Taxing Hidden Wealth: The Consequences of U.S. Enforcement Initiatives on Evasive Foreign Accounts

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ABSTRACT: In 2008, the IRS initiated efforts to curb the use of offshore accounts to evade taxes. This paper uses administrative microdata to examine the impact of enforcement efforts on taxpayers' reporting of offshore accounts and income. We find that enforcement caused approximately 50,000 individuals to disclose offshore accounts with a combined value of about $100 billion. Most disclosures happened outside offshore voluntary disclosure programs, by individuals who never admitted prior noncompliance. Disclosed accounts were concentrated in countries often characterized as tax havens. Enforcement-driven disclosures increased annual reported capital income by $2-$4 billion, corresponding to $0.6-$1.2 billion in additional tax revenue.

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1. Introduction

The use of secret offshore accounts to evade tax liabilities is a serious challenge for tax policy. One prominent study estimates that households around the world hold $6 trillion in offshore banking centers, amounting to about 8% of total household financial wealth (Zucman, 2013). Other research suggests that, at least in one set of countries, offshore wealth is highly concentrated at the top of the wealth distribution and almost never reported to the tax authorities (Alstadsæter, Johannesen and Zucman, 2019). The size and concentration of offshore wealth suggests that improved tax enforcement for offshore income and wealth could generate substantial revenue and perhaps also large social welfare gains, but it is not straightforward to achieve in a world of extremely mobile financial assets and foreign tax havens[1] with institutionalized financial secrecy.

In response to this challenge, beginning in 2008 the U.S. government conducted a series of enforcement initiatives aimed at offshore accounts of its citizens. First, it compelled a number of tax havens to accept information exchange agreements under which the Internal Revenue Service (IRS) can request account information about U.S. taxpayers suspected of tax evasion. Second, it took *ad hoc* legal measures to force major Swiss banks, most famously the world's biggest private bank, UBS, to turn over names and account details of many of their U.S. customers. Finally, complementing the measures aiming to facilitate detection of undeclared offshore income, it established a series of programs under which cooperating U.S. taxpayers who voluntarily disclose their previously unreported offshore accounts and the taxable income they generate are subject to reduced penalties and avoid criminal sanctions. Many countries have pursued very similar policies, combining cross-border exchange of banking information and incentives to self-declare foreign assets.

This paper uses comprehensive administrative data to estimate compliance responses to the bundle of U.S. enforcement efforts starting in 2008. From a policy perspective, it is important to know how effective the global wave of enforcement has been in fostering tax compliance and raising tax revenue, but the available evidence is scant and indirect.[2] We analyze data on reported foreign accounts

[1] We use the term tax haven loosely to indicate jurisdictions with low effective tax rates and a sufficient commitment to financial secrecy so as to be attractive to foreigners desiring to shield income from home-country taxation. There is no single universally accepted list of such jurisdictions, and being so designated is often disputed by named countries. In Section 5, for descriptive analyses we make use of the countries meeting the 2000 OECD definition of uncooperative tax havens. In these analyses, we also show by-country information separately for all countries. This list does not have any official role in IRS enforcement efforts; the IRS does not have an officially accepted definition of a tax haven.

[2] Langenmayr (2017) shows that U.S.-owned deposits in offshore jurisdictions increased in 2009 relative to a synthetic control group and interprets this as evidence that the OVD was associated with an increase in offshore tax evasion.

from Reports of Foreign Bank and Financial Accounts (FBARs), which must be filed annually by U.S. taxpayers when the total value of their foreign accounts exceeds $10,000. We combine these data on reported foreign accounts with information on participation in Offshore Voluntary Disclosure (OVD) programs and income reported on tax returns. Combining these data sets permits us to study the effect of enforcement on account disclosures and income reporting not only for OVD participants, but also for any individuals who disclosed "quietly," by beginning to report a foreign account and income in that account without entering OVD.

We begin by documenting a sharp increase in the number of self-reported foreign accounts that coincides with the enhanced enforcement efforts. In each of the years 2005 through 2008, approximately 40,000 U.S. residents filed an FBAR for the first time, disclosing that they owned foreign accounts. Many of these were presumably taxpayers who simply opened their first foreign account and duly filed an FBAR. In 2009, the number of first-time FBAR filers more than doubled to about 90,000 individuals.[3] The steep increase is suggestive that a large number of taxpayers - a simple difference estimate would be around 50,000 individuals - disclosed previously unreported foreign accounts in response to the new enforcement policies. Only about 15,000 of the first-time FBAR filers in 2009 participated in the voluntary disclosure program, suggesting that much of the compliance response - a simple difference estimate would imply around 35,000 individuals - occurred in the form of "quiet disclosures" outside of the voluntary disclosure program. We estimate that the combined value of the accounts disclosed because of the enforcement efforts was just over $100 billion.

This reading of the trends in FBAR reporting is consistent with patterns in the underlying microdata. The increase in first-time FBAR filings was disproportionately large for account types that are *a priori* more likely to play a role in tax evasion,[4] even for those who did not participate in an OVD program. First, the increase was much larger for accounts in countries often characterized as tax havens than in other foreign countries. For instance, the number of first-time FBAR filings related to

Hanlon, Maydew and Thornock (2015) show that information exchange treaties between the U.S. and offshore tax havens lead to a decrease in portfolio investment from the cooperating tax havens into the U.S., consistent with a decrease in "round-tripping" by U.S. households, but do not discuss whether this reflects an increase in tax compliance or shifting of evasive accounts to non-cooperating tax havens. Heckemeyer and Hemmerich (2018) find that information exchange treaties are associated with a significantly larger decline in foreign portfolio investment in tax havens than in non-tax-havens.

[3] The FBAR filers we study are single or joint individual owners of accounts disclosed on FBARs; we do not focus on businesses. We use the term individuals loosely throughout to refer to single or joint account owners.

[4] We use the term evasion referring to non-compliance with income or asset reporting. The paper studies "traces of evasion;" we do not have audit data or information on whether the individuals were charged with or convicted of tax evasion. Throughout the paper we use the terms non-compliance and evasion interchangeably.

accounts in the Cayman Islands grew from about 300 in 2008 to approximately 4,500 in 2009. Second, the increase was more pronounced for large accounts (above $1 million), which are more likely to serve investment rather than transactional purposes, than for smaller accounts (below $100,000). Third, there was no comparable increase in new FBAR filings by taxpayers residing outside of the U.S., who have a clear non-tax motive for holding a foreign account. New accounts disclosed by those previously filing an FBAR were also disproportionately high-value and concentrated in tax havens.

Entering OVD required paying back taxes and substantial penalties, but eliminated the risk of more severe criminal penalties, while disclosing outside OVD allowed a taxpayer to avoid paying back taxes and penalties at the risk of harsher criminal penalties if evasion was later detected. We next try to understand the factors determining whether taxpayers disclosed inside or outside of the voluntary disclosure program. Under the assumption that the 2009 cohort of first-time FBAR filers would have resembled the 2008 cohort in the absence of expanded enforcement, we identify the characteristics of those induced to file by enforcement. Our findings support the notion that taxpayers decided to enter OVD when the risk of detection and prosecution for a quiet disclosure was sufficiently high, as those using the voluntary disclosure program were more likely to disclose a large account (with higher risk of criminal charges in case of detection), and to disclose an account in Switzerland (with a higher detection risk given the concurrent crackdown involving Swiss banks).

To measure the effect of the enforcement initiatives on tax compliance, we are ultimately interested in whether new disclosure of foreign accounts is associated with a resulting increase in reported taxable income. Here, we turn to the data from income tax returns. We employ an event study methodology that allows us to estimate the increase in taxable capital income occurring when a taxpayer discloses foreign accounts for the first time. To account for the underlying trend in reported income, we include a comparison group of individuals who filed an FBAR and reported the same number of accounts in every year during our sample period.

Not surprisingly, for individuals participating in the voluntary disclosure program—who have admitted to non-compliance—we estimate a sharp and substantial increase in reported taxable capital income after disclosure. More intriguingly, for first-time FBAR filers *not* participating in OVD—who have not admitted non-compliance—we also find a substantial increase in capital income in the first year of filing an FBAR, although with smaller relative effects than we observe for the OVD participants.

These results suggest that the unusually large group of first-time FBAR filers in 2009 includes a significant number of quiet disclosers, who started reporting foreign accounts and the capital income accruing to these accounts in response to the enforcement initiatives without admitting tax evasion, explicitly or implicitly. Three additional pieces of evidence support this interpretation. First, other types of income do not increase following disclosures. Second, the increase in capital income at the time of the first FBAR filing was not reflected in the third-party reports filed by domestic banks, suggesting that the income indeed was associated with foreign accounts. Third, we find that the probability of filing amended tax returns for previous tax years doubled after a first-time FBAR filing, although from a low baseline of around 3%. These facts bolster our claim that the effect on capital income reporting is being driven by quiet disclosures, and rule out alternative explanations.

Finally, we estimate the total effect of the policy on reported taxable capital income and tax revenue. Depending on what assumptions we make to address the issue of heterogeneous effects of disclosure on reported income, we find that these enforcement initiatives increased capital income reporting by $2 to $4 billion annually, corresponding to $0.6 billion to $1.2 billion in annual tax revenue. Most of the total effect comes from quiet disclosers rather than OVD participants, although the dollar amount per individual is larger for OVD participants.

To put these findings in perspective, it is instructive to compare our estimate of offshore wealth disclosed in 2009 because of the enforcement efforts, around $100 billion, to a recent estimate of total offshore wealth owned by U.S. households in roughly the same period of about $1,000 billion (Alstadsæter, Johannesen and Zucman, 2018). The growing literature on offshore tax evasion provides two potential explanations for why the enforcement efforts we study did not have a larger effect on tax compliance. One set of studies shows that targeted enforcement policies induce some owners of offshore accounts to adapt a new evasion strategy, for instance by moving assets to non-cooperative tax havens (Johannesen and Zucman, 2014; Johannesen, 2014; Menkhoff and Miethe, 2019) or by adding layers of secrecy in the form of anonymous shell corporations (Omartian, 2016). Additionally, a supply-side theory of offshore tax evasion predicts that increases in enforcement are more effective in inducing evaders with the smallest accounts to become compliant (Alstadsæter, Johannesen and Zucman, 2019).

Our findings also inform current debates about the Foreign Account Tax Compliance Act (FATCA), a highly ambitious policy seeking to enhance tax enforcement by inducing foreign financial

institutions to report information to the IRS about all accounts held by U.S. taxpayers beginning in 2015. Many observers have expressed reservations about FATCA, claiming that it involves significant administrative costs for banks (e.g., Jolly and Knowlton, 2011) and pointing to the compliance costs faced by U.S. citizens when setting up and maintaining foreign accounts for fully legitimate purposes (e.g., Jacobs, 2012). In the face of these concerns, the effectiveness of the enforcement initiatives preceding FATCA in deterring evasion is paramount. Our results suggest that the enforcement policies implemented prior to FATCA had a significant effect on aggregate tax compliance, but may have been limited by a lack of scope, and, thus that stronger policy instruments may be needed to ensure effective taxation of foreign accounts. Whether FATCA will significantly improve overall tax compliance, especially for very high-wealth individuals, will be an important task for future research, as data become available.

2. Background: U.S. Enforcement Policy Initiatives Since 2009

For decades, the use of offshore bank accounts for tax evasion was straightforward and involved a low risk of detection because the banking secrecy of foreign tax havens shielded tax evaders from investigations by the U.S. tax authorities. Starting in 2008, however, the U.S. government adopted a range of enforcement initiatives targeting owners of offshore accounts. The carrot-and-stick approach combined measures to increase the probability of detecting undeclared offshore accounts and a program providing incentives for tax evaders to voluntarily disclose their foreign assets. This paper seeks to understand the effects of this bundle of policies as a whole. Many other countries have since adopted a similar bundle of policies, including enhanced information exchanges and reduced penalties for disclosing offshore wealth. This section provides a summary of these enforcement initiatives.

2.1 Ad hoc legal steps against Swiss banks

When Bradley Birkenfeld, a former employee at the Swiss bank UBS, blew the whistle and revealed that the bank's representatives were knowingly assisting U.S. individuals with tax fraud involving anonymous shell corporations and undeclared Swiss bank accounts, the U.S. government took the fight against offshore tax evasion to court. At the request of the Department of Justice, a federal judge in July 2008 authorized the tax authorities to requisition information from UBS about its U.S. customers without specifying the identities of these customers in advance, a so-called "John Doe summons." A few months later, the FBI announced that UBS was under investigation for its role in tax evasion and several UBS executives, including the head of the wealth management division, Raoul

Weil, were indicted.[5]

While the criminal case against UBS was settled in February 2009 with the bank agreeing to pay a fine of $780 million, the civil case about disclosure of customer lists had more far-reaching legal and political implications. The demand by the U.S. government that UBS provide details about its 52,000 U.S. customers was a direct assault on the Swiss banking secrecy rules, under which UBS was required to protect the privacy of its customers and its executives would face criminal charges in Switzerland if customer lists were shared with the U.S. government. The case was settled in March 2009, when the U.S. and Swiss governments agreed that UBS would reveal the identities of 4,450 customers to the U.S. tax authorities by intermediation of the Swiss Financial Services Authority. How exactly 4,450 names were selected from the 52,000 demanded by U.S. authorities was never disclosed, but these are widely believed to have been the most egregious, wealthy tax evaders.[6]

Apart from the UBS account holders directly named in the settlement, the outcome of the UBS case may have induced compliance responses among offshore tax evaders more broadly by demonstrating that the banking secrecy of foreign tax havens was no longer impenetrable, and instead could be effectively challenged in courts. Later, the U.S. government took a similar approach against a number of foreign banks with major wealth management divisions, issuing John Doe summonses against a number of other foreign banks, including HSBC, Credit Suisse and Wegelin & Co., and establishing a program for several Swiss banks to provide information on U.S. taxpayers.

2.2 Information exchange

At the same time as the U.S. government took *ad hoc* legal steps against individual banks to obtain information about their customers, it also pursued a broader agenda to improve its access to tax-relevant information from foreign banks through bilateral information exchange agreements. In a first step, several countries believed to be tax havens were compelled to accept the conventional mode of cross-border cooperation in tax matters under which tax authorities can request bank information about specific taxpayers from other countries in tax evasion cases. Many important tax havens had long rejected this type of cooperation, often with reference to the banking secrecy rules in their domestic law. However, coordinated political pressure by the United States and other G20 countries,

[5] Mr. Weil was eventually found not guilty.

[6] For example, the IRS commissioner said at the time that "we were never interested in pursuing 52,000 accounts," and that the 4,450 names gave IRS "access to the accounts we wanted" (DOJ, 2009b).

involving an explicit threat to impose economic sanctions on non-cooperative jurisdictions issued at the G20 summit held in April 2009, induced virtually every tax haven in the world to agree to the standard. The U.S. government signed bilateral agreements about information exchange on request with six tax havens, Switzerland, Luxembourg, Liechtenstein, Malta, Monaco and Panama, during the period 2008-2010.

The main limitation of these agreements is that tax authorities can only request bank information about specific taxpayers, and only in tax evasion cases where they possess sufficient evidence to assert the relevance of the information requested. In practice, the information exchange agreements are therefore rarely used and prominent tax experts have argued that the mode of cooperation is simply too weak to be an effective deterrent of offshore tax evasion (Sheppard, 2009).

In a second step, the U.S. Congress passed a new law inducing foreign banks to provide information about all accounts owned by U.S. taxpayers to the U.S. tax authorities. This move from occasional information exchange with foreign jurisdictions under bilateral treaties to systematic reporting by all foreign banks represents a dramatic change in the tax enforcement efforts with respect to offshore accounts. The new reporting regime is detailed in the Foreign Account Tax Compliance Act (FATCA), which was proposed in Congress in October 2009 and signed into law by President Obama in March 2010. While the first reporting of foreign account information under FATCA was due in 2015, several years after our period of analysis, the prospect of much more comprehensive third-party reporting of foreign income may have induced compliance responses as early as 2009 when such legislation was initially being considered by legislators.

