Banks and International Tax Cooperation

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Abstract

Governments enhance their efforts to counteract global tax flight to reduce large losses of tax revenue. Households are able to evade taxes on worldwide income, provided that banks give them this opportunity. The third-party information reporting allows financial institutions to reduce households' risk of detection. This paper studies the conditions under which financial institutions as cross-border tax intermediaries can be forced to prevent tax flight and derives the optimal tax on cross-border income. The theoretical analysis shows that the "stick approach" towards uncooperative banks prevents cross-border tax evasion only if the expected bank fine is sufficiently high and thus if all banks are made compliant. The basic model is extended to allow for asymmetric countries of different population size and to consider heterogeneity in the banking industry and a continuous bank choice on the probability that tax evasion is detected.

Keywords: FATCA; tax evasion; information exchange; global banking; tax competition

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1 Introduction

The residence principle implies that governments tax capital income where households live. However, tax authorities have no automatic access to residents' data beyond the border to enforce tax obligations. The resulting international tax flight leads to huge losses of tax revenue. Hence, governments exchange information to tax residents' foreign income. Nevertheless, the political will is not sufficient to prevent tax evasion. Tax authorities also depend on bank's support to enforce the residence principle as third-party information reporting is implemented for savings income taxation.

This paper studies the conditions under which governments can force financial institutions to cooperate for tax purposes and derives the optimal tax rate on cross-border income. It analyses how international tax evasion evolves and how banks can be involved in international tax cooperation in order to prevent households from evading taxes. A model is set up that explains the fight against tax flight through the "banking channel" and that incorporates tax compliance costs to financial institutions. Tax competition between countries and households' cross-border savings tax evasion have been examined before, e.g. in Huizinga and Nielsen (2003). The decision-making of banks as cross-border tax intermediaries is the innovative addition of the model in this paper.

Most recently, the G20 (2014), the OECD (2014), the European Council (2014), and the US Internal Revenue Service IRS (2014) triggered enhanced international tax cooperation, defined as any type of cooperation across borders to enforce tax obligations. The EU Savings Tax Directive and the OECD Harmful Tax Competition Initiative make governments sign bilateral tax treaties, which mostly include information exchange clauses. In 2014 agreements were reached to implement automatic information exchange as a global standard for tax cooperation. Banks are assumed to stop providing concealment services to non-residents as soon as their home countries agree on intergovernmental cooperation.

The innovative feature of the US Foreign Account Tax Compliance Act (FATCA) is that it makes financial institutions act as so-called "cross-border tax intermediaries" (Grinberg, 2012). The United States of America concentrates on the crucial role of the banking sector for households' opportunity to evade taxes. It requires foreign financial institutions to cooperate with its tax authority to prevent US citizens' tax flight based on the Model 2 Intergovernmental Agreements. The US

approach aims at the transmission of information on US citizens' international investments (IRS, 2014).

The "stick approach" is a popular method to improve tax compliance. The "black-listing" of uncooperative tax havens combined with the threat of sanctions is a well-known policy tool of the OECD (2000) Harmful Tax Competition Campaign. Penalties on governments and on households have been in place for several years. The latest prominent case of Uli Hoeness, who is the former president of the German football club Bayern Munich, shows that the punishment of tax evaders can incorporate in addition to fines also imprisonment (NZZ, 2014a). A more recent approach is the punishment of financial institutions for the support of cross-border tax evasion. Several Swiss banks such as the UBS, Wegelin, and the Credit Suisse had to pay high fines for having helped Americans evade taxes from the US tax authority.[1]

The FATCA makes use of various "stick approaches" to punish non-compliance. First, there is a 30% withholding "penalty tax" on all fixed, determinable, annual or periodic income, gross proceeds and passthru payments, which is enforced through the tax system.[2] Second, foreign financial insitutions have to close the bank account for long-term recalcitrant depositors. Third, the IRS takes sanctions against foreign financial institutions themselves (McGill, 2013). The model focuses on this forced tax compliance of banks. In line with recent research on tax evasion such as Prinz, Muehlbacher, and Kirchler (2014), the present paper points out the complex interaction of different players in tax compliance, which goes beyond the relationship between taxpayers and governments.

