANK: havens SAVER: non-havens
Signed	-0.0849* (0.0893)	-0.1156** (0.0349)	0.0457 (0.6926)		
Signed × NewTreaty				-0.1349** (0.0243)	
Signed × DomLaw				0.0163 (0.8825)	
Signed (Contemp)					0.0223 (0.6331)
Signed (+1 quarter)					-0.0927 (0.1300)
Signed (+2 quarters)					-0.1306** (0.0449)
Signed (+3 quarters)					-0.1724*** (0.0057)
Signed (>3 quarters)					-0.1818** (0.0137)
Constant	3.4685*** (0.0000)	3.2187*** (0.0000)	4.3499*** (0.0000)	3.2171*** (0.0000)	3.2196*** (0.0000)
Observations	39,758	30,960	8,798	30,960	30,960
R-squared	0.0870	0.0796	0.1167	0.0798	0.0803
Number of panelid	1,631	1,285	346	1,285	1,285
Countrypair FE	YES	YES	YES	YES	YES
Time FE	YES	YES	YES	YES	YES

Note: p-values in parentheses, based on robust standard errors clustered at the country-pair level. *** denotes significance at the 1% threshold, ** at the 5% threshold, and * at the 10% threshold.

The dependent variable is the stock of deposits held by savers of country i in banks of tax haven j at the end of quarter q . The unit of observation is the country-haven pair (i, j) and the sample period goes from 2003q4 to 2011q2. For a given haven j there are up to 220 saving countries i , and we consider the deposits held in 13 tax havens j . *Signed* is a dummy equal to 1 if there exists a treaty providing for information exchange between i and j in quarter q . *NewTreaty* is a dummy equal to 1 if the event establishing information exchange is a new treaty; *DomLaw* is a dummy equal to 1 if the event establishing information exchange is a change in haven's j domestic law. *Signed (Contemp)* is a dummy equal to 1 in the quarter q when the legal event establishing information exchange between i and j occurs; *Signed (+1 quarter)* is a dummy equal to 1 in $q + 1$, and so on.

Source: BIS, restricted bilateral locational banking statistics.

Table 2: Depositors Shifted their Deposits to Non-Compliant Havens

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
	BANK: havens SAVER: non-havens TREATY COVERAGE: number	BANK: havens SAVER: non-havens TREATY COVERAGE: number	BANK: havens SAVER: non-havens TREATY COVERAGE: number	BANK: havens SAVER: non-havens TREATY COVERAGE: share	BANK: havens SAVER: non-havens TREATY COVERAGE: share	BANK: havens SAVER: non-havens TREATY COVERAGE: share
Signed	-0.1659*** (0.0052)	-0.0498 (0.4286)	-0.0750 (0.2410)	-0.1470** (0.0141)	-0.0770 (0.2780)	-0.0883 (0.2167)
Saving tax directive (STD)	-0.2161*** (0.0004)	-0.2198*** (0.0003)	-0.1553*** (0.0077)	-0.2127*** (0.0005)	-0.2130*** (0.0005)	-0.1812*** (0.0019)
Treaty coverage	0.0059** (0.0402)			0.1311* (0.0510)		
Treaty coverage × Signed		0.0001 (0.9719)			0.0243 (0.7715)	
Treaty coverage × (1- Signed)		0.0120*** (0.0033)			0.1830** (0.0253)	
Treaty coverage × STD × Signed			-0.0030 (0.3202)			-0.0707 (0.4595)
Treaty coverage × (1-STD) × Signed			0.0066 (0.1937)			-0.0898 (0.5230)
Treaty coverage × STD × (1-Signed)			-0.0071 (0.3697)			0.1878 (0.1090)
Treaty coverage × (1-STD) × (1-Signed)			0.0183*** (0.0000)			0.2943*** (0.0019)
Constant	3.2147*** (0.0000)	3.2115*** (0.0000)	3.2094*** (0.0000)	3.2231*** (0.0000)	3.2221*** (0.0000)	3.2204*** (0.0000)
Observations	30,960	30,960	30,960	30,669	30,669	30,669
R-squared	0.0829	0.0841	0.0867	0.0832	0.0835	0.0853
Number of panelid	1,285	1,285	1,285	1,266	1,266	1,266
Countrypair fixed effects	YES	YES	YES	YES	YES	YES
Time fixed effects	YES	YES	YES	YES	YES	YES

Note: p-values in parentheses, based on robust standard errors clustered at the country-pair level. *** denotes significance at the 1% threshold, ** at the 5% threshold, and * at the 10% threshold.

