

Voluntary Disclosure of Evaded Taxes – Increasing Revenues, or Increasing Incentives to Evade?

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Abstract

Many countries apply lower fines to tax evading individuals when they voluntarily disclose the tax evasion they committed. I model such voluntary disclosure mechanisms theoretically and show that while such mechanisms increase the incentive to evade taxes, they nevertheless increase tax revenues net of administrative costs. I then test these theoretical predictions in two separate empirical analyses. First, I confirm that voluntary disclosure mechanisms increase tax evasion, using the introduction of the 2009 offshore voluntary disclosure program in the U.S. for identification. Second, I quantify the additional tax revenues of voluntary disclosures by considering how some state-level governments in Germany bought whistle-blower data from foreign bank employees, thereby increasing the detection probability and the use of voluntary disclosures.

Keywords: Tax evasion, voluntary disclosure, self-reporting

JEL Classification: H26, K42, H24

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1 Introduction

Households worldwide hold about 8% of their total financial wealth, almost U.S.-\$ 6 trillion, in tax havens (Zucman, 2013). Correspondingly, tax authorities forego high tax revenues: Estimates for the United States show that personal income tax evasion via offshore accounts may cost around \$70 billion annually (Gravelle, 2009). The need for tax revenues in the wake of the financial crises has now rekindled governments' efforts to curb such income tax evasion.

Principally, governments can fight tax evasion by individuals who hold their wealth offshore in two ways. First, they can negotiate with tax havens to share information regarding foreigners' accounts. An example is the recent agreement between the United States and Switzerland forcing Swiss banks to provide information on accounts owned by U.S. citizens. However, such treaties are not very effective, as tax evaders rather shift their funds to different tax havens instead of repatriating them (Johannesen and Zucman, 2014). Second, governments can set incentives for individual taxpayers to declare foreign wealth and the tax evaded on it.

Many countries incentivize individuals to come clean by a “voluntary disclosure” mechanism. Usually, the prerequisite is to report *all* foreign asset holdings. The income on these assets is then taxed retroactively at the standard tax rate, but no or a reduced fine is levied. Such programs exist in many countries (see Table 1 for an overview), and are often part of the general law and for an unlimited period. There is, however, some criticism as commentators fear that the option of voluntary disclosure increases the incidence of tax evasion, as these programs offer the possibility to escape high punishments if individuals decide that the probability of detection has increased.

[Table 1 about here.]

This paper provides an analysis of such voluntary disclosure mechanisms. In a first step, I model theoretically how the possibility of voluntary disclosure changes the incentive to evade taxes and affects tax revenues. I then test my predictions empirically in two separate analyses. First, I test whether the introduction of voluntary disclosure increases tax evasion, using the introduction of the 2009 offshore voluntary disclosure program in the U.S. for identification. I measure tax evasion indirectly by changes in the offshore deposits of U.S. residents, using deposit data provided by the Bank for

International Settlements (BIS). Second, I quantify the tax revenue effects of voluntary disclosures. To do so, I consider that state-level governments in Germany have bought whistle-blower data from foreign bank employees, thus increasing the detection probability. The ensuing increase in voluntary disclosures allows to estimate their tax revenue effects.

In more detail, my theoretical model frames tax evasion as a rational choice of individuals that bear a moral (psychic) cost when evading taxes. There is ex-ante uncertainty about the probability of being caught and fined, and individuals have the possibility to voluntarily disclose the tax evasion they committed after the detection probability is revealed. In equilibrium, the individuals with the lowest moral cost will evade taxes, those with intermediate moral costs will first evade taxes but voluntarily disclose later when the detection probability is high, and those with the highest moral costs will never evade taxes. In this model I show that the existence of voluntary disclosure increases the number of individuals who evade taxes. This result arises as voluntary disclosure allows individuals to better differentiate their actions according to the detection probability. Governments set voluntary disclosure fines optimally, trading off this higher tax evasion with savings in administrative costs. As long as the administrative costs of auditing and fining tax evaders are positive, voluntary disclosures increase tax revenue, net of administrative costs.

I then test the main results on tax evasion and tax revenues empirically. First, I analyze how the existence of voluntary disclosure affects tax evasion. To identify this effect, I use the introduction of the first Offshore Voluntary Disclosure Program in the U.S. in 2009. Employing a synthetic control approach, I analyze how U.S. deposits in offshore havens have changed compared to deposits from other countries. This analysis confirms that the existence of a voluntary disclosure program indeed increases tax evasion, in line with the theoretical model. Second, studying Germany, I quantify the revenue effects of voluntary disclosures. My estimates suggest that one voluntary disclosure brings in on average around €20,000.

Several strands of literature are relevant to this paper. First, there is a large literature on tax evasion by individuals (see Slemrod (2007) for an overview). The theory goes back to Allingham and Sandmo (1972) and Yitzhaki (1974), who model tax evasion analogous to portfolio choice. Sandmo (2005) provides a review of this line of literature. Despite the obvious difficulties to measure tax evasion, there is also a large empirical literature, which Alm (2012) summarizes.

To my knowledge, no paper studies a voluntary disclosure program as described above. However, there is some literature on tax amnesties, which are short-run programs (often about three months long) that usually do not fine tax evaders. Also in contrast to voluntary disclosures, tax amnesties often include those already under investigation for tax evasion and allow only a partial reporting of prior tax evasion. In this literature, Malik and Schwab (1991) propose a model with uncertainty about the disutility from tax evasion to explain why individuals take up the offer of a tax amnesty (which they never would in the standard Allingham-Sandmo model). Alm and Beck (1990) set up a prospect theory model in which the share of evaded tax that is declared in the amnesty is the main decision parameter. Stella (1991) discusses the interaction between future enforcement and tax amnesties, predicting that amnesties are unlikely to generate additional revenue. Alm and Beck (1993) confirm this result empirically in a time-series analysis.¹

Closer to this paper is an analysis by Andreoni (1991), who asks how a “permanent tax amnesty” (in effect, a voluntary disclosure program in the sense discussed above) would affect the efficiency and equity of the tax system. He proposes a model in which people use the amnesty when shocks to their consumption make them unwilling to bear the risk of audit. In this model, the tax amnesty acts similar to social insurance, allowing those in bad luck to eliminate some of their risk. He does not consider administrative costs or the optimal fine set by the government, but assumes (as common in this literature) that there is no fine after a disclosure.

All in all, there is little theoretical and almost no empirical evidence on the tax evasion and tax revenue effects of tax amnesties. Voluntary disclosure programs with their modern characteristics (e.g. requiring full disclosure, and having a specifically chosen fine as their most prominent characteristic) have so far been an understudied aspect of tax evasion. This paper aims to shed some light on them. Section 2 provides the theoretical model. Then, section 3 empirically tests the results of the model and section 4 concludes.

¹Some further papers study the optimal self-reporting of violations of the law in a non-tax context. A first contribution is Kaplow and Shavell (1994), who show that self-reporting increases welfare as it saves enforcement resources and reduces uncertainty for individuals facing potential sanctions. Their model has been extended to consider ex-post asymmetric information (Feess and Heesen, 2002) or self-reporting at different stages of an investigation (Feess and Walzl, 2005).