2.3 Voluntary disclosure programs

Complementing the initiatives aiming to facilitate detection of undeclared offshore accounts, the IRS also implemented a series of "voluntary disclosure" programs with incentives for offshore tax evaders to voluntarily declare their foreign assets.[7] The first initiative of this kind was the Offshore Voluntary Disclosure Program, under which participants benefitted from reduced civil penalties and escaped criminal prosecution. The program was initiated in March 2009, and expired in October 2009. To apply for participation in the program, taxpayers had to submit a letter to the IRS containing identifying information and details about their foreign accounts or entities. Once cleared to participate,

[7] These initiatives are summarized and assessed in Lederman (2012).

the taxpayer was required to i) provide copies of previously filed original and amended returns, ii) submit updated complete and accurate returns for the previous six years, iii) provide information about previously undisclosed income, including information on financial accounts, institutions and facilitators, and iv) remit the necessary back taxes and penalties imposed by the OVD Program. Taxpayers already under investigation for tax evasion were ineligible for the program.

A key feature of the OVD program was the uniform penalty structure under which participants were liable for unpaid taxes and interest for the previous six years, an "accuracy-related penalty" of 20% of the total unpaid taxes, and an "offshore penalty" of 20% of the value of the disclosed assets.[8] As the heightened publicity of the reporting requirements for offshore accounts made many taxpayers aware of their FBAR filing requirement for the first time in 2009, the IRS clarified that individuals who had been paying all taxes due but had been unaware of their FBAR filing requirement should not participate in OVD and incur the offshore penalty, but rather they should simply file the delinquent FBARs (IRS, 2009). Subsequent to the 2009 OVD Program, the U.S. offered several other voluntary disclosure programs with similar terms and conditions: the Offshore Voluntary Disclosure Initiative, in place between February and September 2011, and the 2012 Offshore Voluntary Disclosure Program, in place from January 2012 onward. Each subsequent program increased the overall offshore penalty, and simultaneously introduced lower penalties and an easier disclosure process for less substantial non-compliance. We refer to this set of programs by the acronym OVD.

The IRS reported that the first voluntary disclosure program, active from March to October 2009, drew around 15,000 disclosures of offshore accounts and resulted in the collection of $3.4 billion in back taxes and penalties (IRS, 2011). As of 2014, the IRS reported 45,000 disclosures occurred through the voluntary disclosure programs—including later OVD programs in 2011 and 2012—resulting in the collection of $6.5 billion in back taxes and penalties (IRS, 2014). It is important to note that these figures do not include what we call "quiet disclosers," taxpayers who started reporting their foreign accounts in response to the increased risk of detection without participating in the OVD program. In addition, because the IRS figures combine taxes and penalties and pool payments relating to many tax years, they do not provide information about voluntary compliance via increased reporting

[8] The OVD penalty structure was in lieu of the usual penalty structure for a willful failure to file FBAR, which was the greater of $100,000 or 50 percent of the balance in the account at the time of the violation, for each violation. To ensure that the OVD program in fact reduced the applicable penalty, the tax authorities would compare the OVD penalties to the total penalties applying absent the program, and the discloser would be liable for the lower amount. The civil penalty for *non-willful* failure to file an FBAR was up to $10,000 per violation.

of capital income following disclosures, nor do they provide annualized information.

3. Conceptual Framework

We next describe the decision options faced by a potentially non-compliant taxpayer. We use this framework to motivate a number of empirical strategies that examine the full range of potential effects of the IRS enforcement initiatives. Figure 1 illustrates the decision-making process for taxpayers with offshore wealth, and how their behavior may change as a result of the 2008-2009 enforcement, which consisted of an increase in detection probabilities and an increase in the salience of the penalties for failure to file an FBAR. One should think of the reasoning presented here as the reduced form of a more complicated structural model describing each decision taxpayers make.

We divide taxpayers with foreign bank accounts into three groups prior to the enforcement policy change. The first group is fully compliant with the tax law and FBAR reporting before the enforcement and is thus unaffected by enforcement. The second group is compliant with their tax obligations, but due to compliance costs or ignorance of their filing responsibilities, they did not file FBARs prior to 2009. Increased publicity of the requirements and non-filing penalties in 2008 may induce these individuals to file an FBAR. The third group consists of individuals who, prior to the policy change, are non-compliant with their tax obligations and also do not file an FBAR.[9] Some members of this group might continue to risk detection and not change their behavior at all, especially with regard to accounts in countries where U.S. tax authorities are not yet able to obtain information from foreign banks. Others shift the location of accounts to less cooperative jurisdictions or change the structure of their foreign asset holdings to make them even harder to detect. The other possibility is that many of these individuals will file an FBAR and start remitting taxes due on the income in the accounts. Note that this type of response to enforcement could occur for high-wealth tax evaders deliberately concealing wealth, but also for individuals who were unintentionally non-compliant.[10] Detecting and characterizing this response is a key part of our empirical analysis.

Individuals who decide to start complying fully must also decide whether to enter the OVD

[9] One can imagine a fourth group that is compliant with FBAR filing requirements but not with tax obligations. It seems sensible to rule this out *ex ante*, as admitting the existence of an account to the authorities without remitting taxes on the income in that account would be exceedingly risky.

[10] Many unintentional noncompliers evaded relatively little tax. The fact that some individuals with little tax due entered 2009 OVD and were subject to the offshore penalty was the main motivation for changes to the OVD penalty structure introduced (and retroactively applied) for small accounts and non-willful noncompliance in later years.

program. Entering the OVD effectively shields individuals from criminal prosecution for tax fraud, but it exposes them to the substantial penalties incurred by OVD participants, as described in the previous section. The alternative to entering OVD is to come into compliance simply by filing the correct forms and reporting the correct income, without explicitly admitting any prior wrongdoing--a "quiet disclosure." Quiet disclosers would avoid the sizable OVD penalties, but they also risk criminal prosecution if their prior non-compliance is discovered. Quiet disclosures are therefore an attractive option when individuals believe that criminal prosecution in the near future is unlikely, due for example to their perception of limited resources of the IRS and/or the probable existence of larger-scale evaders the IRS might be more likely to prosecute. Finally, quiet disclosers might not file amended tax returns and FBARs for prior years, thus remitting no back taxes or penalties.

Our analysis of FBAR filings, OVD participation, and income reporting will shed light empirically on each of the decisions described thus far. One final decision newly compliant taxpayers make is whether to repatriate the wealth once enforcement makes holding offshore wealth relatively less tax-attractive. We are limited in our ability to directly observe this type of behavior. Our estimates of the impact of enforcement are therefore a lower bound of the total impact including repatriation.

4. Data

We examine data from the IRS Compliance Data Warehouse (CDW), which provides access to a wide variety of tax return, enforcement, compliance, and other data. De-identified taxpayer data are extracted from filed tax returns, enforcement information, and narrative data that sequence taxpayer history. The individual returns file includes transcribed tax returns for individuals and includes most taxpayer-filed forms and schedules, plus third-party-filed information documents. We observe the information reported on Form 1040, the individual income tax return, including nearly all the line items on the main form and supplemental schedules, as originally filed by the taxpayer. We also have indicators of whether and when amended 1040 returns were filed, although we do not have access to line-by-line information from the amended returns.

4.1 Foreign Bank Account Reports (FBARs)

Crucial to our analysis is micro data from the Report of Foreign Bank and Financial Accounts. The official name of this form is FinCEN Form 114, where FinCEN is short for Financial Crimes

Enforcement Network,[11] but it is generally known as the FBAR (Foreign Bank Account Report), and we refer to it as such.

United States "persons" are required to file an FBAR if the person had a financial interest in or signature authority over at least one financial account located outside of the United States, and the aggregate value of all foreign financial accounts exceeded $10,000 at any time during the calendar year reported. As defined by the instructions to the FBAR, a United States person includes "U.S. citizens; U.S. residents; entities, including but not limited to, corporations, partnerships, or limited liability companies, created or organized in the United States or under the laws of the United States; and trusts or estates formed under the laws of the United States." Extensive rules are designed to ensure that individuals cannot avoid an FBAR filing requirement for assets they own by holding them indirectly, for example through a shell corporation in a foreign country. Indirectly-held financial assets are subject to FBAR reporting rules, and are within the purview of the enforcement crackdown.[12]

The FBAR is a calendar-year report that during the period of our analysis had to be filed on or before June 30 of the year following the calendar year being reported. Effective July 1, 2013, the FBAR must be filed electronically and, as of 2017, the filing date is April 15. The FBAR is filed, separately from federal tax returns, with FinCEN, which is a distinct agency from the IRS.[13] Unlike the filing of federal tax returns, there is no provision for requesting an extension of time to file an FBAR. The filer of an FBAR is required to report account numbers and identifying information for the U.S. person who owns the assets in the account (directly or indirectly), including an address and the maximum value of each account for the year. Prior to 2009, filers were required to report the account value within various ranges, but beginning in 2009 they were required to report the exact maximum dollar amount.

4.2 Voluntary disclosure

The final component of our analysis in this paper relies on data regarding participation in the offshore voluntary disclosure programs (the Offshore Voluntary Disclosure Programs/Initiatives of 2009,

[11] Our data include the earlier version of this form, TD Form 90-22.1, which has been required since the Banking Secrecy Act of 1970, and which was superseded as of September 30, 2013 by FinCEN Form 114 (FBAR).
[12] In some cases, individuals may hold assets through networks of accounts, trusts. and corporations in multiple countries. The FBAR filing requirements essentially require that each account that an individual owns directly or indirectly and in any country be reported individually on the FBAR.
[13] IRS obtains data on FBARs from FinCEN; like many enforcement procedures, the exact way in which the IRS uses FBARs for tax enforcement is not publicly known.

2011, and 2012, all referred to here as OVD). Our data on the voluntary disclosure programs consist of whether an individual participated in one of the voluntary disclosure programs, the date that an IRS official recorded receiving their application to participate in the program, and the opening and closing dates for the case. We use the first of these dates to determine when an individual participated in the OVD program. In some cases, processing delays could cause the date of receipt of an application to be after the actual submission of the application, and the opening date of the case can be later still, which is important to bear in mind when considering some of the results regarding the timing of OVD participation and the associated income reporting.

5. Aggregate Data Analysis

5.1 Total FBAR and OVD filings

In this section, we present evidence suggesting that the enforcement efforts in 2009 were associated with a sizable increase in tax compliance. In particular, we use information on filings of FBARs and enrollment into the OVD programs to document a sharp increase in disclosures of foreign wealth in 2009 and to show that the increase in disclosures was much stronger for the types of foreign accounts that are *a priori* most likely to be used for tax evasion.

Figure 2 shows the number of individuals filing an FBAR (left axis) and the number of individuals participating in the OVD programs (right axis) in each year over the period 2001-2011. The number of FBAR filers grew from 131,000 filers in 2001 to around 402,000 filers in 2011. There is a noticeable jump in the number of FBAR filers between 2004 and 2005, which is plausibly due to the introduction in 2004 of a penalty for non-willful failure to file an FBAR, and a much larger jump in 2009 coinciding with the enforcement efforts. There were around 15,000 OVD participants in both 2009 and 2011; the two years in the sample period where a voluntary disclosure program was in place. The fact that we record a positive number of OVD participants in 2010 is attributable to the processing delays mentioned in Section 4.2.

Table 1 provides descriptive statistics on FBAR filers and their foreign accounts in 2008 and 2009, highlighting several important properties of the sample. First, recall that all U.S. taxpayers with accounts greater than the threshold size held outside of the U.S. are required to file FBARs, whether they reside in the U.S. or not. Approximately one-third of the FBAR filers were residing outside of the U.S. as indicated by the address reported on the FBAR. We expect that, conditional on having a

foreign account, the probability of using the account to evade U.S. income taxes is higher among individuals living in the U.S. than among individuals living in foreign countries, simply because the latter have a clear transaction motive for holding an account in the country where they live. Second, in 2008 about one-sixth of the FBAR filers reported at least one account in a tax haven, which we define in this paper as the OECD (2000) list of uncooperative tax havens[14] plus Switzerland, Singapore, Hong Kong and Luxembourg. When a taxpayer discloses a tax haven account, this is arguably more likely to represent an increase in compliance because tax haven accounts are known to be largely undeclared for tax purposes (Alstadsæter, Johannesen and Zucman, 2019). Third, a small fraction of FBAR filers (1% in 2008) amends FBARs for previous years. Although there may be cases where taxpayers discover non-deliberate errors on previous years' FBARs and choose to correct them, the filing of amended returns is generally a strong indication of new compliance. Finally, the table shows that many FBAR filers have multiple accounts (59% in 2008 and 65% in 2009), so that the number of reported accounts is almost three times as large as the number of filers in 2008 and almost four times as large in 2009. As of 2008, most reported accounts were located in Europe (45%), North America (28%) and Asia (24%) and most disclosed accounts are relatively small, with values between $10,000 and $100,000 being the most frequent range. The analysis below will devote considerable attention to the change in the nature of FBAR reports around the time of the enforcement efforts.

5.2 New disclosers of foreign accounts

To detect the effect on tax compliance of the enforcement efforts that began in earnest in 2009, we construct an annual measure of new disclosers of foreign accounts. For three reasons, the aggregate number of FBAR and OVD filings reported in Figure 2 do not directly measure this concept. First, the series do not distinguish between new and continuous FBAR filers. Second, the aggregate FBAR series includes taxpayers living outside of the U.S. for whom a non-U.S. account is most often not a "foreign" account but rather is an account in their country of residence, in part to facilitate local transactions. Third, while OVD participants represent new disclosures by definition, they may or may not be included in the number of FBAR filers in the year they apply to participate in the OVD; depending on the precise timing of the application and the processing time at the IRS, the disclosed assets may be recorded on an FBAR for the first time in the application year or in a later year.

[14] The OECD list of tax havens can be found on page 17 of the 2000 progress report found at http://www.oecd.org/ctp/harmful/2090192.pdf

To address these issues, we construct a measure of "new disclosers" of foreign accounts, which comprises two distinct groups: "OVD filers" in year *t* who are counted in the year they file an OVD application regardless of their FBAR filings; and "first-time FBAR filers" in year *t*, defined as tax payers that file an FBAR in year *t* and did not file an FBAR in years *t*-1, *t*-2 and *t*-3. To avoid double counting, the latter group excludes taxpayers who participated in an OVD at any time during the sample period and taxpayers with non-U.S. addresses.

Figure 3 reports statistics on these groups of new disclosers over the period 2005-2011. Figure 3.A. shows that the annual number of new disclosers hovered at about 40,000 individuals in each of the years from 2005 to 2008, and then surged to around 90,000 individuals in 2009. The increase of about 50,000 contains about 15,000 OVD participants, but mostly reflects individuals who file a new FBAR outside of the OVD program. There was another surge in first-time FBAR filing in 2011 coinciding with the second OVD program, but again the majority of new filers did so outside of the OVD program.

Figure 3.B shows the aggregate value of the accounts reported by the new disclosers.[15] The value was between $20 and $28 billion in the years 2005-2008 with a slightly increasing trend after 2006, but in 2009 jumped by a factor of over four and a half to $135 billion, and then returned to $40 billion in 2010. These data patterns suggest that the enforcement policies in 2008-2009 had a significant effect on new disclosers of foreign accounts. Simple difference estimates suggest that the policies induced around 50,000 taxpayers to disclose accounts with a total value of around $100 billion, with three-quarters of the response occurring in the form of quiet disclosures outside of the OVD program.

5.3 The characteristics of newly disclosed accounts

The spectacular surge in the number of taxpayers who filed an FBAR for the first time in 2009 without

[15] There are a number of measurement issues. First, prior to 2009, FBAR filers were not required to report exact account values, but were asked to choose between four value ranges: below $10,000, between $10,000 and $100,000, between $100,000 and $1 million, and above $1 million. We impute aggregate values before 2009 by assuming that the (unobserved) distribution of values within each range was the same as the (observed) distribution in 2009. Second, on a few FBARs, reported account values are so extremely large that they almost certainly reflect typing errors. For instance, in a number of observations the FBAR account value was concatenated with the account number from the next line, so that the FBAR account value appeared to be in the trillions of dollars. We address this issue by trimming account values at $1 billion. Third, our OVD dataset does not contain information on the precise value of the disclosed assets. For OVD filers in year *t*, we approximate this with the aggregate value of the accounts reported on the FBAR in year *t* (or in year *t*+1 if no FBAR is filed in year *t*) minus the value of the accounts reported in year *t*-1 (if any). This procedure is reasonable given that OVD participants were required to file delinquent FBARs.

participating in the OVD initiatives suggests that the enforcement efforts induced a significant number of quiet disclosures of foreign accounts previously used for tax evasion. To further probe this interpretation, we describe the heterogeneity of the surge along two dimensions, account country and account value. Throughout we exclude OVD participants, to focus on potential quiet disclosers.