The dependent variable is the stock of deposits held by savers of country i in banks of tax haven j at the end of quarter q . The unit of observation is the country-haven pair (i, j) and the sample period goes from 2003q4 to 2011q2. *Signed* is a dummy equal to 1 if there exists a treaty providing for information exchange between i and j in quarter q . *STD* is a dummy equal to one if the country-haven pair (i, j) applies the EU Savings Tax Directive. In col. (1)-(3), *Treaty coverage* counts the number of treaties that i has with tax havens other than j . In col. (4)-(6), *Treaty coverage* measures the share of the deposits held in 2004 by residents of country i in BIS-reporting havens that are covered by a treaty in quarter q .

Source: BIS, restricted bilateral locational banking statistics.

Table 3: Deposits Held Through Sham Corporations Responded More

VARIABLES	(1)	(2)	(3)	(4)
	BANK: havens SAVER: havens	BANK: havens SAVER: havens	BANK: havens SAVER: havens	BANK: havens SAVER: havens
	TREATY COVERAGE: number	TREATY COVERAGE: number	TREATY COVERAGE: share	TREATY COVERAGE: share
Treaty coverage, non-havens	-0.0067** (0.0188)	-0.0095*** (0.0015)	-0.5900*** (0.0000)	-0.6045*** (0.0000)
Treaty coverage, havens		0.0087 (0.3362)		0.0224 (0.9103)
Signed		0.0536 (0.6726)		0.1005 (0.4022)
Constant	4.3572*** (0.0000)	4.3604*** (0.0000)	4.4043*** (0.0000)	4.4057*** (0.0000)
Observations	8,798	8,798	8,798	8,798
R-squared	0.1188	0.1199	0.1359	0.1365
Number of panelid	346	346	346	346
Countrypair fixed effect	YES	YES	YES	YES
Time fixed effect	YES	YES	YES	YES

Note: p-values in parentheses, based on robust standard errors clustered at the country-pair level. *** denotes significance at the 1% threshold, ** at the 5% threshold, and * at the 10% threshold.

The table investigates how the signature of a treaty between a tax haven (e.g., Switzerland) and a non-haven country (e.g., France) affects the deposits recorded by the BIS as belonging to tax havens (e.g., the deposits in Swiss banks recorded as belonging to Panama). The dependent variable is the stock of deposits recorded as belonging to haven i (e.g., Panama) in the banks of haven j (e.g., Switzerland) at the end of quarter q . The unit of observation is the haven-haven pair (i, j) and the sample period goes from 2003q4 to 2011q2. For a given banking haven j , there are up to 41 “saving” havens i . We consider the deposits held in 13 banking havens j . In col. (1)-(2), *Treaty coverage, non-havens* counts the number of treaties that j has with non-haven countries (and *Treaty coverage, havens* the number of treaties that j has with other havens). In col. (3)-(4), *Treaty coverage, non-havens* measures the share of the deposits held by non-haven countries in haven j in 2004 that are covered by a treaty in quarter q (and *Treaty coverage, havens*, the share of the deposits recorded as belonging to tax havens in haven j in 2004 that are covered by a treaty in quarter q). *Signed* is a dummy equal to 1 if there exists a treaty providing for information exchange between haven i and haven j in quarter q .

Source: BIS, restricted bilateral locational banking statistics.