2 Model

2.1 Framework

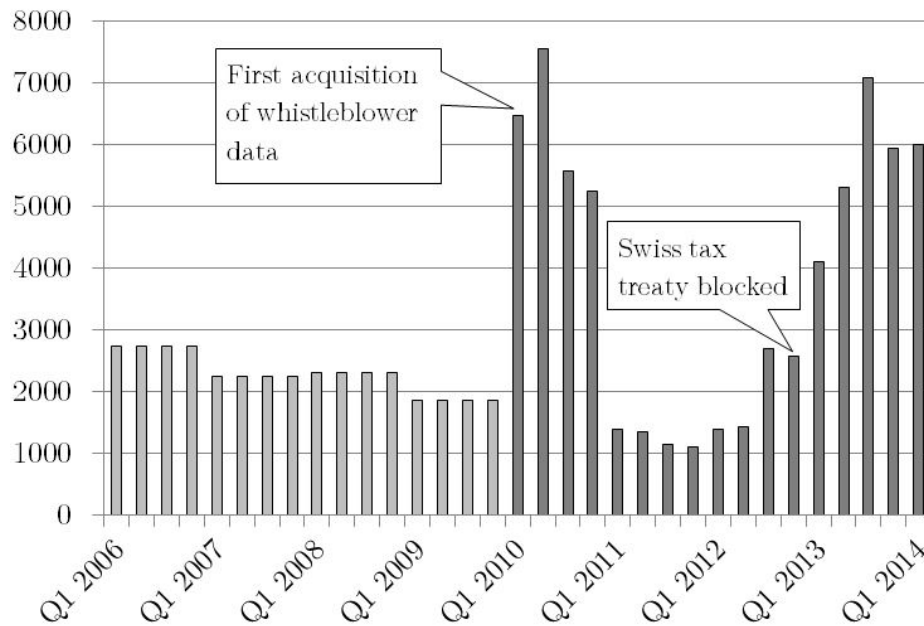
To illustrate the consequences of voluntary disclosure, I set up a model in which individuals may evade capital income taxes by transferring money to an offshore account. The government can set incentives for tax evaders to come clean by offering them the possibility to voluntarily disclose the tax evasion they committed. Offshore income indicated in a voluntary disclosure is then taxed, and fined at a rate chosen by the government.

From the government's point of view, a voluntary disclosure has two main advantages. First, it detects tax evasion that it potentially would not have exposed otherwise. Second, a voluntary disclosure saves the government audit and other administrative costs, such as the cost of the time spent collecting information from less-than-cooperative offshore banks.

Individuals in the model face ex-ante uncertainty about detection probabilities. This uncertainty reflects, for example, that there is a certain probability that an informant offers the government information about offshore accounts. Figure 1 clarifies the real-world significance of changes in detection probabilities using the example of Germany, which has bought whistle-blower information offered by former bank employees in tax havens at a large scale. The first acquisition of such data in February 2010 for € 2.5 million was widely discussed in the media. Further purchases followed in 2012 and 2013. In 2011, it became known that Germany and Switzerland had negotiated a tax treaty under which undeclared accounts of German nationals in Switzerland would be subject to a one-time tax payment. This single tax payment was supposed to be collected anonymously and to exempt the account holder from prosecution for tax evasion committed in the past. However, in November 2012, the upper house of the German parliament did not pass this tax treaty, thus making voluntary disclosure again the only possibility to come clean on past tax evasion.

The model reflects such changes in the underlying detection probabilities. With probability q , a high detection probability p_H occurs (e.g. because the government receives whistle-blower information). Correspondingly, with probability $1 - q$ there is no leak and the detection probability is low (p_L). This uncertainty not only reflects the real-world facts described above, but is also necessary for the model, as rational

Figure 1: Voluntary Disclosures per Quarter in Germany



Voluntary Disclosures per quarter in 15 German states (without Hesse), Q1 2006 - Q1 2014. Graph based on information from state finance ministries, data for 2006-2009 is extrapolated based on information for Lower Saxony and Schleswig-Holstein.

individuals will only voluntarily disclose tax evasion they optimally chose to commit earlier if they have received new information.

Not all individuals have the same willingness to evade taxes. Kleven et al. (2011) show that even among Danish tax payers who self-report their income (and thus have the opportunity to evade taxes), less than 40% actually evade taxes. I model such heterogeneity among individuals by a moral cost of tax evasion ($\alpha_i \in [0; A]$), which is specific to the individual. In equilibrium, there will be three different groups of individuals: First, a group of “non-evaders”, who have high moral costs and never evade taxes; second, “disclosers”, who evade taxes but voluntarily disclose if the high detection probability is drawn; and lastly “evaders”, who evade even when the high detection probability occurs.

Individuals decide about tax evasion and voluntary disclosure by maximizing their expected utility.² Individual i 's utility is

$$U_i = y - \tau_{is} - \mathbb{1}\alpha_i, \tag{1}$$

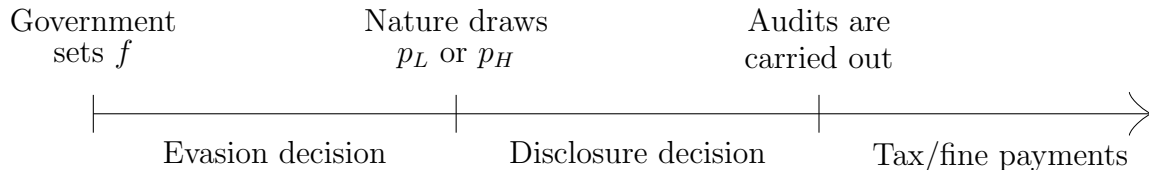
where y is the individual's pre-tax capital income, τ_{is} is the tax (and fine) payment that depends on the individual's tax evasion and disclosure decisions as well as the state of the world s , and $\mathbb{1}$ is an indicator function that is equal to one if the individual evades taxes and zero otherwise.³

Individuals are liable to pay taxes at the statutory rate t . They can evade this tax by hiding their money in an offshore account and not declaring the income derived from it. Due to the linear structure of the utility function, it is never optimal to declare a share of the true income. If the tax authorities detect the tax evasion, the individual pays a fine $F > 1$ that is proportional to the evaded tax. I treat the fine for tax evasion, F , as exogenous, assuming that it is set to be in an appropriate relation to punishments

²There is also a part of the literature that does not rely on expected utility theory. Alm et al. (1992) show in an experiment that some individuals overweight the low probability of audit. Dhimi and Al-Nowaihi (2010) model such behavior using prospect theory and predict a positive relationship between tax rates and tax evasion. However, when testing whether expected utility theory or prospect theory provide a better explanation of individuals' behavior regarding tax evasion, King and Sheffrin (2002) find experimental evidence in favor of expected utility theory.

³I assume risk-neutral individuals as this simplifies the exposition considerably. Very similar results concerning tax evasion and tax revenues can also be derived in a model with risk aversion.

Figure 2: Sequence of events



for other crimes.⁴

The government may allow voluntary disclosures of prior tax evasion. As is common practice, a voluntary disclosure requires that the individual reports all income on which he evaded taxes. He then has to pay taxes on this income retroactively. Additionally, the government imposes a fine f ($1 \leq f \leq F$), which is proportional to the evaded taxes. The government sets this fine to maximize revenues. Moreover, I assume that a voluntary disclosure clears the conscience of the individual, i.e. that after a voluntary disclosure the individual no longer has moral qualms about the tax evasion he committed earlier.