First, in Figure 4, we plot the increase in the number of new filers in 2009 along two dimensions: whether or not the FBAR filer reported a U.S. address on their FBAR, and whether or not the filer disclosed an account located in a tax haven according to our definition. If the primary cause of increased disclosures by U.S. filers in 2009 depicted in Figure 3 was not enforcement but, rather, coincident shocks affecting both U.S. and non-U.S. residents—e.g. the economic turbulence of 2009—we should observe similar trends in first-time FBAR filers among the two groups.

Even among filers with U.S. addresses, we might expect some people to hold a foreign account for legitimate reasons. Moreover, filers not holding an account explicitly for evasion might be affected by enforcement, especially the increased salience of FBAR reporting requirements in 2009, so it is useful to know whether the increase in new filers in 2009 could be entirely due to filers who are not deliberately evading taxes. We cannot directly observe whether an account is held for evasive purposes or not; instead, we split the sample by whether or not new filers disclosed an account in tax havens to help us assess this issue.

The results in Figure 4 suggest that a large portion of new disclosures were previously evasive accounts. The four series plotted in the Figure all have very similar trends in the period 2005-2008, but diverge sharply in 2009. We observe a 65% increase for filers with U.S. addresses and no haven accounts, and a 200% increase for filers with U.S. addresses and haven accounts. In contrast, we observe little change in the number of disclosures by filers with non-U.S. addresses—whether or not they have haven accounts. The stark increase in disclosures of tax haven accounts for filers with U.S. addresses suggests that a significant fraction of the new FBAR filers were previously evading taxes through their foreign accounts. Motivated by this result, the remainder of this analysis excludes taxpayers reporting an address outside of the U.S. (whose non-U.S. accounts are less likely to be used for tax evasion purposes), in order to focus more precisely on potential quiet disclosers.

Second, in Figure 5, we further highlight the difference between FBAR reporting in tax havens (red bars) and non-havens (blue bars) by displaying the percent change from 2008 to 2009 in the number of first-time FBAR filers reporting accounts in individual countries. Individuals with accounts

in multiple countries are counted multiple times, once for each country in which they have an account. Clearly, increases were disproportionately concentrated in havens. For example, the number of new FBAR filers disclosing an account in the notorious tax haven of the Cayman Islands increased by more than 4,000 filers from 2008 to 2009, for an increase of over 1000%!

Third, in Figure 6, we show the number of new FBAR filers within account size categories. Individuals with multiple foreign accounts are placed into a category based on their largest reported account. The increases in 2009 were larger for those reporting larger accounts, which are more likely to serve wealth storage purposes, and much more modest for smaller account sizes (below $100,000), which are more likely to be transactional accounts. The largest relative surge was among those reporting accounts over $1 million. In sum, by showing that the surge in first-time FBAR filings in 2009 was particularly pronounced for accounts that were more likely used to evade taxes, accounts in tax havens and accounts with large balances, Figures 4-6 constitute further evidence of a surge in quiet disclosures at the time of the enforcement initiatives.

Online appendix Figure A.1 reports one additional piece of evidence of the number of quiet disclosures in 2009, relating to the decision to file amended FBARs to correct prior non-compliance. In Figure A.1, we show the number of new disclosers who filed amended and non-amended FBARs without participating in the OVD program. The number of filers with amended FBARs was relatively constant over the period 2005-2008, but increased by 600% in 2009. In absolute terms, however, the increase was modest, from around 1,000 amendments pre-2009 to around 7,000 amendments in 2009. This suggests that most of the taxpayers disclosing quietly in 2009, estimated at around 35,000 in Section 5.2, did not at the same time amend their FBARs for previous years.

5.4 The intensive margin of disclosure

The analysis to this point has focused on disclosures on the extensive margin of FBAR reporting: individuals who did not report their foreign accounts before 2008, but started reporting in 2009, apparently in response to enforcement. Next, we investigate whether there are also quiet disclosures on the intensive margin: individuals who reported some foreign accounts before 2008 (for instance, small accounts in non-havens serving transactional purposes), but in 2009 started reporting additional accounts (for instance, large accounts in havens serving wealth storage purposes).

To explore this behavioral response, we define three indicators of potential quiet disclosers

among taxpayers who did not participate in the OVD program: (i) FBAR filers who reported exactly one account in year *t*-1 and at least two accounts in year *t* ("new multiple account holders"); (ii) FBAR filers who reported only accounts below $100,000 in year *t*-1 and at least one account above $1 million in year *t* ("new large accounts"); and (iii) FBAR filers who reported only non-haven account(s) in year *t*-1 and at least one haven account in year *t* ("new haven account holders"). Figure 7 shows only slightly increasing trends from 2005 to 2008, followed by sharp increases in 2009 for all three groups: new multiple accounts increased by 63%; new haven accounts increased 70%; and new large accounts increased by 160%. These patterns are clearly consistent with a large increase in quiet disclosures in 2009 on the intensive margin.

5.5 The decision to participate in the OVD Program, conditional on disclosure

For a taxpayer who decides that continued evasion is too risky in the new post-2009 enforcement environment, the decision to disclose quietly or participate in the OVD should weigh the risks and penalties associated with each option. As discussed in Section 3, OVD effectively eliminates the risk of criminal prosecution and the harshest possible penalties, but it also subjects the taxpayer to the OVD's reduced offshore penalty with certainty in addition to back taxes. Theory therefore suggests that the accounts with the highest probability of prosecution conditional on quiet disclosure should be the ones in which taxpayers participate in OVD. We hypothesize that, relative to quiet disclosure, OVD participation is more likely to be attractive for the largest accounts, and for accounts in locations where the enforcement crackdown was especially strong, most notably Switzerland.

In order to compare quiet disclosers to OVD participants, it is useful to have a more refined way to estimate the characteristics of FBARs filed in response to enforcement, as not all new FBAR filers in 2009 were induced by enforcement, and the above analysis suggests that the characteristics of quiet disclosers may differ from that of other new FBAR filers in 2009. To do this, we assume that in the counterfactual where the 2009 crackdown did not occur, 1) the overall number of new filers and 2) the distribution of characteristics of new filers would have been the same in 2009 as in the actual population of new filers in 2008.[16] We label individuals who filed because of the enforcement crackdown in 2009 "FBAR compliers."[17] By the first assumption above, we calculate the number of

[16] We observe from Figures 3, 4, and 6 that the number and characteristics of new FBARs filed was relatively stable from 2005 to 2008, which suggests that these assumptions are correct up to a reasonable approximation.

[17] We use this term to distinguish between all new filers in 2009 and the subset that were induced to file by the enforcement initiatives. The latter may include some "FBAR-only" compliers, who had been reporting income and remitting taxes

FBAR compliers as the simple difference between the number of new FBAR filers in 2008 and 2009. By the second assumption, we compute the probability of some characteristic occurring among FBAR compliers as the change in new FBAR filers with the characteristic scaled by the number of FBAR compliers.[18]

In Figure 8, we show how account characteristics vary across quiet and non-quiet disclosures. Panel A shows that FBAR compliers had significantly higher account values than new FBAR filers overall, but also that the OVD participants had still larger account values. This finding is consistent with the hypothesis that OVD participants should have larger account values than FBAR compliers, as larger account values are associated with a larger probability of detection. Panel B shows that around 45% of OVD participants disclosed a Swiss account, compared to less than 10% of FBAR compliers. In sharp contrast, over 10% of FBAR compliers disclosed an account in the Cayman Islands, compared to a negligible share of OVD participants. As the enforcement efforts in 2009 targeted accounts in Switzerland, but not those in the Cayman Islands, the patterns are consistent with our hypothesis about the role of prosecution risk in shaping the mode of disclosure. Figure 8.B suggests that, although they are less important overall, OVD disclosures were much more concentrated in Liechtenstein and Luxembourg than quiet disclosures. Tax evaders may have perceived these countries as risky as they both signed information exchange treaties with the U.S. in 2008 and Lichtenstein was home to the first leak of customer data from an offshore bank in the same year (Johannesen and Stolper, 2017).

6. The Response of Reported Capital Income

To this point, we have focused on the impact of the enforcement initiatives on reported foreign accounts. Of more direct tax policy interest is the effect of enforcement on income reported, and subjected to tax, on U.S. tax returns. It is conceivable, although inconsistent with evidence above, that our results to this point could be obtained without an increase in income tax compliance, if individuals filing new FBARs had been paying tax on the income in those accounts but failing to declare them on

correctly all along. Regardless of whether they are engaging in a true quiet disclosure, these taxpayers are newly compliant with the FBAR filing rule, and they are compliers in the sense of the Imbens and Angrist (1994) treatment effects framework.

[18] For example, suppose the overall number of new filers increases from 40,000 to 90,000 from 2008 to 2009—an increase of 50,000. Suppose further that among filers with accounts in some haven country *C*, disclosures increased from 4,000 in 2008 to 14,000 in 2009—an increase of 10,000. Our assumptions would imply that of the 50,000 FBAR compliers, 10,000, or 20% of all FBAR compliers, disclosed an account in *C*.

an FBAR. In this section, we analyze capital income reporting behavior, by linking individuals' income tax returns with their FBAR reports and information on OVD participation.

We examine whether the disclosure of an account was associated with increased reported financial capital income for two groups of disclosers: OVD participants and first-time FBAR filers with U.S. addresses outside the OVD program. To remove confounding trends due to the business cycle, we difference reported income in this group against a comparison group, who owned offshore wealth but were compliant before the enforcement crackdown. Specifically, our comparison group consists of individuals that filed FBARs continuously from 2006 to 2009 *and* reported the same number of accounts on their FBARs in each of these years. The latter restriction helps purge the comparison group of intensive margin compliers of the type discussed in Section 5.4.[19]

We analyze data on reported incomes for these groups for four years before and four years after each group's initial disclosure of an offshore account in 2009. Specifically, we estimate a flexible difference-in-differences (DD) model of the form

$$f(y_{it}) = \alpha + \sum_{\substack{s=-4, \\ s\neq -1}}^{4} \beta_s D_{it}^s + \omega_i + \delta_t * agegrp_i + \varepsilon_{it}\,, \qquad (1)$$

where D_{it}^s are event-time dummies equal to 1 when an individual is observed in the disclosure group in year s; s=*0* is the year of disclosure. We estimate the same specification separately for OVD participants and other first-time FBAR filer group; the comparison group is the same throughout. Our specification also includes individual fixed effects, ω_i, and year fixed effects, δ_t, interacted with age groups. The interaction of year fixed effects with age groups helps to control for life-cycle wealth accumulation and career paths.[20] The coefficient β_s represents the change in income from the year before disclosure, s=*-1*, to year s. Under the assumption that aggregate shocks to the various age groups affect the disclosure and comparison groups in the same way before and after the event, we can interpret β_s as the change in income attributable to new disclosures of offshore accounts. We examine various sources of income as the outcome y_{it}; we expect to observe impacts for capital income flows specifically. To accommodate zeros and, in some cases, negative values (due to capital

[19] Removing the latter restriction from the comparison group yields very similar results. The point estimates of interest are slightly smaller if we remove the restriction on the number of accounts being reported by continuous filers, which is consistent with the presence of increased tax compliance among some continuous FBAR filers.
[20] Age groups are defined as of year 2010 and are 25-40 years, 41-50 years, 51-60 years, and 61-80 years.

losses) of the dependent variable, we use an inverse hyperbolic sine (IHS) transformation. For positive ranges of y_{it}, the coefficients of the event-time dummies can be interpreted exactly like a log specification. Interpreting the results in the presence of an effect on the propensity to report zero capital income is more complicated. Nonetheless, we prefer the IHS transformation because we believe it is more appropriate to assume that the underlying trends are parallel in approximately logarithmic terms, but we do not wish to exclude zeros, as doing so can introduce bias and, as we show in Online Appendix Figures A.2 and A.3, individuals reporting zero in the pre-disclosure period are apparently an important part of the effects of the policy.[21]

Table 2 presents statistics on the incomes of individuals in the two disclosure groups and the comparison group in the year before their disclosure of an offshore account (s = -1 in equation (1)). These individuals have very high incomes compared to the rest of the U.S. tax filing population, although they do not all have the extremely high level of income some popular characterizations of offshore account holders might suggest. About 60% of either OVD participants or new FBAR filers are in the top 10% of the income distribution. Median annual income (as measured by adjusted gross income) is about $160,000 in each group. However, at the top of the income distribution in both disclosure groups we examine, there are some very high-income individuals. The 90th percentile of income is almost $1.25 million among OVD participants and $885,000 for other new FBAR filers, an income level that puts all of these individuals in the top 0.5% of the overall U.S. income distribution by a considerable margin.

6.1 Reported income response of OVD participants

To establish the validity of our DD method, as well as to learn about the reported income responses of admitted non-compliers upon the time of disclosing an account, we first apply this method to 2009 OVD participants. Figure 9 plots estimated coefficients on the event time dummies and corresponding 95% confidence intervals for various income sources (Table A.1 reports the regression coefficients). The first panel shows results for reported interest income, dividend income and capital gains. OVD participants and the comparison group exhibit very similar trends in all three outcomes in pre-disclosure years but diverge sharply following disclosure. For interest income, we observe a coefficient

[21] Using instead a traditional log transformation and simply dropping zero and negative observations gives similar results (see, e.g., Table A.2).

of 1.06 for event time 1 corresponding to an increase of approximately 189%.[22] The corresponding estimates are 0.49 (63%) for dividend income and 0.21 (23%) for capital gains. The second panel shows the results for total financial capital income, which combines interest, dividends, and capital gains. We observe a coefficient in event year 1 of 0.75 (112%).[23]

These patterns indicate, unsurprisingly, that disclosures through the OVD program were associated with large increases in financial capital income reporting. We return to these estimates below when we estimate the compliance effect of the enforcement initiatives in terms of reported taxable income and tax revenue. Additionally, we find an increased propensity to report any capital income at the time of disclosure. By estimating Eq. (1) using a binary dependent variable indicating whether the individual reported any positive capital income as the outcome, we find a 2.9 percentage point increase in the probability of reporting any positive capital income (see Figure A.2.B).

6.2 Reported income response of other 2009 first-time FBAR filers

We now turn to the group of individuals that we suspect contains a large number of previously non-compliant individuals: first-time FBAR filers with U.S. addresses who did not participate in an OVD program. We therefore compare the qualitative and quantitative patterns observed in Figure 9 with the income reporting patterns around first-time FBAR filing, defined in exactly the same way as in the previous subsection.

Figure 10 plots the coefficients and corresponding 95% confidence intervals for the event study of various types of income for first-time FBAR filers. Online Appendix Table A.3 shows the estimated coefficients. In most respects, the patterns are very similar to those observed for OVD participants, with large increases in reported capital income at the time of first-time FBAR filing and virtually no changes in other types of income. The magnitudes of the estimated percentage change for capital income components are slightly smaller compared to the OVD group, but surprisingly similar given that the increases seen for voluntary disclosure program participants consist entirely of admitted non-compliers, and the group of first-time filers admitted no non-compliance and likely contains

[22] This approximation is the exponential of the coefficient minus 1. We use this approximation because the IHS transform approximates the log transformation for positive values of the outcome variable. Refer to the discussion of equation (1)) for more details.