Table 4: Robustness Tests

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	OECD countries only		Exchange-rate adjusted		Country-year fixed effects				Interbank deposits	
	BANK: havens		BANK: havens		BANK: havens				BANK: havens	
	SAVER: OECD		SAVER: non-havens		SAVER: OECD				SAVER: non-havens	
Signed	-0.1905*** (0.0094)	-0.1230 (0.1321)	-0.0890* (0.0954)	-0.0431 (0.4898)	-0.2962*** (0.0001)	-0.1407* (0.0862)	-0.1163* (0.0744)	-0.0984 (0.2175)	-0.0248 (0.7963)	-0.0425 (0.7083)
STD		-0.5302*** (0.0000)		-0.2279*** (0.0002)		-0.6431*** (0.0005)		-0.3727** (0.0211)		-0.0224 (0.8235)
Treaty coverage × Signed		0.0052 (0.1956)		0.0015 (0.5938)		0.0022 (0.6543)		0.0030 (0.5400)		0.0004 (0.9449)
Treaty coverage × (1- Signed)		0.0128** (0.0210)		0.0125*** (0.0023)		0.0115** (0.0151)		0.0040 (0.3838)		-0.0034 (0.6904)
Constant	4.8144*** (0.0000)	4.7834*** (0.0000)	3.2197*** (0.0000)	3.2197*** (0.0000)	3.2197*** (0.0000)	3.2197*** (0.0000)	3.2197*** (0.0000)	3.2197*** (0.0000)	3.7524*** (0.0000)	3.7532*** (0.0000)
Observations	8,049	8,049	30,693	30,693	8,049	8,049	8,049	8,049	20,489	20,489
R-squared	0.0852	0.1129	0.0644	0.0693	0.1744	0.1903	0.2910	0.2941	0.0394	0.0395
Number of panelid	307	307	1,270	1,270	307	307	307	307	1,004	1,004
Countrypair fixed effects	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Time fixed effects	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Saver-year dummies	NO	NO	NO	NO	YES	YES	YES	YES	NO	NO
Bank-year dummies	NO	NO	NO	NO	NO	NO	YES	YES	NO	NO

Note: p-values in parentheses, based on robust standard errors clustered at the country-pair level. *** denotes significance at the 1% threshold, ** at the 5% threshold, and * at the 10% threshold.

The dependent variable is the stock of deposits held by savers of country i in banks of tax haven j at the end of quarter q . The unit of observation is the country-haven pair (i, j) and the sample period goes from 2003q4 to 2011q2. *Signed* is a dummy equal to 1 if there exists a treaty providing for information exchange between i and j in quarter q . *STD* is a dummy equal to one if the country-haven pair (i, j) applies the EU Savings Tax Directive. *Treaty coverage* counts the number of treaties that i has with tax havens other than j . Col. (1)-(8) consider the deposits held by non-bank agents; col. (9)-(10) the deposits held by banks.

Source: BIS, restricted bilateral locational banking statistics.

Supplementary Table : Probit Model of Treaty Formation

VARIABLES	(1) BANK: havens SAVER: non-havens	(2) BANK: havens SAVER: non-havens	(3) BANK: havens SAVER: non-havens	(4) BANK: havens SAVER: non-havens
Deposit growth rate, -4q to 0q	0.0004 (0.6916)	0.0011 (0.4146)	-0.0010 (0.6283)	-0.0013 (0.7340)
Deposit growth rate, -8q to -4q	-0.0017* (0.0849)	-0.0012 (0.3985)	-0.0019 (0.2841)	-0.0037 (0.2745)
Deposits (in logs)			0.0010** (0.0398)	0.0034*** (0.0002)
Distance (in logs)			-0.0041*** (0.0000)	-0.0039* (0.0513)
GDP (in logs)			0.0041*** (0.0000)	0.0991*** (0.0041)
Observations	56,069	37,053	11,844	4,743
Time fixed effect	NO	YES	YES	YES
Saver-country fixed effect	NO	NO	NO	YES

Note: p-values in parentheses, based on robust standard errors. *** denotes significance at the 1% threshold, ** at the 5% threshold, and * at the 10% threshold.

This table investigates what determines the signature of a treaty between a country i and a tax haven j . The dependent variable is a dummy equal to 1 if a country i and haven j sign an information exchange treaty in quarter q . The unit of observation is the country-haven pair (i, j) and the sample period goes from 2003q4 to 2011q2. The estimates are marginal effects. *Deposit growth rate* captures the growth rate of the deposits held by savers of country i in haven j before quarter q . We consider two measures of the growth rate of deposits: the percentage growth over the 4 quarters before q and the percentage growth from 8 quarters to 4 quarters before q . *Deposits* is the log of the stocks of deposits held by country i in haven j in quarter q , *GDP* the log of country's i GDP (from the World Bank's World Development Indicator), *Distance* the geodesic distance between i and j (from the CEPII database, <http://www.cepii.fr/anglaisgraph/bdd/distances.htm>)

Source: BIS, restricted bilateral locational banking statistics.