Given these tax and fine payments, an individual's utility will be

$$\begin{aligned}
 U^t &= y - ty && \text{if no evasion,} \\
 U^0 &= y - \alpha_i && \text{if evasion not detected,} \\
 U^F &= y - pFty - \alpha_i && \text{if evasion detected,} \\
 U^{vd} &= y - fty && \text{if evasion voluntarily disclosed.}
 \end{aligned}$$

Anticipating these different outcomes, individuals decide about tax evasion anticipating the following sequence of events described in figure 2. The government, in turn, anticipates individuals' decisions and sets the voluntary disclosure fine accordingly.

Figure 2 describes in more detail the stages of the game. First, the government sets the voluntary disclosure fine f . In the second stage, individuals decide whether they want to evade taxes. They anticipate that nature will draw the detection probability p in the next stage. After the detection probability is revealed, individuals may have the option to voluntarily disclose the tax evasion they committed. Lastly, the government audits some taxpayers, and individuals accordingly pay taxes and fines.

⁴Since the analysis of Kolm (1973), it is well known that with positive marginal costs of auditing, the government optimally sets the fine for tax evasion to the maximal level that is in line with moral and legal constraints. This is the implicit assumption in the model presented here.

2.2 Benchmark Without Voluntary Disclosure

As a benchmark, consider first the case when voluntary disclosure is not possible. Individuals then base their evasion decision on the expected detection probability, \bar{p} , with $\bar{p} = qp_H + (1 - q)p_L$. Comparing the expected utility when evading taxes $[\bar{p}U^F + (1 - \bar{p})U^0]$ with the utility if they pay all taxes (U^t) shows that individuals with a moral cost $\alpha_i < \alpha^0$ evade taxes, with α^0 given by

$$\alpha^0 = ty[1 - \bar{p}F]. \quad (2)$$

The number of evaders is higher the higher the potential gain from tax evasion (ty), and lower the higher the expected fine ($\bar{p}Fty$).⁵

The government incurs administrative costs c for each tax evading individual, as it checks and audits their tax returns and collects information from offshore banks. For later use, tax revenues net of administrative costs, T^0 , are given by

$$T^0 = \int_0^{\alpha^0} [\bar{p}Fty - c] dG(\alpha_i) + \int_{\alpha^0}^A ty dG(\alpha_i). \quad (3)$$

The first term denotes taxes and fines net of administrative costs that are collected from evaders; the second term are taxes paid by non-evaders.

2.3 Voluntary Disclosure

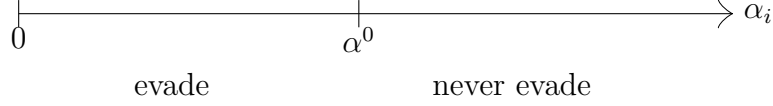
A voluntary disclosure implies that an individual reports all income on which he evaded taxes to the authorities. In most countries voluntary disclosures are associated with a fine (see Table 1 for details). The voluntary disclosure fine $f \geq 1$ is lower than a fine for tax evasion ($f \leq F$), and in some countries no fine is levied ($f = 1$).

If nature draws the low detection probability, it cannot be rational to voluntarily disclose – after all, the same individual chose to evade taxes when it was still unclear whether the low or the high detection probability would arise. However, if nature draws the high detection probability, evaders with relatively high moral costs of tax evasion may opt for a voluntary disclosure, preferring a certain, but lower, fine payment and clear conscience over the tax saving with the risk of a high fine if evasion is detected. In particular, individuals will disclose if their utility after a disclosure U^{vd} is higher than

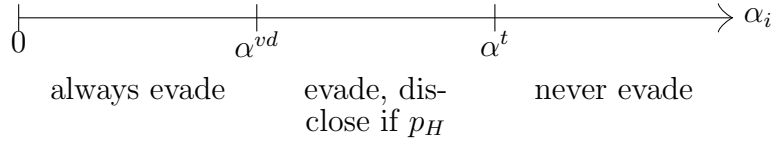
⁵As common in the literature I assume that $\bar{p}F < 1$, i.e. that tax evasion is worthwhile in expectation.

Figure 3: Behavior of individuals with different moral costs α_i .

Without voluntary disclosure program:



With voluntary disclosure program:



the expected utility if they evade $[p_H U^F + (1 - p_H)U^0]$. Thus, individuals disclose when their moral cost are $\alpha_i \geq \alpha^{vd}$, with

$$\alpha^{vd} = ty(f - p_H F). \quad (4)$$

More individuals voluntarily disclosure when the fine associated with voluntary disclosure is low. But even when there is no fine after a voluntary disclosure ($f = 1$), not all individuals will voluntarily disclose if the detection probability p_H is sufficiently low that there still is an expected gain from tax evasion.

Even with the voluntary disclosure possibility, not everyone evades taxes. In particular, individuals with moral costs $\alpha_i \geq \alpha^t$ choose no evasion over evading and disclosing when the detection probability is high, with

$$\alpha^t = ty \frac{1 - qf - (1 - q)p_L F}{1 - q}. \quad (5)$$

α^t is larger than α^{vd} when $f < (1 - q)F(p_H - p_L)$. After deriving the equilibrium fine it will become clear that this condition always holds in equilibrium. Figure 3 shows how the different types of individuals behave in equilibrium depending on whether voluntary disclosure is possible or not.

Ex ante, i.e. before the detection probability is revealed, expected tax revenues net of administrative costs when voluntary disclosure is possible are

$$T = \int_0^{\alpha^{vd}} [\bar{p}Fty - c] dG(\alpha_i) + \int_{\alpha^{vd}}^{\alpha^t} [qfty + (1 - q)(p_L Fty - c)] dG(\alpha_i) + \int_{\alpha^t}^A ty dG(\alpha_i). \quad (6)$$

The first term refers to the revenue collected from evaders, the second term to the expected revenue from those who voluntarily disclose when the detection probability is high, and the last term to the revenue collected from non-evaders. Note that no administrative costs arise when a voluntary disclosure has been made, as the disclosure has to contain all information necessary for assessing the tax liability.

The government sets the fine that applies after a voluntary disclosure to maximize the expected tax revenues. Assuming that there is a mass M of taxpayers with moral costs α_i distributed uniformly in the interval $[0, A]$, eq. (6) can be rewritten as

$$T = [\bar{p}Fty - c] \frac{\alpha^{vd}M}{A} + [qfty + (1 - q)(p_L Fty - c)] \frac{(\alpha^t - \alpha^{vd})M}{A} + ty \frac{A - \alpha^t M}{A}. \quad (7)$$

Maximizing this expression over f yields the optimal voluntary disclosure fine f^* as

$$f^* = 1 + (1 - q)F(p_H - p_L) - \frac{(1 - q)^2 c}{2qty}. \quad (8)$$

The optimal fine for voluntary disclosure is higher when the fine for tax evasion (F) is higher, and lower when the administrative costs associated with tax evasion are higher. When the difference between the detection probabilities in the two states of the world is large, the voluntary disclosure fine is higher as the difference in detection probabilities increases the incentive for individuals to come clean.