[23] We show in the online appendix Figure A.2 that repeating this exercise for wage and salary income, income from sole-proprietorships (1040 Schedule C) and income from pass-through businesses (1040 Schedule E) reveals no differential income reporting following disclosure.

people who were previously compliant. The estimated coefficient in event year 1 is 0.62 (86%) for interest income, 0.20 (22%) for dividend income and 0.10 (10%) for capital gains income. These are all at least 50% of the estimated increase for voluntary disclosure program participants. We estimate a coefficient in event year 1 of 0.49 (63%) for total financial capital income. A larger amount of the response in total financial capital income in this group comes from the extensive margin: we estimate a 4.2 percentage point increase in the probability of reporting any positive financial capital income. [24]

Because only a subset of this group filed an FBAR because of enforcement, we interpret the effects presented in Figure 10 and Table A.3 as the reduced form estimates of a two-stage model like the instrumental variables model of Imbens and Angrist (2004). In the first stage, enforcement induces disclosures of a set of compliers to file FBAR (see Section 5.6). In the second stage, enforcement-driven disclosures lead to increased reported income. The exclusion restriction here requires that income does not jump when a legitimate first-time FBAR filer discloses an account. In this case, we can estimate the effect of disclosure on reported income of compliers by scaling the estimates in Figure 10 by the fraction of the 2009 first-time FBAR filers who were compliers, just as one divides a reduced-form estimate by the first-stage estimate to obtain a local average treatment effect. From Figure 3.A, we concluded that roughly 50 percent of the approximately 75,000 first-time FBAR filers in 2009 were compliers who disclosed because of enforcement. The exact estimate based on a simple difference from 2008 to 2009 is 46 percent. The estimate of the effect of enforcement on the compliers for each type of income would therefore be around twice as large as the estimates depicted in Figure 10 and reported in Table A.3—the implied point estimate for total financial capital income in event year 1 is 1.05. This effect is similar to, but slightly larger than, the comparable estimate for OVD filers.[25]

With respect to the validity of the research design we observe that, unlike with the OVD participants, there are slightly increasing trends in the pre-disclosure period for interest and dividend income. This is not entirely surprising, given that some portion of first-time FBAR filers will be legitimately opening new accounts. We might thus expect that the timing of the first filing contains information about the income path prior to filing. Nevertheless, we see a large, sharp jump in capital

[24] We also find little to no estimated change in wages and salary income or income of sole proprietorships and other forms of pass-through business income as reported on 1040 Schedules C and E, respectively. The results for these income sources and for the probability of reporting positive capital income can be found in the online appendix Figure A.3.
[25] An alternate estimate in Online Appendix Table A.9, puts the fraction of quiet disclosers that are compliers at 62 percent. Scaling by this number instead gives an estimate for total income of 0.79, which is very close to that of the OVD sample.

income at first-time filing, which is a clear break from trend for each type of capital income. The size of this jump suggests that the magnitude of the bias from slightly divergent pre-trends is likely small.

We next provide further evidence that the increases in reported income accompanying account disclosures did indeed result from disclosures of foreign accounts and not some confounding source. To do so, we leverage the fact that interest and dividend income from assets held in the US are already subject to third party information reporting from US financial institutions. Forms 1099-INT and 1099-DIV report the amount of interest and dividend income accruing to taxpayers in their US accounts. We therefore decompose total reported interest and dividend income from the individual's tax return into income reported by US financial institutions, and income reported by the taxpayer but not reported by domestic financial institutions. For both interest and dividends, we calculate the total domestic income as the sum of the Form 1099 income received by the taxpayer (including that of the taxpayer's spouse for married taxpayers filing jointly), and we impute reported income from foreign sources as the difference between the total income reported by the taxpayer and the domestic income reported on 1099 forms.[26] We then estimate our event study specification on each type of income separately. We do not analyze capital gains here, as directly held capital gains and losses in domestic accounts were not subject to complete information reporting until 2011, and even then only for assets acquired after January 1, 2011. Figure 11 depicts the results, with the point estimates reported in Table A.5. In Figures 11.A and 11.B we observe that the estimated effects on overall reported interest and dividend income are disproportionately driven by income *not* appearing on Form 1099 domestic information reports, and are thus almost certainly driven by reporting of foreign accounts.

We investigate one additional margin of response to enforcement: the extent to which individuals amended earlier income tax returns to report previously unreported income, without participating in an OVD program or paying the associated penalties. Studying amended returns provides evidence about a margin of response quiet disclosers may consider, and it provides strong evidence on the existence of quiet disclosure responses, as there is no other reason we should expect an increase in amended returns upon filing a new FBAR. We estimate a linear probability model like Eq. (1), with an indicator for filing an amended tax return for one of the last four years in year t as the outcome (see Online Appendix Figure A.5). We estimate no differential pre-trend. Filers are 3.3

[26] Adding income from pass-through entities reported on Schedule K-1's to the 1099 income for our concept of third-party reported income has little effect on the results. Relatedly, it is unlikely that the $10 minimum for issuance of a domestic 1099 form for interest or dividend income affects the results.

percentage points more likely to submit an amended tax return when they file a new FBAR, relative to the comparison group. This represents a doubling of the rate of filing an amended tax return: the rate of amendment in the reference period (*t*-1) is 3 percent. This result suggests that almost 50% of individuals filing amended tax returns when they file a new FBAR are quiet disclosers.

6.3 The total effect of enforcement

In this section, we use the event study results above to estimate the implied effect on total reported capital income and tax revenues for OVD participants and first-time FBAR filers.[27] We use two related methods of estimating the total effects and ultimately present a range of estimates for the effect of the enforcement initiatives on capital income reporting and revenue collections.[28]

6.3.1 Direct method

What we call the "direct method" of estimating the total effect of enforcement uses the average effects from the results in Section 6.1 and 6.2 to estimate the change in total reported capital income for OVD participants and first-time filers. Specifically, we assume a uniform effect of disclosure in IHS terms to impute a counterfactual reported capital income in year *t*+1 for each individual in the disclosure group. The counterfactual of total reported income, Y_{cf}, is calculated as $Y_{cf} = \sum_i f^{-1}(f(y_i) - \beta_y)$, where $f()$ is the IHS transformation, y_i is reported income of individual i in the disclosure group in year *t*+1, and β_y is the *t*+1 estimated coefficient from the event study for income source y. We estimate the total change in reported income attributable to enforcement as the difference between total income actually reported and the counterfactual total. To facilitate the analysis of tax revenues, we estimate total effects separately for interest, dividends, and capital gains; the results are similar if we apply the method to total financial capital income.

The top row of each of the three panels of Table 3 shows the results from this method; details of the calculation can be found in the online appendix Table A.7. For OVD participants, we estimate a change in total reported capital income of almost $700 million. For first-time filers, our estimate is about $3.5 billion. Assuming non-qualified dividends and short-term capital gains are negligible, so that all dividends and capital gains are taxed at a top marginal tax rate of 15 percent, our calculation

[27] Our measure of the total effect on tax revenue does not account for some ways in which taxpayers might change other income tax reporting to offset the impact on their tax liability of reporting additional income, as in Slemrod et al (2017). Our results suggest that some forms of offsetting, such as reduced reporting of business income, are uncommon.
[28] Our revenue estimates only account for federal income taxes and not for income taxes imposed in some U.S. states.

suggests that OVD participants incurred $184 million more in taxes due to their disclosure of offshore wealth, while other first-time FBAR filers owed $1 billion more in taxes.[29]

6.3.2 Indirect method

In this section we discuss potential bias in the previous approach and implement a complementary, indirect approach. We model the change in reported capital income accompanying a disclosure as

$$\Delta y_i = d_i r_i V_i, \qquad (2)$$

where Δy_i is the change in reported income (in dollars), d_i equals one if the individual was non-compliant prior to disclosure and zero otherwise, r_i is the taxable rate of return (excluding unrealized capital gains), and V_i is the newly reported account value. Dividing by a baseline (non-zero) value $y_{i,t-1}$ yields

$$\frac{\Delta y_i}{y_{i,t-1}} = d_i r_i \frac{V_i}{y_{i,t-1}}. \qquad (3)$$

In Figure A.6, we show that in our data the ratio $V_i/y_{i,t-1}$ is decreasing in $y_{i,t-1}$. Assuming homogeneous effects in our direct method therefore imposes an effect that is too large at the top of the income distribution and too small at the bottom. As the capital income distribution has a thick top tail (Piketty, 2013), using an approach that overestimates the effect at the top likely over-estimates the total effect. The first key assumption of our indirect approach is that the ratio $V_i/y_{i,t-1}$ does not co-vary with $d_i r_i$, i.e. $cov(d_i r_i, V_i/y_i) = 0$. Taking expectations of Eq. (3) and applying this assumption, we have

$$E[d_i r_i] = \frac{E[\Delta y_i/y_{i,t-1},]}{E[V_i/y_{i,t-1}]}. \qquad (4)$$

We estimate the numerator of the right-hand side of Eq. (4) in the regressions in Section 6.1 and 6.2, and we estimate the denominator directly.[30] We can thereby estimate $E[d_i r_i]$, which we will call the *compliance-adjusted rate of return*, separately for OVD participants and first-time FBAR filers. Our second

[29] Note that these tax liabilities are calculated for a single year following disclosure of an offshore account. These figures do not include any back taxes or penalties that are paid by the taxpayer as a result of disclosure. The total effect we estimate is thus the annual forward-looking effect from voluntary tax compliance not counting the penalty components of the payments made during participation in the OVD program or amending of tax returns.

[30] When calculating statistics for the ratio V_i/y_i , we exclude observations with zero or negative y_i, and, due to the extreme skew of the distribution from observations with a very small denominator, we trim the distribution at its 95th percentile.

key assumption is that $d_i r_i$ does not vary by offshore wealth: $cov(d_i r_i, V_i) = 0$. Under this assumption we can apply the estimates of $E[d_i r_i]$ to estimate the total change in income reporting (the sum of Δy_i using Eq. (2)). Most plausible ways in which our two zero-covariance assumptions would fail—e.g. if those with larger accounts or higher income earn higher rates of return (Piketty, 2013) or are more likely to be ex ante noncompliant—imply that this method gives a lower bound on the total effect.

The results of this approach are summarized in the second row of each panel of Table 3—see Table A.8 for details. This method yields an estimate of a change in reported capital income of approximately $450 million for OVD participants and $1.5 billion for first-time filers. These estimates of the total effect of enforcement are smaller than what we obtain from the direct method. This is consistent with the intuition discussed above that the direct and indirect approaches are likely to provide upper and lower bounds on the total effect, respectively.

Finally, we note that estimates from the direct and indirect methods imply sensible values for the rates of return. As reported in Table 3, with details provided in Tables A.7-A.9, the compliance-adjusted rates of return we estimate, in the range of 1 to 3 percent, are reassuringly reasonable. Our estimates reflect increases in *taxable* income and are therefore not immediately comparable to *market* returns. First, to the extent that some new FBAR filers were fully tax compliant, their compliance-adjusted return was zero. Second, to the extent that quiet disclosers did not realize capital gains or adopted the well-known avoidance strategy of selling stocks with latent losses and keeping stocks with latent gains (Shefrin and Statman, 1985), capital gains do not enter our estimates.[31]

7. Conclusion

We find that enforcement initiatives on the taxation of offshore wealth increased the number of individuals reporting foreign accounts to the IRS by around 50,000 taxpayers and increased the total amount of wealth disclosed by about $100 billion. Most of this response occurred outside of the Offshore Voluntary Disclosure programs. Even outside the OVD programs, newly disclosed accounts were disproportionately concentrated in countries often characterized as tax havens. Overall patterns of response suggest that the increase in foreign account reporting reflected an increase in tax

[31] Market returns in 2009 indeed consisted largely of capital gains: interest rates were generally low (e.g. 0.1% return on a 3-month bill) and while stock market returns were high (e.g. 25% return on S&P 500), only a small fraction was dividends (e.g. 2.5% on S&P 500).

compliance.

The reporting of new foreign accounts coincided with substantial increases in financial capital income flows reported on tax returns, even for those who never participated in a voluntary disclosure program. Our results suggest that a number of individuals made quiet disclosures to avoid the significant penalties that would be otherwise be due under the voluntary disclosure program. In total, we estimate that enforcement efforts led individuals to report $2 to $4 billion annually in total financial capital income, which corresponds to an increase in tax revenues of $570 million to $1.25 billion annually. On the whole, these results imply that the increase in tax compliance induced by this set of policy initiatives was significantly larger than suggested by official statistics based solely on backward-looking information about tax and penalty payments made under the voluntary disclosure programs (e.g. IRS, 2014).

Our estimated total effect of enforcement is sizable, but small relative to independent estimates of the amount of concealed offshore wealth and capital income overall (Zucman, 2013; Alstadsæter, Johannesen and Zucman, 2018). An increase of $100 billion in disclosed wealth would constitute 10% of total US-owned offshore wealth as estimated in prior work.[32] Significant non-compliance likely remained after the enforcement initiatives studied in this paper were implemented. However, the policy regime in the period we study was one of targeted enforcement. Further research should examine the subsequent, more comprehensive enforcement efforts undertaken by the U.S. and other countries, and also account for the compliance costs of these policies.

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[32] We note that the 10% figure is a lower bound because it does not include potential repatriation of offshore assets.

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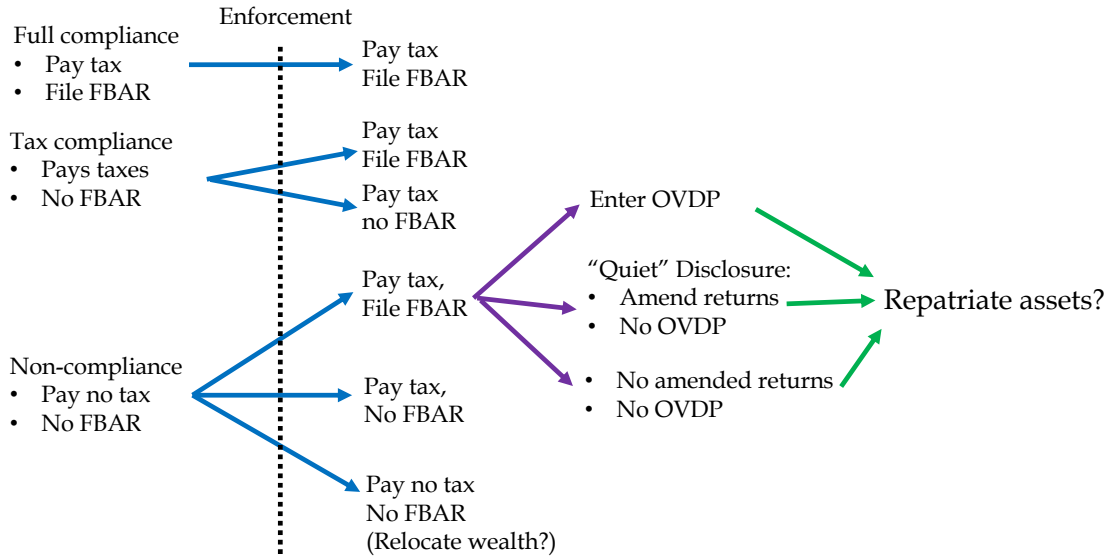
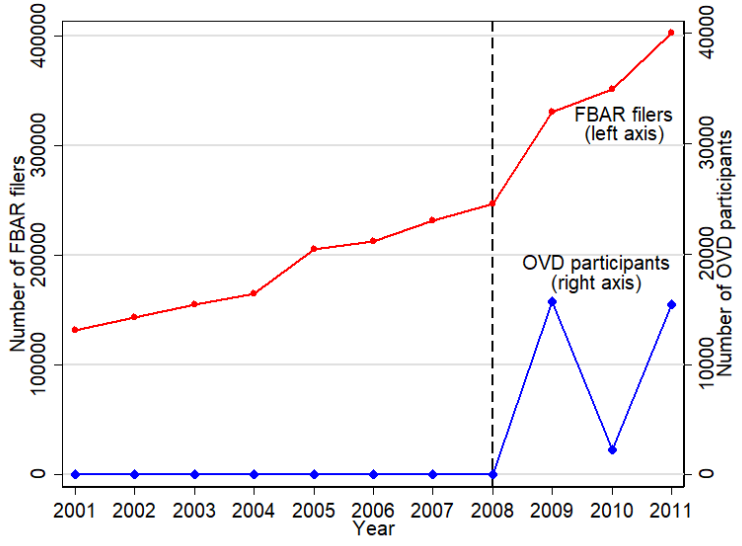
Figure 1. Decision-Making over Tax Compliance with Foreign Assets and the 2008-2009 Enforcement Initiatives



Notes: This figure illustrates the decisions faced by individuals with foreign accounts in following 2008-2009 enforcement efforts. The first column divides individuals into three groups based on their compliance with FBAR filing and/or tax obligations. The second column examines the potential responses of each group to enforcement. The third column examines the additional decision by a previously non-compliant individual who opts to come into compliance over how to do so. We note that there are some potential behaviors not covered by this figure; the intention is to convey here the most likely behavior given the institutional environment.