Previous models for income tax evasion incorporate a penalty on tax evaders in addition to the probability of detection.[3] However, the political focus on savings tax compliance shifted from households to financial institutions. The government intends to enforce taxpayers' tax compliance via the tax intermediary, namely the bank. If the government can prevent the supply of concealment services, tax evasion is no longer possible. As a result, a fine on tax evaders becomes redundant.

[1]Further details on the UBS case can be found in Economist (2012). NZZ (2013) discusses the Wegelin case. NZZ (2014b) outlines the case of the Credit Suisse.

[2]Note that FATCA is not a withholding tax system but a documentation system that uses the tax system to enforce tax compliance.

[3]Allingham and Sandmo (1972), Srinivasan (1973), and Yitzhaki (1974) are the first papers on tax evasion. The corresponding literature is reviewed by Andreoni, Erard, and Feinstein (1998), Sandmo (2005), Alm (2012), and by Pickhardt and Prinz (2014).

While the bank faces a fine for supporting tax flight with some probability, there is no penalty on tax evaders in the present model.

The probability of detection has played a crucial role in the capital tax competition literature since the seminal study of Bacchetta and Espinosa (1995). They have introduced a new strategic variable in addition to the tax rate: the probability that cross-border tax evasion is detected. This seminal research is complemented by Janeba and Peters (1999), Huizinga and Nielsen (2003), Bacchetta and Espinosa (2000), Eggert and Kolmar (2002), Makris (2003), Eggert and Kolmar (2004), Keen and Ligthart (2006), and by Keen and Ligthart (2007).

The model in this paper is based on these articles – especially on Huizinga and Nielsen (2003) – but deviates from the analytical frameworks in certain ways. Although some papers such as Eggert and Kolmar (2002), Eggert and Kolmar (2004), and Huizinga and Nielsen (2003) consider financial institutions, they do not model them as decision makers for international tax cooperation as governments are decisive for data transfer in the EU and OECD context. On the contrary, the financial institution determines the access to non-resident bank client data in the present model to refer to the innovative US approach.

This study brings various contributions to the literature. First, it shows the mechanism how financial institutions can be involved in international tax cooperation to prevent households' tax evasion. In particular, it illustrates how a fine on a non-compliant bank can increase the probability of detecting tax evasion in the third-party information reporting system for savings income taxation. Second, it demonstrates that banks as cross-border tax intermediaries have to decide on tax compliance similar to households in the context of a FATCA-type approach. Third, it examines whether FATCA is a substitute for intergovernmental information exchange.

The main result of the theoretical analysis is that banks cooperate with foreign governments if the expected fine for supporting tax evasion is sufficiently high. Excluding infinite fines on the basis of the bankruptcy constraint and based on the principle of proportionality, bank compliance is achieved if the expected fine equals the marginal profits. A higher expected bank fine discourages banks from supporting tax evaders and thus cross-border depositing so that governments can impose higher tax rates. The intervention on banks' supply of concealment services is shown to be effective to counteract tax flight and to have a strategic

effect on tax policy similar to intergovernmental information exchange but cannot substitute the global standard for automatic information exchange.

The paper has the following structure. Section 2 outlines the model setup and studies the decisions of households, financial institutions, and of governments. Section 3 extends the theoretical framework to allow for asymmetric countries of different population size, to consider heterogeneity in the banking industry and a continuous bank choice on the probability that cross-border tax evasion is detected. Section 4 discusses the policy implications of the theoretical results. The last section concludes.

2 The Model

The basic model includes two open countries with symmetric population sizes. Financial capital can flow from the domestic country to the foreign country and vice versa. In other words, households allocate savings worldwide and choose between a financial institution at home and one abroad. The model concentrates on tax-induced cross-border investments to study the phenomenon of cross-border tax evasion and is based on Huizinga and Nielsen (2003).[4]

Governments tax cross-border capital income according to the residence principle.[5] This implies that governments intend to tax worldwide income where the depositor lives. This taxation principle necessitates international tax cooperation because tax authorities do not obtain information on foreign income. In this setting, households make decisions on depositing under uncertainty. The probability of detection determines whether the government taxes residents' cross-border income.