For further interpretation, consider the cutoffs α^{*vd} and α^{*t} as a function of the underlying parameters:

$$\alpha^{*vd} = (1 - \bar{p}F)ty - \frac{(1 - q)^2 c}{2q}, \quad (9)$$

$$\alpha^{*t} = (1 - \bar{p}F)ty - \frac{(1 - q)c}{2}. \quad (10)$$

Clearly, when there are no administrative costs associated with fining detected tax evasion, $\alpha^{*vd} = \alpha^{*t} (= \alpha^0)$, i.e. the revenue-maximizing government sets the fine so high that voluntary disclosure is not attractive for any evaders.

To understand this result, consider how voluntary disclosure affects the tax evasion decision. Voluntary disclosure can be interpreted as an option that an individual may exercise when the detection probability proves to be high. Without this option (i.e. in an economy without voluntary disclosure), individuals come to a decision about evading taxes based on the expected probability of detection, \bar{p} . In contrast, if voluntary disclosure is possible, individuals anticipate that they can voluntarily disclose when the

detection probability is high and thus decide about tax evasion based only on the low detection probability p_L and the voluntary disclosure fine f . In the extreme case of no voluntary disclosure fine ($f = 1$), they evade as if the detection probability was p_L for sure. As more people evade taxes when the detection probability is lower, the possibility of voluntary disclosure increases the number of people who evade taxes to start with.

Proposition 1 *A voluntary disclosure program with an optimally set fine in the presence of administrative costs increases the number of individuals that evade taxes.*

Proof. Proof by contradiction: Assume $\alpha^t < \alpha^0$. Then, from eqs. (2) and (10),

$$ty [1 - \bar{p}F] > ty [1 - \bar{p}F] + \frac{(1 - q)c}{2},$$

which is a contradiction as $c \geq 0$. ■

For a revenue-maximizing government, the higher tax evasion when a voluntary disclosure program exists seems to be an argument against introducing such a program. However, voluntary disclosure has several other effects on tax revenues. With voluntary disclosure, more individuals pay tax (and the low fine f) in the state of the world with the high detection probability, and administrative costs are lower. In contrast, in the low detection probability state, it has clear negative effects as there is more evasion but no voluntary disclosures take place.

To see the overall effect on tax revenues, I compare the equilibrium tax revenues T^* (derived by inserting the optimal fine f^* and α^{*vd} and α^{*t} in eq. 7) with eq. (3), assuming a uniform distribution of α_i also in this case. This shows

$$T^* > T^0 \Leftrightarrow \underbrace{\frac{(1 - q)c}{2} \left\{ 2 - \frac{1 - q}{q} [\bar{p}Fty - c - F\bar{p}] + \frac{(3 - q)c}{2qty} \right\}}_{\equiv \Omega} > 0. \quad (11)$$

First, note that $T^* = T^0$ when there are no administrative costs ($c = 0$). Without administrative costs of collecting evaded taxes, the government optimally sets the voluntary disclosure fine so high that no voluntary disclosure takes place in equilibrium (see eqs. 10 and 9). This behavior is optimal as an attractive voluntary disclosure program (i.e. a program with a fine sufficiently low that there is some uptake) would increase tax evasion (and thereby tax revenues), without the corresponding benefit of

lower administrative costs. However, when there administrative costs, $T^* - T^0$ is rising in c , i.e. higher administrative costs make voluntary disclosure more attractive for the revenue-maximizing government. Therefore, in this case the government sets the voluntary disclosure fine so that voluntary disclosure takes place in equilibrium (i.e. that $\alpha^{*vd} < \alpha^{*t}$, as visible from eqs. 9 and 10). The following proposition summarizes these results:

Proposition 2 *If there are administrative costs when assessing evaded taxes, the existence of a voluntary disclosure program raises expected tax revenues net of administrative costs.*

Proof. Ω from eq. (11) is zero when $c = 0$, and $\frac{\partial \Omega}{\partial c} > 0$. Therefore, for any positive c , $\Omega > 0 \Leftrightarrow T^* > T^0$. ■

Intuitively, as long as administrative costs are positive, the voluntary disclosure mechanism generates efficiency gains in terms of reduced collection costs. The government can increase these efficiency gains by drawing people into the voluntary disclosure scheme, but this implies setting a low fine and foregoing additional tax revenue. In addition, a low fine implies that evasion becomes more attractive ex ante. But clearly, when the government has an additional instrument available, it will use it such that its net tax revenues are increased.

3 Empirical Analysis

In the following, I empirically test some of the predictions from the theoretical model. The main test considers Proposition 1, i.e. whether voluntary disclosure increases tax evasion. In a second test, I analyze a shock to the detection probability to gauge the size of the tax revenues effects.

First, I study how the introduction of a voluntary disclosure program in the U.S. in 2009 affected tax evasion. In Proposition 1 the model predicted that introducing voluntary disclosure increases tax evasion. To test this effect, I use data on offshore account balances, comparing the offshore money of U.S. residents with those from various control countries using a synthetic control method.

Moreover, the model predicts that voluntary disclosures take place only when the high detection probability occurs, and that the voluntary disclosures lead to increased

net tax revenues. An event that came close to such an exogenous increase in the detection probability is the acquisition of whistle-blower data of Swiss bank accounts by German tax authorities in early 2010. Figure 1 on page 6 confirmed that this acquisition was indeed associated with a strong increase in the use of voluntary disclosures.

The supposed positive effect on tax revenues is the main advantage of voluntary disclosure programs. However, there exist no estimates the size of this effect for a permanent voluntary disclosure program. Section 3.2 will provide some first estimates of these revenue consequences.

3.1 United States: Voluntary Disclosure and Tax Evasion

3.1.1 Background

The U.S. introduced a voluntary disclosure program in 2009.⁶ This program ran from mid-March till mid-October 2009 and was considered a success: About 15,000 taxpayers voluntarily disclosed prior tax evasion (U.S. Government Accountability Office, 2014). In February 2011, the IRS announced a follow-up program (the 2011 Offshore Voluntary Disclosure Initiative), which ended in mid-September 2011. Again, a large number of taxpayers (about 18,000) took advantage of this program. Ultimately, the IRS began an open-ended offshore voluntary disclosure program (OVDP) in January 2012. Table 2 provides an overview of some of the locations of foreign accounts declared in the 2009 program, showing that they referred to many different countries.

[Table 2 about here.]

All three initiatives had relatively similar requirements. They referred specifically to unreported income from undisclosed offshore accounts for years after 2003. Individual taxpayers disclosing income in the program have to pay the full amount of tax, plus interest, and a monetary penalty of up to 25% of unpaid taxes. Moreover, there is an additional penalty of 20% (2009 program), 25% (2011 initiative) or 27.5% (2012 program) of the value of the assets in the foreign bank accounts. These penalties are

⁶The IRS already experimented with voluntary disclosure programs in the first half of the twentieth century. However, since 1952, no formal policy regarding intentional tax evaders has existed until 2009, except for a three-month program in 2003 (the 2003 offshore voluntary compliance initiative). As only 1,321 taxpayers used the 2003 initiative, I will in the following focus on the program started in 2009. For more information, see Madison (2001) and U.S. Government Accountability Office (2013).

significantly lower than the general punishments for tax evasion or failure to declare foreign accounts.⁷ Table 3 gives an overview of the taxes and penalties paid by participants in the 2009 OVDP.

[Table 3 about here.]