Figure 2: FBAR Filers and OVD Participants



Notes: This figure plots the total number of individuals disclosing foreign bank accounts by filing FBARs on the left axis and the total number of individuals participating in a Offshore Voluntary Disclosure (OVD) program on the right axis by year. We observe a gradually increasing trend in the number of FBAR filers prior to 2008, and a sharp increase in 2009. The increase in 2009 is much larger than the number of OVD participants.

Figure 3: New Disclosers of Foreign Accounts

Figure 3.A. Number of new disclosers

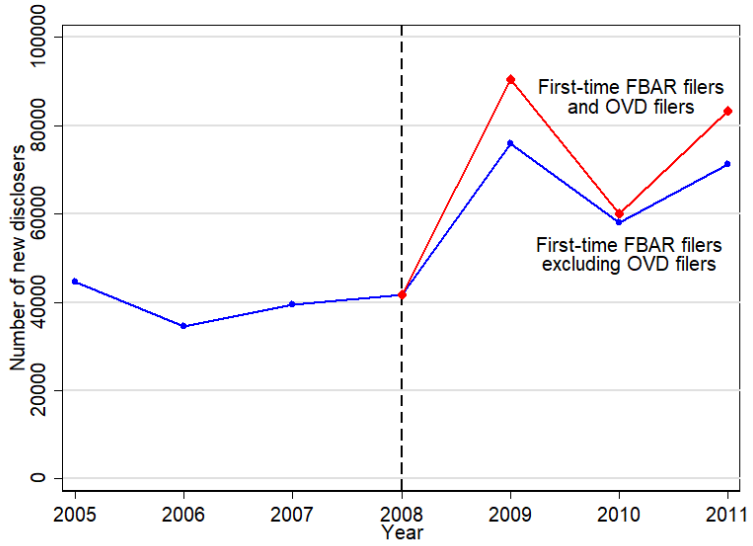
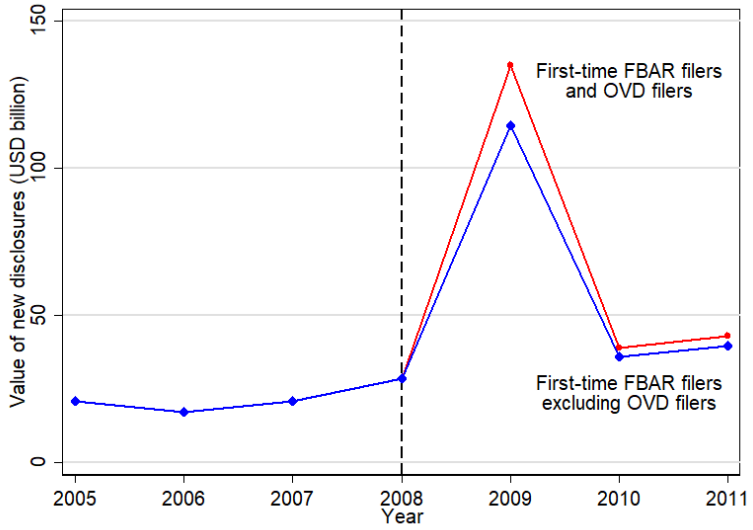
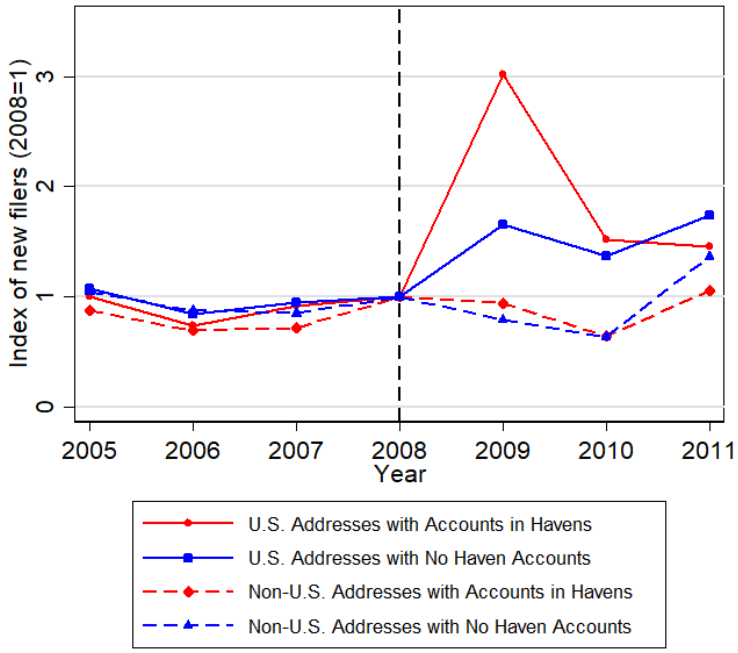


Figure 3.B: Value of accounts disclosed by new disclosers



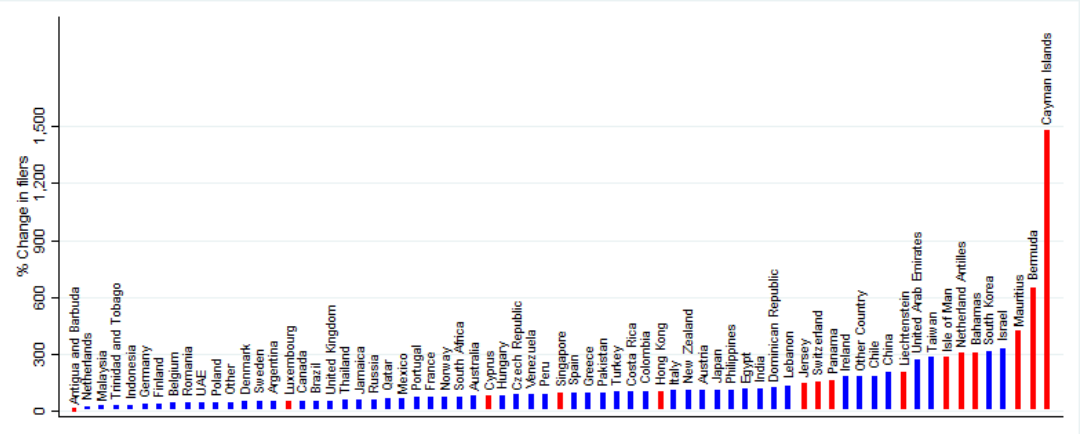
Notes: This figure describes aggregates related to "new disclosers" of foreign accounts by year. The group of "new discloser" in year t comprises "OVD filers" in year t and "first-time FBAR filers" in year t (defined as taxpayers with U.S. addresses that file an FBAR in year t and did not file an FBAR in years t-1, t-2 and t-3). Panel A plots the number of new disclosers excluding OVD filers (blue line) and including OVD filers (red line). Panel B plots the total account values disclosed by new disclosers excluding OVD filers (blue line) and including OVD filers (red line). We observe a sharp increase in new filers and reported assets in 2009, only a small portion of which is accounted for by OVD participants.

Figure 4: First-time FBAR Filers - Haven v. Non-Haven Account Holders, by U.S. vs Non-U.S. Addresses



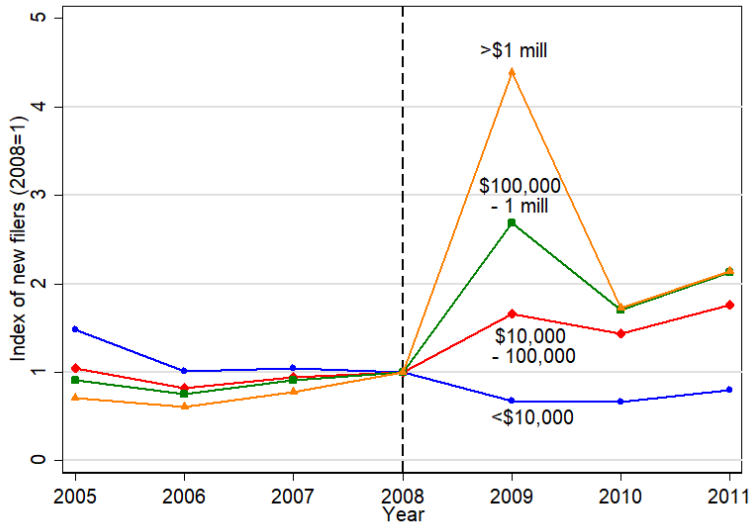
Notes: This figure plots the number of "first-time FBAR filers" by year (defined as taxpayers that file an FBAR in year t and did not file an FBAR in years t-1, t-2 and t-3) normalized by the 2008 level. Series are plotted separately by whether the FBAR filer reports having a U.S. or non-U.S. address and by whether the FBAR filer reports holding an account in a tax haven. OVD participants are excluded from the tabulations in all years. We define tax havens using the OECD (2000) list of uncooperative tax havens plus Switzerland, Singapore, Hong Kong and Luxembourg. The 2008 levels for each category are: 5,025 for U.S. filers with haven accounts; 36,649 for U.S. filers with no haven accounts; 4,804 for non-U.S. filers with haven accounts; 23,272 for non-U.S. filers with no haven accounts.

Figure 5: Percent Change in First-time FBAR Filings, 2008-2009, by Country



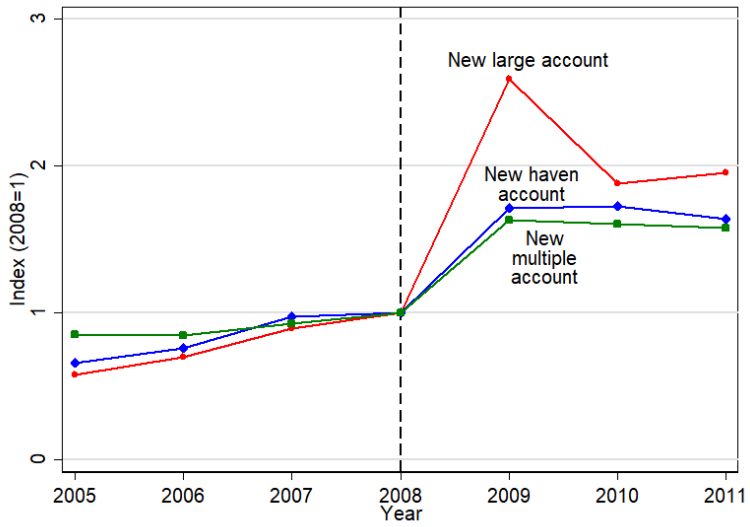
Notes: This figure plots the percent change from 2008 to 2009 in the number of "first-time FBAR filers" (defined as taxpayers that file an FBAR in year t and did not file an FBAR in years t-1, t-2 and t-3) by the country in which new filers reported accounts. OVD participants and non-US address filers are excluded from the tabulations. Tax havens are shown with red bars; we define tax havens using the OECD (2000) list of uncooperative tax havens plus Switzerland, Singapore, Hong Kong and Luxembourg. We exclude countries with fewer than 50 new filers in 2008.

Figure 6: First-time FBAR Filers, by Account Value, 2005-2011



Notes: This figure plots the number of "first-time FBAR filers" (defined as taxpayers that file an FBAR in year t and did not file an FBAR in years t-1, t-2 and t-3) by year and by the value of the largest account disclosed. All series are normalized by the 2008 level. OVD participants and non-US address filers are excluded from the tabulations. The 2008 levels are 6,059 filers, 25,427 filers, 8,893 filers, and 1,295 filers for the four categories, respectively, in ascending order of the account value categories.

Figure 7: Additional Account Disclosures for Previous FBAR Filers



Notes: This figure plots the number of taxpayers in year t who filed an FBAR in year t-1 and discloses at least one additional account on the FBAR filed in year t. We count individuals who previously disclosed only one account and start declaring multiple accounts (green line), individuals who previously disclosed only non-haven accounts who start disclosing haven accounts (blue line), and individuals who previously only disclosed small accounts and start disclosing large (>$1 million) accounts (red line). OVD participants and non-US address filers are excluded from the tabulations. All series are normalized by the 2008 level. We define tax havens using the OECD (2000) list of uncooperative tax havens plus Switzerland, Singapore, Hong Kong and Luxembourg.

Figure 8: Account Characteristics among OVD Participants and FBAR Compliers

Figure 8.A. Account Value

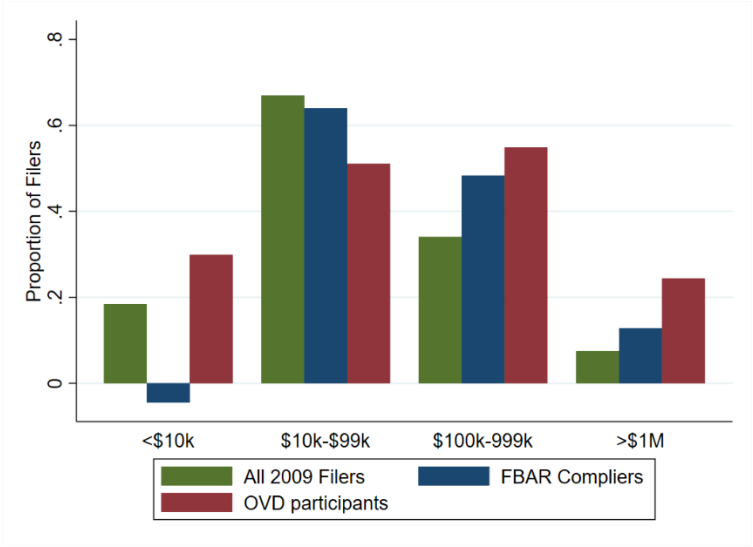
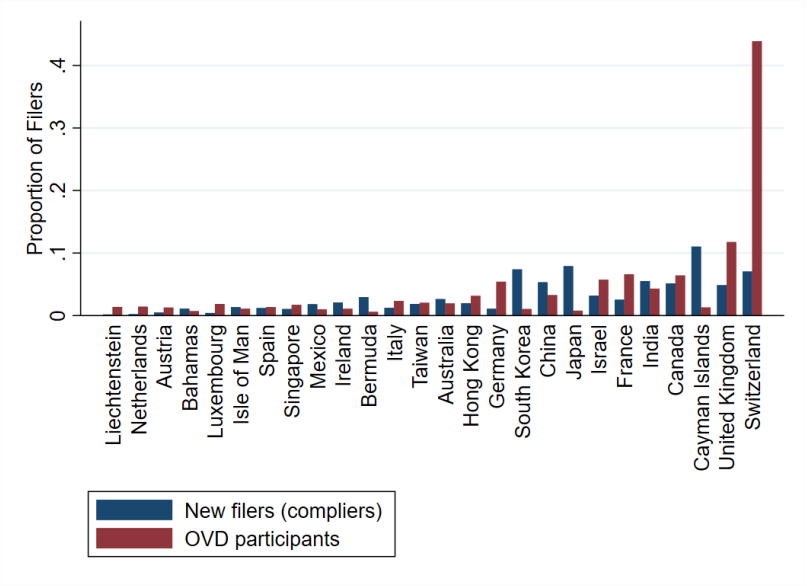


Figure 8.B: Account Country



Notes: This figure compares the characteristics of accounts disclosed by OVD participants to the estimated characteristics of accounts disclosed by "first-time FBAR filers" who were induced to file in 2009 because of enforcement (denoted FBAR compliers – see the main text for details). Panel A compares the distribution of account values for the two groups (as well as a third group comprising all "first-time FBAR filers" in 2009). Panel B compares the distribution of account country for the two groups.