3.1.2 Data and Descriptives

I use the introduction of the first program in 2009 to estimate how the existence of voluntary disclosure has affected tax evasion activities. By its nature, data on tax evasion is scarce. I therefore proxy for tax evasion using the deposits of U.S. residents in offshore banking centres.⁸ These are unpublished quarterly data obtained from the Bank for International Settlements (BIS). Table 4 gives an overview of the amount of assets held in offshore banking centres, and shows that these assets make up a significant fraction of the overall assets U.S. residents hold abroad.

[Table 4 about here.]

There are some potential issues with measuring tax evasion indirectly by foreign assets: First, it is not clear if these deposits really belong to individuals. Johannesen and Zucman (2014) show that households hold at least 50% of the tax haven deposits. Second, it is possible that individuals do pay tax on this income. There is, however, little reasons except tax evasion for individuals to hold assets in the very small countries in the offshore banking aggregate.⁹

A further potential problem when studying the introduction of voluntary disclosure in the U.S. is the Foreign Account Tax Compliance Act (FATCA), which went into effect on March 18, 2010, about a year after the introduction of voluntary disclosure. However, only a few of the relevant tax haven countries have concluded agreements with

⁷Civil penalties for tax evasion are the greater of \$100,000 or 50% of the total balance of the foreign account. In addition, criminal penalties of up to \$500,000 or up to 10 years of imprisonment are possible for the failure to file a report of foreign bank and financial accounts.

⁸These offshore banking centers are the Bahamas, Bahrain, Bermuda, Cayman Islands, Curacao, Guernsey, Hong Kong, Isle of Man, Jersey, Macao, Netherlands Antilles, Panama, and Singapore.

⁹Johannesen and Zucman (2014) also show that tax treaties signed by a tax haven significantly decrease deposits held in this haven, confirming that tax haven deposits are a reasonable proxy for evaded taxes. I will discuss later how the signing of tax treaties may impact the results.

the U.S. regarding the implementation of FATCA (in particular, Bermuda, Cayman Islands, Isle of Man, and Jersey), and these treaties only enter into force in 2013 or 2014. Nevertheless, to have as little influence of FATCA in this study as possible, I end the observation period with the first quarter of 2010, looking only at the year directly following the introduction of voluntary disclosure and ending before the implementation of FATCA.

3.1.3 Research Design

I use the synthetic control method, which Abadie et al. (2010) developed specifically to analyze the effectiveness of policy interventions at an aggregate level.¹⁰ This method extends the difference-in-differences framework to allow that the effects of unobserved variables on the outcome vary over time. It proceeds by creating a control region (“synthetic U.S.”) from a weighted average of other countries without policy changes (the “donor pool”). The weights are chosen so that the synthetic U.S. are as similar as possible to the U.S. Specifically, denoting the vector of preintervention variables for the treated country by X_1 , and a matrix with characteristics of the potential control countries by X_0 , the synthetic control method chooses the weights W used in forming the synthetic control to minimize $\sqrt{(X_1 - X_0W)'V(X_1 - X_0W)}$, where V is a positive semidefinite matrix chosen to minimize the mean square prediction error over the pretreatment period. An important advantage of this method is that the data choose the control group, instead of the researcher.

The BIS has made available the data on deposits in offshore banking centers of counterparties from several countries (Austria, Belgium, Canada, Denmark, Finland, France, Germany, Ireland, Netherlands, Norway, Spain, Sweden, United Kingdom and United States). The data set is on a quarterly basis, starting in the first quarter of 2006, so that data on twelve pre-intervention quarters is available. I discard from the donor pool the countries that also had temporary voluntary disclosure program in the time period (France, Netherlands, and the United Kingdom). I also drop Germany due to the special circumstances described in Section 3.2, and Norway due to a large field experiment that was carried out on the full population of offshore tax evaders (Bott et al., 2014). As almost all countries signed tax treaties with one or some of the tax havens in the offshore banking aggregate, I cannot drop these countries. No country, however, has signed tax treaties with all tax havens in the sample period.

¹⁰For other applications of this method see e.g. Kleven et al. (2013) or Hinrichs (2012).

The outcome variable of interest, *Liab*, are the deposits in offshore banking centers held by residents of various countries (“counterparty countries”). I scale the deposits by the GDP of the counterparty country. To control for the high remaining variance in the level of offshore deposits, I demean *Liab* by subtracting the counterparty country’s average of *Liab* from each observation.

To construct the “synthetic United States” I also use the per capita GDP as a predictor for the offshore deposits. The synthetic United States are then constructed to match as closely as possible the average GDP per capita before 2009, as well as several lagged values *Liab*. I use the lag of the last quarter before the introduction of voluntary disclosure (Q4 2008), and then every other quarter going back till Q2 2006.

3.1.4 Results

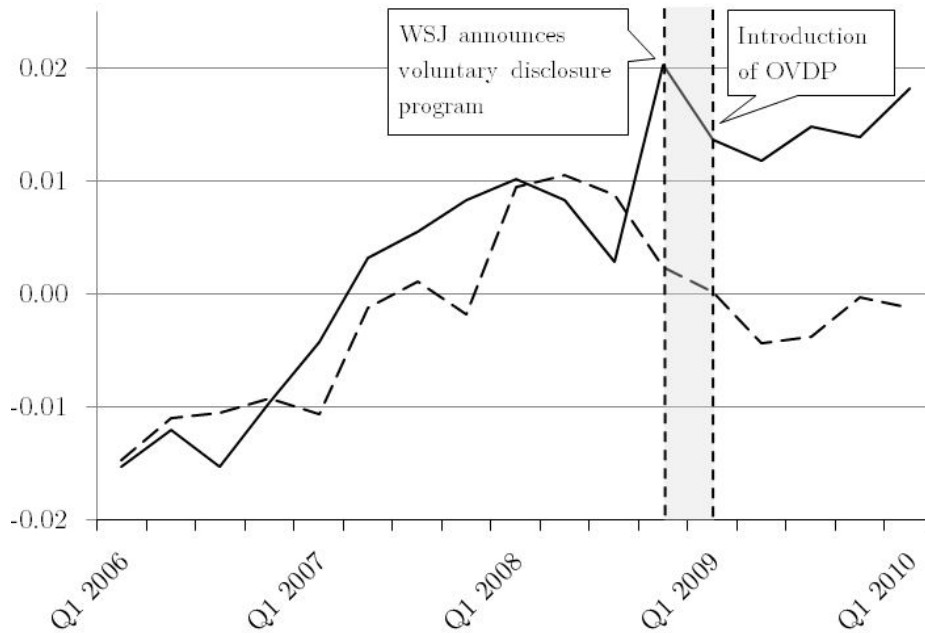
Using the method suggested by Abadie et al. (2010), a combination of Canada (62.4%), Belgium (23.3%) and Austria (14.3%) matches the United States best. All other countries obtain a zero weight in the construction of the synthetic United States. During the period studied, there were only two tax treaties between these countries and offshore banking centers: A treaty between Canada and the Netherlands Antilles, signed on August 29, 2009, and between Belgium and the Bahamas, signed on December 7, 2009.¹¹ According to Johannesen and Zucman (2014), these two tax havens were among the three where bank deposits changed the least in the period in which the treaties were signed. Moreover, if tax evaders shifted their deposits to other tax havens in response to the treaties, they likely shifted them to another offshore banking center.

Figure 4 shows how the offshore deposits of residents of the United States (solid line) and its synthetic counterpart (dashed line) evolved during the period Q1 2006 to Q1 2010. There is a reasonably good fit up to 2009, when voluntary disclosure was introduced. As predicted by the model, foreign deposits of U.S. residents rise significantly after the introduction of voluntary disclosure. The study period ends at the end of Q1 2010, when FATCA went into effect. As FATCA was designed to limit offshore tax evasion, a clear identification of the effects of voluntary disclosure is no longer possible after this date.

A notable feature of Figure 4 is that the tax evasion starts to rise in the last quarter of 2008. This can be explained by an announcement effect, as the Wall Street

¹¹Based on tax treaty information from Johannesen and Zucman (2014).

Figure 4: Trends in *Liab*: United States vs. synthetic United States



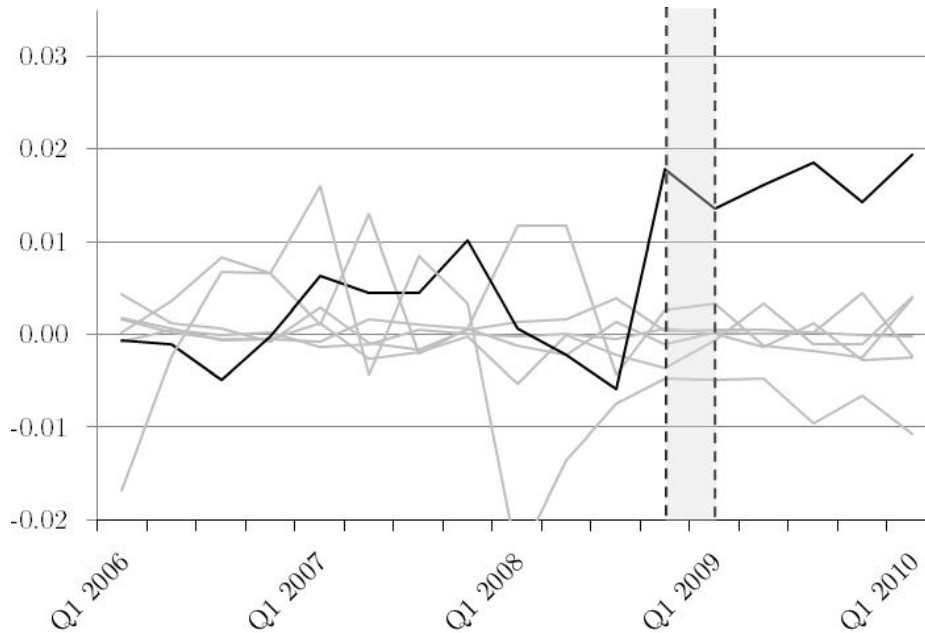
Journal reported in November 2008 that the IRS was considering a voluntary disclosure program for offshore tax evasion.¹² The article did not mention that the program would be temporary, instead it implied that the IRS would in the future collaborate more with repentant tax evaders.

To evaluate the significance of these estimates, one has to consider if these results could be driven solely by chance. To evaluate this, I carry out placebo tests where I randomly select a country instead of the United States as the treated country. If the placebo studies show that the gap estimated for the U.S. is unusually large relative to the gaps of the countries that did not introduce voluntary disclosure, the present analysis provides significant evidence of an effect of voluntary disclosure.

I thus apply the synthetic control method to every country in the donor pool. In

¹²“UBS Clients Seek Amnesty on U.S. Taxes”, The Wall Street Journal, November 24, 2008. One might think that the prosecution of the Swiss bank UBS for abetting tax evasion might have caused tax evaders to shift their assets to other tax havens. However, the FBI’s investigation of the UBS tax evasion case was already underway and public knowledge in mid-2008, and in July 2008, UBS announced that it would cease providing cross-border private banking services to US clients. Moreover, an analysis of data on fiduciary deposits of U.S. citizens in Swiss banks shows that in 2008 and 2009, their assets did not change relative to those deposits held by other nationalities.

Figure 5: Placebo test



each iteration I assign the intervention to a different country. Figure 5 reports the results of the placebo test, with each line representing the gap between *Liab* of the treated and the synthetic control country. The gray lines show the gap for countries in the donor pool, and the the black line denotes the gap estimated for the United States.¹³

The placebo test shows that the high values of *Liab* in 2009 and 2010 are unlikely to arise by chance, confirming the theoretical result that the introduction of voluntary disclosure leads to more tax evasion.

3.2 Germany: Voluntary disclosure and tax revenues

3.2.1 Background and Descriptives

Germany has a long-established voluntary disclosure program in its general tax law. It treats a voluntary disclosure as a means to return to “tax honesty” and does not punish tax evasion if the taxpayer voluntarily discloses the tax evasion before the tax

¹³As in Abadie et al. (2010) I drop countries that have a preintervention mean squared prediction error more than double that of the United States.

authorities start an investigation. For a successful voluntary disclosure, an individual has to report all taxes evaded in the last ten years. He then has to repay the taxes evaded in this ten-year period, plus a 6% interest payment per year. There is no fine (beyond the heightened interest rate) after a voluntary disclosure.

The possibility of a penalty-free voluntary disclosure has led to public discussion after some German federal states bought data sets provided by informants from tax haven banks. This significantly increased the (perceived) detection probabilities for tax evasion. The first CD was bought on February 26th, 2010, by the German state of Northrhine-Westphalia. It contained information on the names and credit balances of German-owned accounts of an undisclosed bank in Switzerland. The state of Northrhine-Westphalia, co-financed by the federal government of Germany, paid €500 million to an unknown informant. Since then, German states have bought several other additional CDs with data on accounts in Switzerland and Luxembourg. The data have been shared freely among the German federal states, which are the jurisdictions in charge of all tax collections, including federal income taxes.

3.2.2 Research Design

In the theoretical setting presented in section 2, a higher detection probability induces some individuals who chose to evade taxes earlier to voluntarily disclose.¹⁴ This empirical test provides some first evidence to quantify the revenue effects of voluntary disclosures.

I use that German statistics separate income tax revenues into different categories.¹⁵ One such category is the *veranlagte Einkommensteuer*, self-reported income tax, which summarizes all revenue collected from self-reported income, such as entrepreneurial income, interest income received on foreign bank accounts, and revenue raised after a voluntary disclosure. In contrast, interest and dividend income earned within Germany, or on foreign assets held in a deposit at a German bank, are subject to *Abgeltungsteuer*, capital income withholding tax.

In the following I will employ a difference-in-difference (DiD) design, testing how

¹⁴In a more dynamic setting a higher detection probability would also lead to less tax evasion in later periods. I will briefly discuss below why my setup should be able to control for additional effects via changes in evasion.

¹⁵The data in this section is from the GENESIS data base provided by the German Federal Statistical Office.

the increase in the detection probability after the acquisition of the first whistle-blower data set in February 2010 changed the self-reported income tax revenue relative to the capital income withholding tax revenue.¹⁶

The validity of the DiD analysis rests on the assumption of common trends before the intervention. This precondition implies that without the treatment, the dependent variable of treated and control groups would move in the same direction. Figure 6 provides some evidence that this assumption holds. Revenues from self-reported income tax, and from capital income withholding tax, both increase from 2006-2008, then fall in 2009. These movements are broadly in line with the overall economic development in Germany in these years. In 2010, after the acquisition of the whistle-blower data, the revenues for the two tax collection methods diverge: while withholding tax revenues continue to decline, revenues from self-reported income tax revenues increase, implying that the additional revenues from voluntary disclosures overcompensate the negative trend in tax revenues.