Figure 9: Event Study of Reported Income for OVD Participants

Figure 9.A: Interest, Dividends and Capital Gains

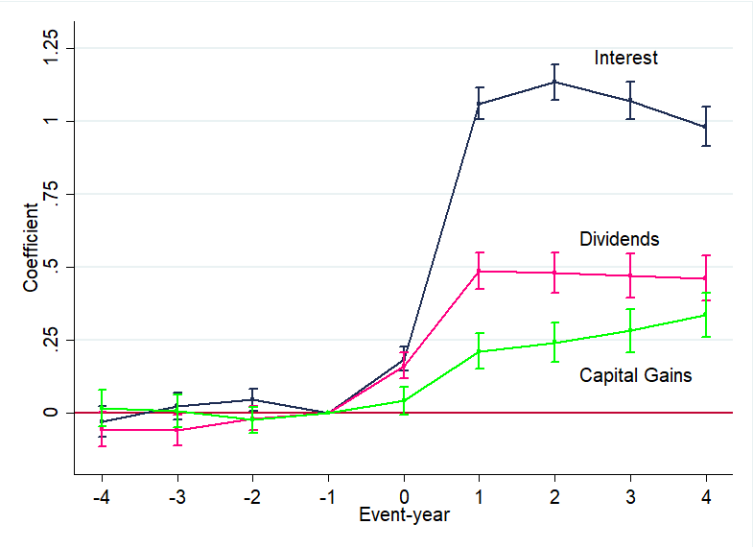
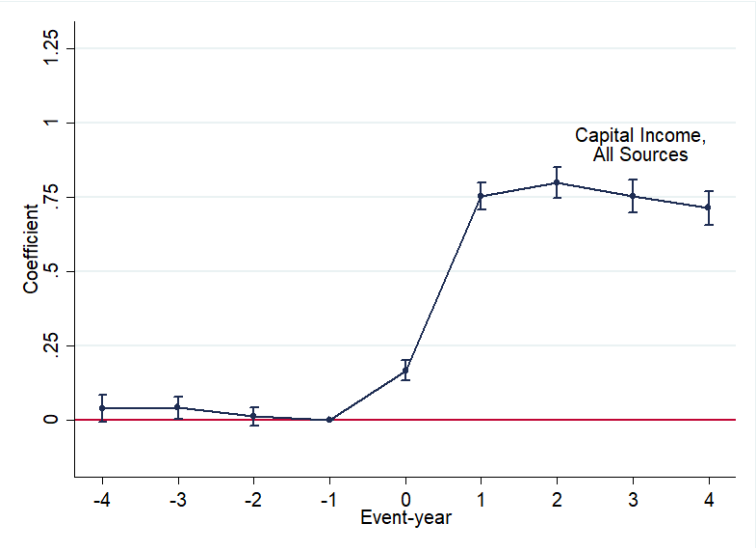


Figure 9.B: Total Capital Income



Notes: The figure illustrates how individuals participating in the OVD in 2009 changed the reporting of various types of capital income around participation. The sample includes OVD participants as well as a comparison group of non-participants that filed FBARs continuously from 2006 to 2009 and reported the same number of accounts on their FBARs in each of these years. We illustrate the results from four separate regressions where the dependent variables are reported interest income, dividend income and capital gains (Panel A) and total capital income (Panel B) respectively. The dependent variables are transformed with the inverse hyperbolic sine function. The explanatory variables are individual fixed effects; a full set of interactions between calendar year dummies and four age group dummies; and a set of event-year dummies indicating the year relative to OVD participation (coded zero for the comparison group). The figure illustrates the estimated coefficients on the event-year dummies as well as 95% confidence intervals (based on standard errors clustered at the individual level).

Figure 10: Event Study of Reported Income for First-Time FBAR Filers

Figure 10.A: Interest, Dividends, and Capital Gains

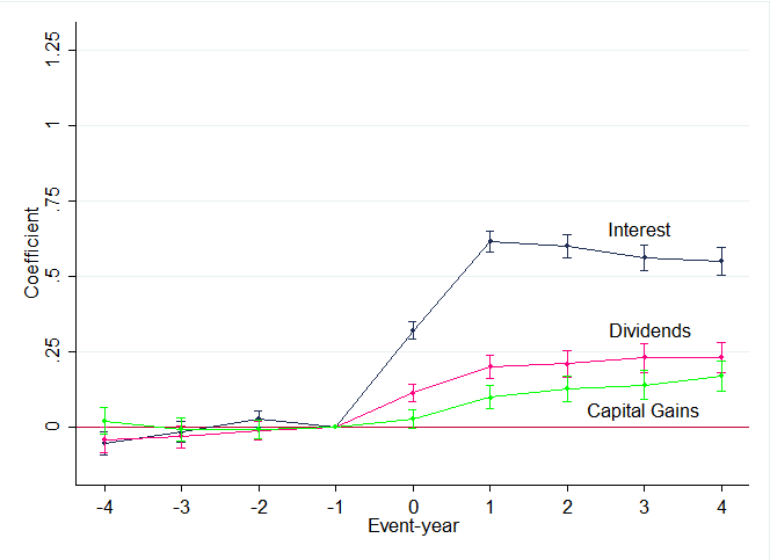
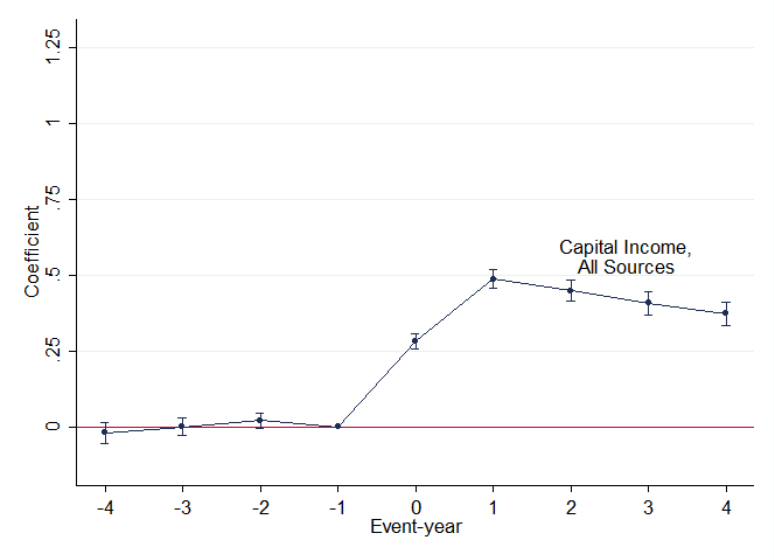


Figure 10.B: Total Capital Income



Notes: The figure illustrates how "first-time FBAR filers" in 2009 changed the reporting of various types of capital income around first-time filing. The sample includes "first-time FBAR filers" in 2009 as well as a comparison group that filed FBARs continuously from 2006 to 2009 and reported the same number of accounts on their FBARs in each of these years. We illustrate the results from four separate regressions where the dependent variables are reported interest income, dividend income and capital gains (Panel A) and total capital income (Panel B) respectively. The dependent variables are transformed with the inverse hyperbolic sine function. The explanatory variables are individual fixed effects; a full set of interactions between calendar year dummies and four age group dummies; and a set of event-year dummies indicating the year relative to first-time filing (coded zero for the comparison group). The figure illustrates the estimated coefficients on the event-year dummies as well as 95% confidence intervals (based on standard errors clustered at the individual level).

Figure 11: Decomposing Reported Income in Event Study of First-Time Filers

Figure 11.A: Interest

Figure 11.B: Dividends

Notes: The figure illustrates how "first-time FBAR filers" in 2009 changed the reporting of various types of capital income around first-time filing. The sample includes "first-time FBAR filers" in 2009 as well as a comparison group that filed FBARs continuously from 2006 to 2009 and reported the same number of accounts on their FBARs in each of these years. We illustrate the results from six separate regressions where the dependent variables measure interest income (Panel A) and dividend income (Panel B) respectively. In both cases, there are separate regressions for income reported by domestic financial institutions (on Forms 1099-INT and 1099-DIV); income reported by the taxpayer but not by domestic financial institutions; and total income. The dependent variables are transformed with the inverse hyperbolic sine function. The explanatory variables are individual fixed effects; a full set of interactions between calendar year dummies and four age group dummies; and a set of event-year dummies indicating the year relative to first-time filing (coded zero for the comparison group). The figure illustrates the estimated coefficients on the event-year dummies as well as 95% confidence intervals (based on standard errors clustered at the individual level).

Table 1: Characteristics of FBAR filers and accounts in 2008 and 2009

	2008		2009	
Total number of FBAR filers	**247,106**	100%	**330,525**	100%
U.S. address	150,362	61%	230,723	70%
non-U.S. address	96,744	39%	99,802	30%
haven account	39,584	16%	64,584	20%
no haven account	207,522	84%	265,941	80%
amended return	2,767	1%	4,581	1%
no amended return	244,339	99%	325,944	99%
multiple accounts	145,992	59%	213,975	65%
single account	101,114	41%	116,550	35%
Total number of FBAR accounts	**721,091**	100%	**1,297,591**	100%
Europe	322,727	45%	574,248	44%
Asia	176,252	24%	329,911	25%
North America	199,702	28%	350,834	27%
Other	22,410	3%	42,598	3%
<$10,000	242,769	34%	367,801	28%
$10,000 - $100,000	341,759	47%	601,317	46%
$100,000 - $1 million	118,894	16%	264,259	20%
>$1 million	17,669	2%	64,214	5%

Notes: This table summarizes the characteristics of all FBAR filers and their foreign accounts in 2008 (left panel) and 2009 (right panel), which serves as the baseline for our analysis of the increase in reporting from 2008 to 2009. The upper half of the table describes "FBAR filers" while the bottom half describes "FBAR accounts". "U.S. address" indicates that the filer reports a U.S. address on the FBAR; "haven account" indicates whether at least one of the reported accounts is in a tax haven (defined using the OECD (2000) list of uncooperative tax havens plus Switzerland, Singapore, Hong Kong and Luxembourg); "amended return" indicates that the individual filed an amended tax return for an earlier fiscal year; "multiple accounts" indicates that the individual reports more than one foreign account on the FBAR; "Europe", "Asia", "North America" indicate in which region the account is held; "<$10.000", "$10.000-$100.000", "$100.000-$1 million" and ">$1 million" indicate the value of the account.

Table 2: Statistics on Reported Income in the Year before Disclosure

OVD Participants

Income	mean	median	p25	p75	p90	p99
Interest	78,317	7,924	1,136	31,603	103,667	952,520
Dividends	67,463	6,231	253	30,482	94,557	806,017
Capital Gains	42,472	2,139	0	15,169	56,469	532,772
Wages	199,754	37,209	0	155,200	364,250	2,253,626
AGI	781,731	177,080	78,873	427,060	1,236,501	10,266,601
Total Tax	175,310	25,193	6,076	90,541	277,893	2,451,757
Sched C Income	25,787	0	0	0	22,226	441,208
Sched E Income	117,307	0	0	12,000	179,009	2,811,869

First-time Filers

Income	mean	median	p25	p75	p90	p99
Interest	57,692	1,240	112	8,009	44,537	970,424
Dividends	57,968	369	0	6,442	49,889	850,591
Capital Gains	42,551	118	0	3,474	29,456	550,640
Wages	280,804	114,126	19,290	238,357	481,447	3,073,700
AGI	649,312	159,224	72,466	335,236	885,327	10,059,205
Total Tax	156,427	21,622	4,570	65,140	203,777	2,372,693
Sched C Income	17,865	0	0	0	9,811	363,155
Sched E Income	123,919	0	0	0	57,866	3,033,635

Comparison Group Filers

Income	mean	median	p25	p75	p90	p99
Interest	53,288	3,659	496	15,262	52,050	745,906
Dividends	76,831	2,403	0	16,935	69,607	951,457
Capital Gains	55,479	678	0	7,639	38,585	639,977
Wages	259,340	98,700	0	224,562	472,293	2,736,528
AGI	661,073	166,995	78,664	356,801	972,078	9,755,223
Total Tax	142,965	21,611	4,736	63,841	194,384	2,027,565
Sched C Income	11,846	0	0	0	6,909	297,234
Sched E Income	90,962	0	0	0	22,523	1,956,672

Notes: This table describes the distribution of various types of income for three distinct groups of individuals: individuals participating in the OVD in 2009 (upper panel); "first-time FBAR filers" in 2009 (middle panel); and the comparison group of individuals filing FBARs continuously from 2006 to 2009 and reporting the same number of accounts on their FBARs in each of these years (bottom panel). "Capital gains" includes realized capital gains and losses; "AGI" stands for Adjusted Gross Income; "Schedule C Income" is income from sole-proprietorships; "Schedule E Income" is income from pass-through businesses; "p25", "p75", "p90" and "p95" refer to the 25th, 75th, 90th and 95th percentiles respectively. All statistics are calculated in event-year -1, which is the baseline year in the regression specification.

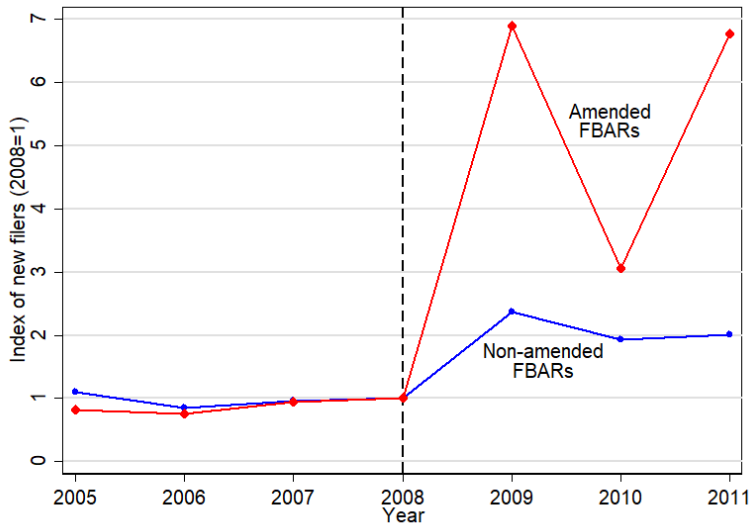
Table 3: Summary of Total Income and Revenue Estimate Results

	Total Reported Assets (millions USD)	Change in Total Reported Capital Income (millions USD)	Compliance Adjusted Rate of Return (E[d*r])	Revenue Estimate (millions USD)
OVD Participants				
Direct	20,700	691	0.033	184
Indirect	20,700	454	0.022	121
First-time Filers				
Direct	114,467	3,580	0.031	1,052
Indirect	114,467	1,568	0.014	460
Total				
Direct	135,167	4,271	0.032	1,236
Indirect	135,167	2,022	0.015	581

Notes: This table summarizes our estimates of the change in total reported capital income and tax revenues using the direct and indirect method as described in Section 6.3 of the text. The first column shows the total assets reported by first-time filers and OVD participants as given in Figure 3.B. For the Direct Method (rows 1 and 3), the change in total reported capital income (col. 2) is derived by applying the coefficients from year *t+1* of the event-studies uniformly to the reported log income of first-time filers and OVD participants and aggregating across individuals. The coefficients are applied separately to interest, dividends and capital gains (Figures 9.A and 10.A). $E[d_i r_i]$ is calculated by dividing the change in reported income by the total reported assets. We assume that newly reported income is taxed at the top marginal rate, 35% for interest and the preferred 15% rate for realized capital gains and dividends. The revenue estimates are derived by applying these rates to the estimated change in reported income from each source. For the Indirect Method (rows 2 and 4), we first convert the year *t+1* event-study coefficient for total financial capital income (Figures 9.B and 10.B) to their implied percent changes in income. We then use Eq. (4) to estimate $E[d_i r_i]$ using the mean ratio of reported assets to reported capital income, $E[V_i/y_i]$ (trimmed at the 95th percentile), which is 51.26 for OVD participants and 46.17 for first-time filers. The compliance adjusted rate of return is then applied to the total reported assets to derive the change in total reported capital income (col. 2). The revenue estimates are derived using the average capital income tax rates from the direct method. The final two rows report the total the effects for OVD participants and first-time filers combined. Complete details of the calculations can be found on the Online Appendix Tables A.7 and A.8.

Appendix Tables and Figures (for Online Publication Only)

Figure A.1: First-time FBAR filers, amended vs. non-amended, 2005-2011



Notes: This figure plots the number of "first-time FBAR filers" in year t (defined as taxpayers that file an FBAR in year t and did not file an FBAR in years t-1, t-2 and t-3) by year and by whether the new filer also filed late/amended FBARs for prior years. OVD participants and non-US address filers are excluded from the tabulations. The series are normalized by the 2008 level. The overall number of late/amended FBARs is small, but we observe an enormous increase in late/amended FBARs in relative terms in 2009. The 2008 levels are 1,092 for amending filers and 37,619 for non-amending filers.