3.2.3 Results

Table 5 reports results from this DiD test. It shows that a higher detection probability in Germany led to voluntary disclosures that increased tax revenues by about €468 million over the next year (col. 1), or by about €117 million per quarter (col. 2). Therefore, a long-established voluntary disclosure program seems to significantly increase tax revenues, in contrast to temporary tax amnesties, which were found in early time-series studies to have no impact on tax collections (Alm and Beck, 1993).

[Table 5 about here.]

15 of the 16 federal states have answered queries about the number of voluntary disclosures, and in these 15 states there were 24,862 voluntary disclosures in 2010, about 22,700 more than in 2006 to 2009. Assuming that the missing state (Hesse) had

¹⁶If tax revenues are also affected by a decrease of tax evasion, this change would primarily increase the capital income withholding tax revenue, as most people invest via a domestic bank when not evading taxes. German banks withhold taxes on capital income also when the capital is invested in foreign assets. Simply declaring wealth held abroad on which taxes were evaded earlier is a highly risky strategy, as this attracts attention from auditors, and most high-income individuals in Germany are audited. Thus, as lower tax evasion mostly affects capital income withholding tax revenue, the revenue estimates from the DiD test should reflect only the direct revenue effect of voluntary disclosures.

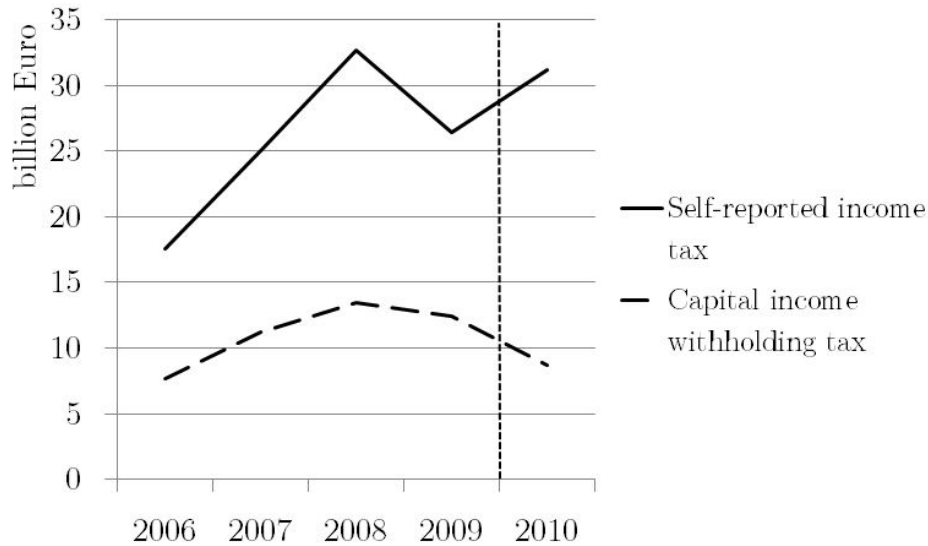


Figure 6: Revenues of *veranlagte Einkommensteuer*, self-reported income tax, and *Abgeltungsteuer*, capital income withholding tax, 2006-2010.

about the same number of disclosures per person as the other states, one can infer that about 24,500 additional voluntary disclosures were caused by the increased detection probability in Germany in 2010. Based on these numbers, the average additional revenues per voluntary disclosure are €19,100. Considering that taxes for the last ten years have to be repaid after a voluntary disclosure, this number is relatively modest: At the standard tax rate of 25%, this implies undeclared capital income below €80,000 over this ten year period. Considering that the tax payment includes a 6% interest payment, the annual evaded tax is about €1500.

4 Conclusion

This paper provides some first results on the effects of voluntary disclosure of tax evasion, a topic that has so far not been studied in the economics literature. The theoretical model has pointed out that the existence of a voluntary disclosure mechanism increases tax evasion. Empirical analysis considering the introduction of voluntary disclosure in the U.S. has confirmed this effect. Nevertheless, for a revenue-maximising government, a voluntary disclosure program can be sensible as it provides a way to collect revenues without incurring high administrative costs for prosecuting tax evaders. Studying the acquisition of whistle-blower data by German states has provided some

estimates for these tax revenue effects.

As this paper is the first to study voluntary disclosures, it has been able to shed light on only some of its aspects. An important argument of the opponents of voluntary disclosure questions the fairness of allowing tax evaders to come clean with a very low or even no punishment. This argument lies clearly outside the revenue-maximization framework provided in this paper. A possible extension to the model could consider one of the arguments in favor of voluntary disclosures: That it offers a good way to come clean for taxpayers who have made unintentional errors when filing their tax returns, or inherited offshore accounts. In any case, the topic of voluntary disclosures of tax evasion clearly provides interesting further research questions.

References

- Abadie, A., Diamond, A., Hainmueller, J. 2010. Synthetic control methods for comparative case studies: Estimating the effect of California's tobacco control program. *Journal of the American Statistical Association*, 105, 493–505.
- Allingham, M. G., Sandmo, A. 1972. Income tax evasion: A theoretical analysis. *Journal of Public Economics*, 1, 323–338.
- Alm, J. 2012. Measuring, explaining, and controlling tax evasion: Lessons from theory, experiments, and field studies. *International Tax Public Finance*, 19, 54–77.
- Alm, J., Beck, W. 1990. Tax amnesties and tax revenues. *Public Finance Quarterly*, 18, 433–453.
- Alm, J., Beck, W. 1993. Tax amnesties and compliance in the long run: A time series analysis. *National Tax Journal*, 46, 53–60.
- Alm, J., McClelland, G. H., Schulze, W. D. 1992. Why do people pay taxes? *Journal of Public Economics*, 48, 21–38.
- Andreoni, J. 1991. The desirability of a permanent tax amnesty. *Journal of Public Economics*, 45, 143–159.
- Bott, K., Cappelen, A., Sørensen, E. Ø., Tungodden, B. 2014. You've got mail: A randomised field experiment on tax evasion. NHH Norwegian School of Economics.
- Dhami, S., Al-Nowaihi, A. 2010. Optimal taxation in the presence of tax evasion: Expected utility versus prospect theory. *Journal of Economic Behavior & Organization*, 75, 313–337.
- Feess, E., Heesen, E. 2002. Self-reporting and ex post asymmetric information. *Journal of Economics*, 77, 141–153.
- Feess, E., Walzl, M. 2005. Optimal self-reporting schemes with multiple stages and option values. *International Tax and Public Finance*, 12, 265–279.
- Gravelle, J. G. 2009. Tax havens: International tax avoidance and evasion. *National Tax Journal*, 62, 727–753.

- Hinrichs, P. 2012. The effects of affirmative action bans on college enrollment, educational attainment, and the demographic composition of universities. *The Review of Economics and Statistics*, 94, 712–722.
- Johannesen, N., Zucman, G. 2014. The end of bank secrecy? An evaluation of the G20 tax haven crackdown. *American Economic Journal: Economic Policy*, 6, 65–91.
- Kaplow, L., Shavell, S. 1994. Optimal law enforcement with self-reporting of behavior. *Journal of Political Economy*, 102, 583–606.
- King, S., Sheffrin, S. 2002. Tax evasion and equity theory: An investigative approach. *International Tax and Public Finance*, 9, 505–521.
- Kleven, H. J., Knudsen, M. B., Kreiner, C. T., Pedersen, S., Saez, E. 2011. Unwilling or unable to cheat? Evidence from a tax audit experiment in Denmark. *Econometrica*, 79, 651–692.
- Kleven, H. J., Landais, C., Saez, E. 2013. Taxation and international migration of superstars: Evidence from the European football market. *American Economic Review*, 103, 1892–1924.
- Kolm, S.-C. 1973. A note on optimum tax evasion. *Journal of Public Economics*, 2, 265–270.
- Madison, A. D. 2001. An analysis of the IRS's voluntary disclosure policy. *Tax Lawyer*, 54, 729–752.
- Malik, A. S., Schwab, R. M. 1991. The economics of tax amnesties. *Journal of Public Economics*, 46, 29–49.
- OECD. 2010. *Offshore Voluntary Disclosure: Comparative Analysis, Guidance and Policy Advice*. OECD Publishing.
- Sandmo, A. 2005. The theory of tax evasion: A retrospective view. *National Tax Journal*, 58, 643–663.
- Slemrod, J. 2007. Cheating ourselves: The economics of tax evasion. *Journal of Economic Perspectives*, 21, 25–48.
- Stella, P. 1991. An economic analysis of tax amnesties. *Journal of Public Economics*, 46, 383–400.

U.S. Government Accountability Office. 2013. Offshore Tax Evasion: IRS Has Collected Billions of Dollars, but May be Missing Continued Evasion. GAO-13-318.

U.S. Government Accountability Office. 2014. IRS's offshore voluntary disclosure program: 2009 participation by state and location of foreign bank accounts.

Yitzhaki, S. 1974. A note on income tax evasion: A theoretical analysis. *Journal of Public Economics*, 3, 201–202.

Zucman, G. 2013. The missing wealth of nations: Are Europe and the U.S. net debtors or net creditors? *Quarterly Journal of Economics*, forthcoming.

Table 1: Voluntary Disclosure in OECD Countries

Country	Legal Basis	Tax & Interest		Penalty	
		Tax	Interest	Monetary	Imprisonment
Australia	General law	Full amount	Varies	Varies	Possible
Austria	General law	Full amount	2.38%	No	No
Belgium	General law	Full amount	7.00%	0-10% of tax	No
Canada	General law	Full amount	Yes	No	No
Chile	General law	Full amount	1.50%	10-300% of tax	≤ 15 years
Czech Rep.	General law	Full amount	ca. 15%	No	No
Denmark	General law	Full amount	Varies	50% of tax	Possible
Estonia	General law	Full amount	0.06%/day	≤ 18,000 EEK	Possible
Finland	General law	Full amount	Yes	30% of tax	≤ 4 years
France	Special program (2009, 2013-14)	Full amount	0.4%/month	Varies	No
Germany	General law	Full amount	6.00%	No	No
Greece	Special program	5% to 8% of total capital		No	No
Hungary	General law	Full amount	1.5-1.75x std. rate	only heightened interest	No
Iceland	None	–	–	–	–
Ireland	General law	Full amount	Varies	3-10% of tax	No
Israel	Special program (2011-2012)	Full amount	No	No	No
Italy	General law	Full amount	Varies	Reduced	No
	Special program in 2008	5% of assets		No penalty	
Japan	General law	Full amount	4-14.6%	Varies	≤ 10 years
Korea	General law	Full amount	0.03%/day	Reduced	Varies
Luxembourg	General law	Full amount	0.6%/month	≤ 10% of tax	No
Mexico	General law	Full amount	Yes	No	Rarely
	Special program in 2009		4-7%	No	No
Netherlands	General law	Full amount	Varies	≤ 300% of tax	No
	Special program in 2009, 2013	Same as gen- eral law		no penalties	
New Zealand	General law	Full amount	Varies	Reduced	No
Norway	General law	Full amount	Yes	No	No
Poland	General law	Full amount	75% of regu- lar rate	No	No
Portugal	General law	Full amount	4.08%	Reduced	No
	Special program in 2009	5% of discl. assets	None	No	No
Slovak Rep.	General law	Full amount	Yes	No	No
Slovenia	General law	Full amount	Increased	No	Possible
Spain	General law	Full amount	Yes	5-20%	No

Sweden	General law	Full amount	Yes	No	No
Switzerland	General law (since 2010)	Full amount	Yes	None, if repeat offender \geq 20% of tax	No
Turkey	General law	Full amount	Yes	No	No
	Special program in 2009	2% or 5% of tax base		No	No
United Kingdom	General law	Full amount	Varies	Reduced	No
	Special program in 2009/2010	Full amount		10-20% of tax	No
United States	Special program 2009, 2011, 2012	Full amount	Varies	20-27.5% of tax, 20% of offshore balance	No

Table based on information from OECD (2010), updated with information from tax authority and tax consultancy homepages.

Table 2: Location of Foreign Bank Accounts, 2009 OVDP

Country	Frequency	Percent
Switzerland	5,427	42%
United Kingdom	1,058	8%
Canada	556	4%
France	528	4%
Israel	510	4%
Germany	484	4%
Hong Kong	362	3%
Singapore	156	1%
Cayman Islands	148	1%
Isle of Man	90	1%
Jersey	72	1%
Bahamas	69	1%

Locations of foreign bank accounts reported in the 2009 offshore voluntary disclosure program, selected countries. Data from U.S. Government Accountability Office (2014).

Table 3: Accounts, Tax Payments and Penalties from 2009 OVDP

	Mean	10th Pctl.	Median	90th Pctl.	Total
Offshore account balance	1,923,310	78,315	568,735	4,054,505	28.9 bn
Tax and interest	127,326	155	16,234	247,528	1.9 bn
OVDP penalty	375,879	13,320	107,949	793,166	5.6 bn

Account balances, tax and penalty payments within 2009 OVDP for 2003-2008 in U.S.-\$. The account balance is an estimate for the highest balance between 2003 and 2008. Data from U.S. Government Accountability Office (2014), totals are own extrapolations.

Table 4: Foreign Asset Holdings of U.S. Residents

	2006	2009	2012
Assets held abroad (total)	\$ 3,205bn	\$ 4,193bn	\$ 4,132bn
Assets in offshore centers	\$ 1,258bn	\$ 1,565bn	\$ 1,216bn

All variables are for U.S. residents. Source: BIS.

Table 5: Difference-in-Difference Results

	(1)	(2)
Post	-233,315** (-2.53)	-58,329** (-2.56)
Treated	935,885** (2.34)	233,971** (2.37)
Post*Treated	468,476** (2.67)	117,119** (2.71)
Observations	64	256
R^2	0.117	0.108

This table shows results from a DiD test that considers the acquisition of whistle-blower information on tax evaders by the German government in February 2010. The dependent variables are self-reported income tax and capital income withholding tax revenues of the 16 German states in thousand Euro, and $Treated = 1$ for self-reported income tax revenues. Column (1) uses tax revenues at the yearly level for 2009 and 2010, column (2) quarterly data from the same period. All regressions are run with an intercept; standard errors are clustered by state. T-statistics in parenthesis, ** indicates significance at the 5% level. Column (2) includes quarterly fixed effects.