Figure A.2: Event Study of Reported Income for OVD Participants

Figure A.2.A: Other Income Sources

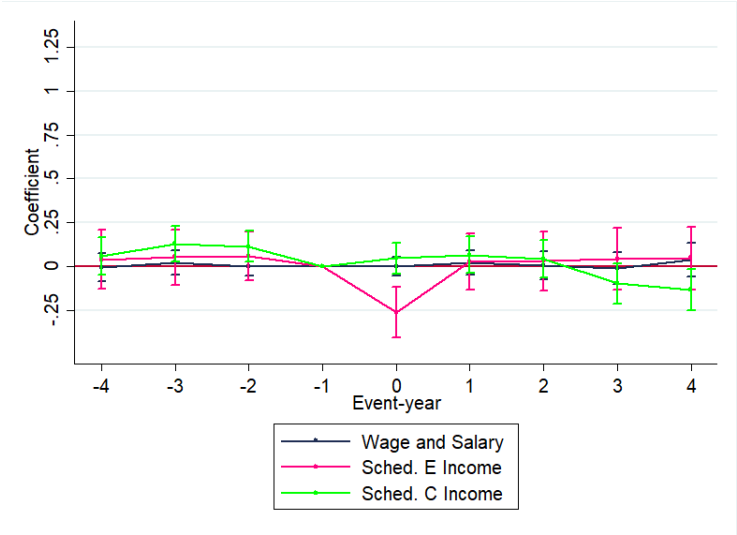
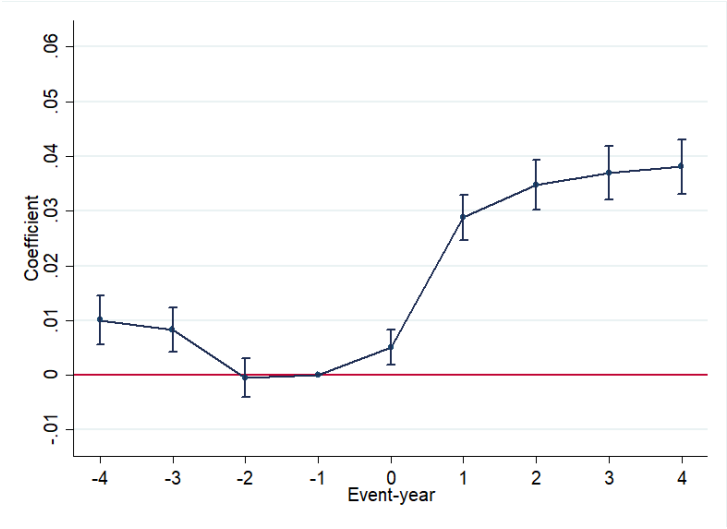


Figure A.2.B: Propensity to Report Positive Capital Income



Notes: The figure illustrates how individuals participating in the OVD in 2009 changed the reporting of various types of capital income around participation. The sample includes OVD participants as well as a comparison group of non-participants that filed FBARs continuously from 2006 to 2009 and reported the same number of accounts on their FBARs in each of these years. We illustrate the results from four separate regressions where the dependent variables are reported wage / salary income, Schedule C income (from sole-proprietorships) and Schedule E income (from pass-through businesses) (Panel A) and a dummy indicating whether the individual reported any capital income (Panel B) respectively. The first three dependent variables are transformed with the inverse hyperbolic sine function. The explanatory variables are individual fixed effects; a full set of interactions between calendar year dummies and four age group dummies; and a set of event-year dummies indicating the year relative to OVD participation (coded zero for the comparison group). The figure illustrates the estimated coefficients on the event-year dummies as well as 95% confidence intervals (based on standard errors clustered at the individual level).

Figure A.3: Event Study of Reported Income for First-Time FBAR Filers

Figure A.3.A: Other Income Sources

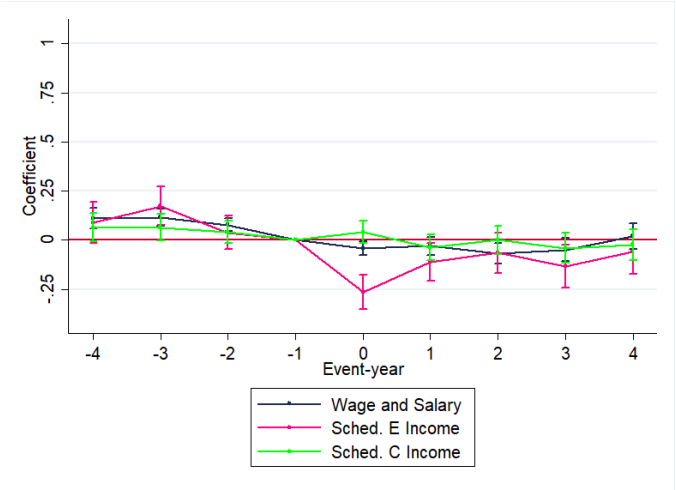
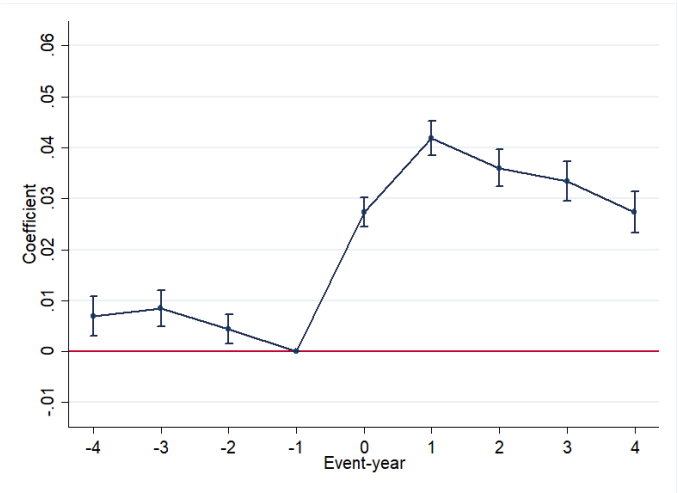


Figure A.3.B: Propensity to Report Positive Capital Income



Notes: The figure illustrates how "first-time FBAR filers" in 2009 changed the reporting of various types of capital income around first-time filing. The sample includes "first-time FBAR filers" in 2009 as well as a comparison group that filed FBARs continuously from 2006 to 2009 and reported the same number of accounts on their FBARs in each of these years. We illustrate the results from four separate regressions where the dependent variables are reported wage / salary income, Schedule C income (from sole-proprietorships) and Schedule E income (from pass-through businesses) (Panel A) and a dummy indicating whether the individual reported any capital income (Panel B) respectively. The first three dependent variables are transformed with the inverse hyperbolic sine function. The explanatory variables are individual fixed effects; a full set of interactions between calendar year dummies and four age group dummies; and a set of event-year dummies indicating the year relative to first-time filing (coded zero for the comparison group). The figure illustrates the estimated coefficients on the event-year dummies as well as 95% confidence intervals (based on standard errors clustered at the individual level).

Figure A.4: Decomposing Reported Income in Event Study of OVD Participants

Figure A.4.A: Interest

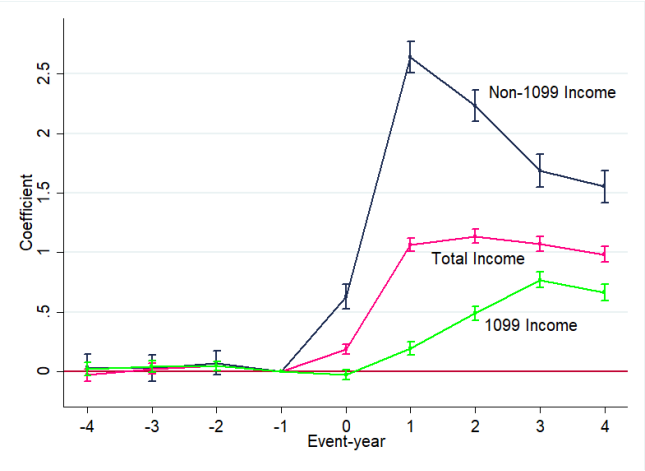
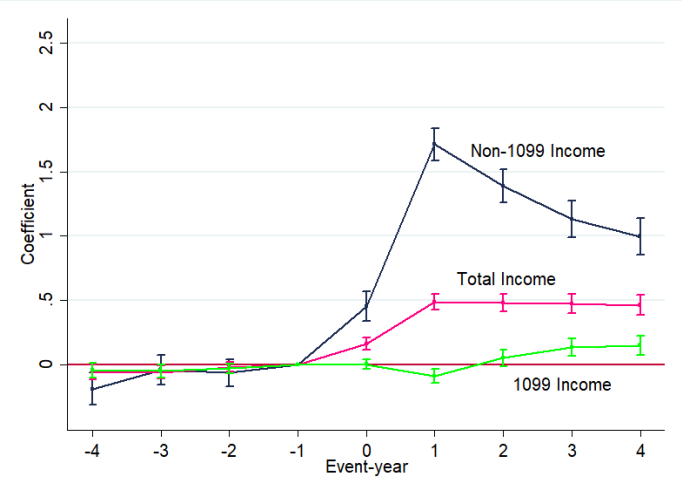
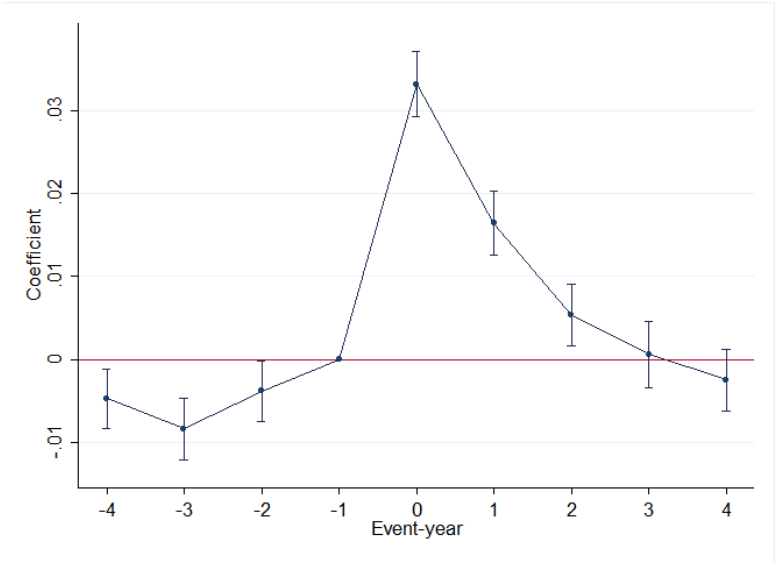


Figure A.4.B: Dividends



Notes: The figure illustrates how individuals participating in the OVD in 2009 changed the reporting of various types of capital income around participation. The sample includes OVD participants as well as a comparison group of non-participants that filed FBARs continuously from 2006 to 2009 and reported the same number of accounts on their FBARs in each of these years. We illustrate the results from six separate regressions where the dependent variables measure interest income (Panel A) and dividend income (Panel B) respectively. In both cases, there are separate regressions for income reported by domestic financial institutions (on Forms 1099-INT and 1099-DIV); income reported by the taxpayer but not by domestic financial institutions; and total income. The dependent variables are transformed with the inverse hyperbolic sine function. The explanatory variables are individual fixed effects; a full set of interactions between calendar year dummies and four age group dummies; and a set of event-year dummies indicating the year relative to first-time filing (coded zero for the comparison group). The figure illustrates the estimated coefficients on the event-year dummies as well as 95% confidence intervals (based on standard errors clustered at the individual level).

Figure A.5: Probability of Amending Returns Relative to First-Time Filing



Notes: The figure illustrates how "first-time FBAR filers" in 2009 changed their amendment behavior around first-time filing. The sample includes "first-time FBAR filers" in 2009 as well as a comparison group that filed FBARs continuously from 2006 to 2009 and reported the same number of accounts on their FBARs in each of these years. We illustrate the results from a regression where the dependent variable is an indicator for amending a tax return from one of the previous four fiscal years in year *t*. The explanatory variables are individual fixed effects; a full set of interactions between calendar year dummies and four age group dummies; and a set of event-year dummies indicating the year relative to first-time filing (coded zero for the comparison group). The figure illustrates the estimated coefficients on the event-year dummies as well as 95% confidence intervals (based on standard errors clustered at the individual level).

Figure A.6: The Ratio of Account Value to Previously Reported Capital Income

Figure A.6.A OVD Participants

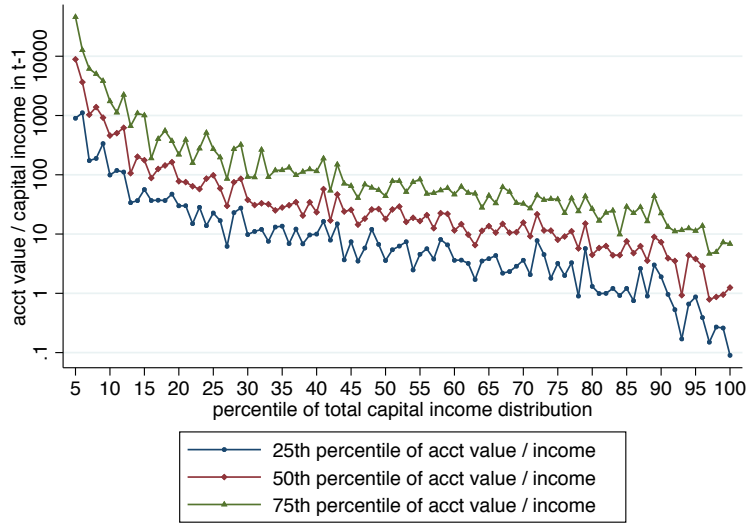
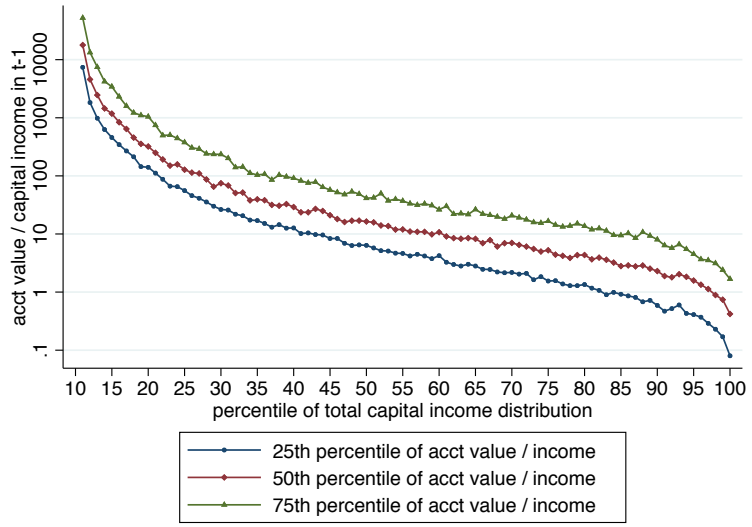


Figure A.6.B First-Time Filers



Note: This table reports quantiles of the ratio of total FBAR account value to capital income in the year before disclosure, by rank in the total capital income distribution. We rank individuals according to their rank among OVD participants or first-time filers rather than the entire population, for simplicity. To obtain total FBAR account value, we add across accounts if the individual reported multiple accounts. Results are very similar when using the maximum account value. Individuals with zero capital income in the prior year are excluded from the analysis.

Table A.1. Event Study of Reported Income for OVD Participants

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
VARIABLES	Interest	Dividends	Capital Gains/Losses	Total Capital Income	Wage and Salary Income	Schedule C Income	Schedule E Income	Report Any Capital Income
Treat*Event time -4	-0.029175	-0.057727*	0.016821	0.037654*	-0.007327	0.058100	0.038931	0.010047***
	(0.026707)	(0.030120)	(0.032029)	(0.022605)	(0.040473)	(0.055647)	(0.085228)	(0.002312)
Treat*Event time -3	0.021958	-0.059572**	0.005719	0.039458**	0.021428	0.128868**	0.050949	0.008329***
	(0.023203)	(0.026812)	(0.028097)	(0.019315)	(0.034816)	(0.051529)	(0.080403)	(0.002055)
Treat*Event time -2	0.044765**	-0.019143	-0.024690	0.011432	-0.000479	0.113871**	0.056469	-0.000465
	(0.018988)	(0.020620)	(0.022403)	(0.015774)	(0.026628)	(0.044487)	(0.070746)	(0.001786)
Treat*Event time 0	0.185001***	0.162393***	0.042006*	0.165828***	-0.001025	0.046455	-0.262716***	0.005046***
	(0.020885)	(0.023374)	(0.024557)	(0.017236)	(0.026585)	(0.044802)	(0.072467)	(0.001665)
Treat*Event time 1	1.061388***	0.485858***	0.210601***	0.753838***	0.019130	0.065406	0.026733	0.028829***
	(0.028153)	(0.031864)	(0.031042)	(0.023409)	(0.035218)	(0.052750)	(0.082196)	(0.002099)
Treat*Event time 2	1.134727***	0.480929***	0.241685***	0.799247***	0.005162	0.042808	0.029695	0.034735***
	(0.030936)	(0.035515)	(0.034463)	(0.026278)	(0.041065)	(0.055308)	(0.085322)	(0.002310)
Treat*Event time 3	1.071524***	0.470303***	0.281265***	0.754004***	-0.010627	-0.098829*	0.042438	0.036872***
	(0.032937)	(0.038258)	(0.037223)	(0.028474)	(0.045553)	(0.058041)	(0.089809)	(0.002496)
Treat*Event time 4	0.982369***	0.461347***	0.336528***	0.712861***	0.037769	-0.133514**	0.045213	0.038090***
	(0.033911)	(0.039553)	(0.038973)	(0.028882)	(0.049007)	(0.059603)	(0.091928)	(0.002524)
Observations	478,350	478,350	478,350	478,350	478,350	478,349	478,289	478,350
R-squared	0.761839	0.842375	0.838480	0.815430	0.851059	0.582259	0.550560	0.540362

Standard errors clustered at the individual-level

*** p<0.01, ** p<0.05, * p<0.1

Note: This table reports the regression coefficients plotted in Figure 9 and Figure A.2.

Table A.2 Event Study of Reported Total Financial Capital Income for OVD Participants, Alternative Specifications

VARIABLES	(1) Inverse Hyperbolic Sine, main specification	(2) Inverse Hyperbolic Sine, exclude zeros in t-1	(3) Inverse Hyperbolic Sine, drop all zeros	(4) Natural log, drop all zeros	(5) Inverse Hyperbolic Sine, balanced sample	(6) Natural log, balanced sample
Treat*Event time -4	0.037654*	0.005081	-0.029644*	-0.029395*	-0.037224**	-0.037178**
	(0.022605)	(0.020643)	(0.016643)	(0.016659)	(0.016167)	(0.016177)
Treat*Event time -3	0.039458**	0.018690	-0.010703	-0.010569	-0.022539*	-0.022546*
	(0.019315)	(0.017439)	(0.014151)	(0.014165)	(0.013045)	(0.013048)
Treat*Event time -2	0.011432	-0.009314	0.012446	0.012590	-0.011175	-0.011215
	(0.015774)	(0.014017)	(0.010792)	(0.010805)	(0.009432)	(0.009439)
Treat*Event time 0	0.165828***	0.127633***	0.125404***	0.125334***	0.115259***	0.115256***
	(0.017236)	(0.014508)	(0.012373)	(0.012384)	(0.010952)	(0.010954)
Treat*Event time 1	0.753838***	0.636726***	0.556000***	0.556174***	0.503996***	0.504088***
	(0.023409)	(0.019300)	(0.017120)	(0.017134)	(0.016135)	(0.016141)
Treat*Event time 2	0.799247***	0.676470***	0.581748***	0.582241***	0.527037***	0.527267***
	(0.026278)	(0.022319)	(0.018853)	(0.018866)	(0.018056)	(0.018060)
Treat*Event time 3	0.754004***	0.634043***	0.529969***	0.530541***	0.483549***	0.483821***
	(0.028474)	(0.024925)	(0.019898)	(0.019914)	(0.019104)	(0.019111)
Treat*Event time 4	0.712861***	0.609308***	0.455921***	0.456233***	0.421575***	0.421801***
	(0.028882)	(0.025562)	(0.021384)	(0.021408)	(0.020807)	(0.020820)
Observations	478,350	461,787	455,201	455,201	370,521	370,521
R-squared	0.815430	0.799785	0.854775	0.854481	0.847574	0.847410

Standard errors clustered at the individual-level
*** p<0.01, ** p<0.05, * p<0.1

Note: This table reports several alternative specifications of the estimation of equation (1) on the impact of disclosure on reported total financial capital income. Column (1) is identical column (4) of Table A.1. Column (2) drops zeros in event year -1, as these individuals are also excluded from the analysis in Table A.8. Column (3) drops all observations of zero financial capital income. Columns (4) is similar to column (3), but use a traditional logarithmic transform instead of an inverse hyperbolic sine transform. In columns (5) and (6) we estimate the regression on a balanced panel of taxpayers using the inverse hyperbolic sine transformation and natural log of the outcome, respectively.

Table A.3. Event Study of Reported Income for First-Time FBAR Filers

VARIABLES	(1) Interest	(2) Dividends	(3) Capital Gains/Losses	(4) Total Capital Income	(5) Wage and Salary Income	(6) Schedule C Income	(7) Schedule E Income	(8) Report Any Capital Income
Treat*Event time -4	-0.055918***	-0.042793**	0.018690	-0.020675	0.111576***	0.064331*	0.090001*	0.006922***
	(0.019564)	(0.021372)	(0.022413)	(0.017233)	(0.026812)	(0.037355)	(0.053483)	(0.001942)
Treat*Event time -3	-0.017580	-0.032300*	-0.007597	0.000033	0.114827***	0.064385*	0.173038***	0.008481***
	(0.017347)	(0.018763)	(0.019421)	(0.015299)	(0.022848)	(0.033960)	(0.050408)	(0.001802)
Treat*Event time -2	0.026820**	-0.012978	-0.008248	0.020076*	0.077914***	0.042086	0.038655	0.004350***
	(0.013662)	(0.014861)	(0.015861)	(0.012129)	(0.017451)	(0.028885)	(0.043218)	(0.001470)
Treat*Event time 0	0.319700***	0.112550***	0.026411*	0.282919***	-0.043702**	0.040283	-0.264761***	0.027352***
	(0.014178)	(0.015046)	(0.015909)	(0.012689)	(0.017543)	(0.028532)	(0.043614)	(0.001484)
Treat*Event time 1	0.615175***	0.199839***	0.097733***	0.487019***	-0.029693	-0.038166	-0.110621**	0.041902***
	(0.017974)	(0.019377)	(0.019496)	(0.015594)	(0.023151)	(0.033502)	(0.049170)	(0.001713)
Treat*Event time 2	0.599319***	0.208778***	0.124829***	0.448476***	-0.067314**	0.000180	-0.064777	0.036002***
	(0.019890)	(0.022310)	(0.021873)	(0.017546)	(0.027108)	(0.036470)	(0.052511)	(0.001854)
Treat*Event time 3	0.561062***	0.229531***	0.138683***	0.407835***	-0.050795*	-0.041437	-0.135222**	0.033437***
	(0.021647)	(0.024515)	(0.023986)	(0.019426)	(0.030109)	(0.038618)	(0.055485)	(0.001995)
Treat*Event time 4	0.549502***	0.231005***	0.168012***	0.372131***	0.019500	-0.024127	-0.060041	0.027288***
	(0.022800)	(0.025752)	(0.025396)	(0.020432)	(0.032584)	(0.040694)	(0.058237)	(0.002062)
Observations	829,533	829,533	829,533	829,533	829,533	829,529	829,396	829,533
R-squared	0.768602	0.840233	0.837671	0.814067	0.811797	0.544995	0.524623	0.555718

Standard errors clustered at the individual-level

*** p<0.01, ** p<0.05, * p<0.1

Note: This table reports the regression coefficients plotted in Figure 10 and Figure A.3.

Table A.4. Decomposing Reported Income in Event Study of OVD Participants

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	Non-1099 Interest	1099 Interest	Total Interest	Non-1099 Dividends	1099 Dividends	Total Dividends
Treat*Event time -4	0.031721	0.017593	-0.029175	-0.190026***	-0.046174	-0.057727*
	(0.059001)	(0.028420)	(0.026707)	(0.064532)	(0.029697)	(0.030120)
Treat*Event time -3	0.027553	0.037893	0.021958	-0.043539	-0.052621**	-0.059572**
	(0.056360)	(0.024938)	(0.023203)	(0.058376)	(0.025717)	(0.026812)
Treat*Event time -2	0.070952	0.045496**	0.044765**	-0.065139	-0.029641	-0.019143
	(0.051329)	(0.019601)	(0.018988)	(0.054460)	(0.019067)	(0.020620)
Treat*Event time 0	0.628838***	-0.027716	0.185001***	0.451373***	0.001383	0.162393***
	(0.054244)	(0.020194)	(0.020885)	(0.059206)	(0.019670)	(0.023374)
Treat*Event time 1	2.640293***	0.192859***	1.061388***	1.712129***	-0.088023***	0.485858***
	(0.065537)	(0.028203)	(0.028153)	(0.065330)	(0.027385)	(0.031864)
Treat*Event time 2	2.232641***	0.487279***	1.134727***	1.386312***	0.049200	0.480929***
	(0.067445)	(0.031344)	(0.030936)	(0.065920)	(0.032772)	(0.035515)
Treat*Event time 3	1.684172***	0.767485***	1.071524***	1.130801***	0.133530***	0.470303***
	(0.069902)	(0.033668)	(0.032937)	(0.071590)	(0.035728)	(0.038258)
Treat*Event time 4	1.551593***	0.663944***	0.982369***	0.996238***	0.147849***	0.461347***
	(0.069096)	(0.036205)	(0.033911)	(0.072524)	(0.038685)	(0.039553)
Observations	478,341	478,341	478,350	478,340	478,341	478,350
R-squared	0.576671	0.767779	0.761839	0.568226	0.861470	0.842375

Standard errors clustered at the individual-level

*** p<0.01, ** p<0.05, * p<0.1

Note: This table reports the regression coefficients plotted in Figure A.4.

Table A.5. Decomposing Reported Income in Event Study of First-Time FBAR Filers

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	Non-1099 Interest	1099 Interest	Total Interest	Non-1099 Dividends	1099 Dividends	Total Dividends
Treat*Event time -4	0.109163***	-0.070468***	-0.055918***	-0.213678***	-0.036008*	-0.042793**
	(0.037077)	(0.021219)	(0.019564)	(0.039639)	(0.020701)	(0.021372)
Treat*Event time -3	0.050156	-0.043082**	-0.017580	-0.130187***	-0.019542	-0.032300*
	(0.034487)	(0.018749)	(0.017347)	(0.035523)	(0.017736)	(0.018763)
Treat*Event time -2	0.020062	-0.004187	0.026820**	-0.066999**	-0.012213	-0.012978
	(0.030984)	(0.014507)	(0.013662)	(0.032061)	(0.013382)	(0.014861)
Treat*Event time 0	0.749249***	0.049669***	0.319700***	0.269119***	-0.064529***	0.112550***
	(0.031612)	(0.014572)	(0.014178)	(0.033294)	(0.013266)	(0.015046)
Treat*Event time 1	1.215824***	0.259789***	0.615175***	0.339037***	-0.003119	0.199839***
	(0.037404)	(0.019562)	(0.017974)	(0.035280)	(0.018205)	(0.019377)
Treat*Event time 2	1.139670***	0.297143***	0.599319***	0.322458***	0.047191**	0.208778***
	(0.038324)	(0.021409)	(0.019890)	(0.037248)	(0.021780)	(0.022310)
Treat*Event time 3	1.127410***	0.283152***	0.561062***	0.376952***	0.090953***	0.229531***
	(0.040379)	(0.022850)	(0.021647)	(0.041276)	(0.023776)	(0.024515)
Treat*Event time 4	1.101122***	0.303910***	0.549502***	0.297557***	0.110638***	0.231005***
	(0.041184)	(0.024423)	(0.022800)	(0.042471)	(0.025432)	(0.025752)
Observations	829,532	829,533	829,533	829,531	829,533	829,533
R-squared	0.607445	0.746965	0.768602	0.603660	0.851211	0.840233

Standard errors clustered at the individual-level

*** p<0.01, ** p<0.05, * p<0.1

Note: This table reports the regression coefficients plotted in Figure 11.

Table A.6. Probability of Amending Returns Relative to First-Time Filing

	(1)
VARIABLES	Amend
Treat*Event time -4	-0.004717***
	(0.001799)
Treat*Event time -3	-0.008348***
	(0.001888)
Treat*Event time -2	-0.003798**
	(0.001850)
Treat*Event time 0	0.033132***
	(0.002020)
Treat*Event time 1	0.016392***
	(0.001960)
Treat*Event time 2	0.005307***
	(0.001892)
Treat*Event time 3	0.000590
	(0.002070)
Treat*Event time 4	-0.002472
	(0.001889)
Observations	829,533
R-squared	0.160275

Standard errors clustered at the individual-level

*** p<0.01, ** p<0.05, * p<0.1

Note: This table reports the regression coefficients plotted in Figure A.5.

Table A.7: Estimates of the Total Effect of IRS Enforcement Initiatives (Direct Method)

	coefficient (t+1)	Change in Total Reported Capital Income (millions)	Tax Rate	Revenue Estimate (millions)
OVD Participants				
Interest	1.06	403	0.35	141
Dividends	0.49	218	0.15	33
Capital Gains	0.21	70	0.15	11
Total		**691**	**0.27**	**184**
First-time Filers				
Interest	0.62	2,573	0.35	901
Dividends	0.20	970	0.15	146
Capital Gains	0.10	37	0.15	6
Total		**3,580**	**0.29**	**1,052**

Notes: This table constructs the estimate of the total effect on reported capital income and tax revenues using the "direct method" described in the text, i.e. assuming a uniform treatment effect. The first column reports the coefficient from the event study for each type of capital income for year *t+1*. The change in total reported capital income (col. 2) is derived by applying these coefficients uniformly to the reported log interest, dividends and capital gains of each first-time filer and OVD participant and aggregating across individuals. We assume for simplicity that realized capital gains and dividends are taxed at the preferred rate, which was 15 percent in the top tax bracket in the period we study. The last column multiplies the total change in reported income by the tax rate.

Table A.8: Estimate of the Total Effect (Indirect Method)

	Coefficient (t+1)	Average Percent Change in Reported Capital Income	$E[V_i/y_i]$ (trimmed 95th ptile)	E[d*r]	Total Reported Assets (millions)	Change in Total Reported Capital Income (millions) (total reported assets * E[d*r])
OVD Participants	0.75	1.13	51.26	0.022	20,700	454
First-Time Filers	0.49	0.63	46.17	0.014	114,467	1,568

Notes: This table constructs the estimate of the total effect on reported capital income and tax revenues using the "indirect method" described in the text. We first convert the coefficient from total financial capital income in the event studies (col. 1) to the implied percent change in income (col. 2). We then use Eq. (4) to estimate $E[d_i r_i]$ from the reported statistics in the second and third columns. We apply this via Eq. (2) to the total reported assets (as shown in Figure 3.B and reported in col. 4) to estimate the total effect on reported income.

Table A.9: Estimated Rates of Return on Foreign Assets

	Total Reported Assets (millions)	Change in Total Reported Capital Income (millions)	E[d*r]	E[r]	E[d]
OVD Participants					
Direct Method	20,700	691	0.033	0.033	1
Indirect Method	20,700	454	0.022	0.022	1
First-Time Filers					
Direct Method	114,467	3,580	0.031	0.033	0.94
Indirect Method	114,467	1,568	0.014	0.022	0.62

Notes: This table considers the implications of our results using the direct or indirect method (Tables 3, A.7 and A.8) for rates of return on foreign wealth. The first to columns report the total assets and total change in reported capital income. The third column estimates the compliance-adjusted rate of return. For the direct method, this is calculated by dividing the change in reported capital income by total reported assets; for the indirect method, it is calculated using Eq. (4). In the last two columns, we decompose the compliance adjusted rate of return into the actual rate of return for previously non-compliant account, and the fraction of accounts that are non-compliant, under the assumption that 1) all OVD participants were previously non-compliant, and 2) the rate of return was the same for OVD participants and first-time filers.