Financial institutions as cross-border tax intermediaries take centre stage in this model. They determine whether international tax cooperation can effectively take place and thus whether tax evasion is prevented. Banks risk a fine for the support of tax flight. In other words, governments punish non-compliant or uncooperative financial intermediaries. The probability that a foreign bank has to pay a fine is the so-called probability of bank punishment, which depends on

[4]The model ignores tax-induced migration and foreign investments for non-tax reasons.

[5]Residence-based savings income taxation is the standard taxation principle as the US is the only advanced country that implements the source principle instead. To capture the US principle, it is assumed that household's citizenship equals her residence.

the bank's willingness to cooperate with the foreign tax authority.

The agents make subsequently the following decisions in both countries:

1. The financial institution decides on its strategy towards tax evaders taking into account the resulting profit.

2. The government imposes a fine on the uncooperative foreign financial institution and chooses the non-resident withholding tax rate such that it maximizes the social surplus.

3. The household allocates savings corresponding to net returns in both countries.

These choices are discussed in more detail.

2.1 Household

The household cannot change the residence country but financial capital is mobile. Each household is risk-neutral and has one unit of savings to deposit at a domestic or foreign financial institution. The financial intermediary invests the raised funds into an asset, which is not accessible to the household. The depositor receives from the bank a certain rate of return. This rate is the difference between the gross interest rate i and the interest spread μ.

The cost per unit of a cross-border bank account δ is fixed and the same for everybody. However, each household has a specific characteristic h. This feature reflects transaction or information costs for a bank account abroad and divides the population into domestic and cross-border depositors. The variable h is uniformly distributed on the interval [0,1]. The household uses a foreign bank account only if the net return is higher abroad than at home, and thus if she can bear the household-specific cost δh (with $\delta > 0$). If she saves the money at a domestic bank, then no transaction costs occur.

The loophole for cross-border tax evasion arises due to the residence-based taxation of international savings income. Governments intend to tax residents' worldwide income under the residence principle but do not have access to information on investments abroad. The bank secrecy law leads to an information

asymmetry between the tax authority and the taxpayer. Consequently, international tax cooperation determines whether governments can also raise tax revenues on residents' income in other countries. The residence principle incentivizes the household not to report foreign investments to the domestic tax authority in order to evade taxes.

A tax intermediary, namely the bank, is involved in the enforcement of capital income tax obligations.[6] It is more efficient to use a tax intermediary than to ask directly the taxpayer to pay taxes.[7] The bank is perfectly informed about its clients' savings income while this information is not automatically available to the tax authority in the presence of a secrecy law. Hence, the administrative cost, i.e. the effort to receive relevant data, is smaller for financial institutions than for tax authorities. In contrast to the household-tax authority relationship, there is no information asymmetry between the household and the financial institution.

In general, third-party information reporting is in place to raise the risk that household's tax evasion is detected so that tax compliance is expected to be higher (Slemrod & Gillitzer, 2014). However, the application to savings income taxation is special due to strict bank secrecy laws. Financial institutions have an incentive to provide concealment services to attract foreign depositors. The key assumption in the present study is that the bank can reduce the risk of detection as it has the opportunity to implement appropriate investment strategies to reduce its clients' global tax obligations.

The probability that the residence country is able to tax its residents' foreign capital income is denoted as λ^*_{fi} (with $\lambda^*_{fi} \in [0, 1]$). Hence, λ^*_{fi} reflects the foreign financial institution's willingness to cooperate with the domestic tax authority. This is how the financial institution determines whether international tax flight is detected and thus prevented.

The resident of the domestic country has to pay a tax t on the savings income at a domestic bank or a non-resident withholding tax t^*_w on the interest from a foreign bank account. The first tax rate is exogenously given. The latter is optimally chosen by the government. In addition, the household has to pay with

[6] This indirect approach is also practised for other tax types. For example, employers transfer mostly taxes on wage to tax authorities so that their employees receive a net wage only.

[7] Intermediation is not restricted to income taxation. The bank plays a similar role in the context of financial intermediation. The task of lenders to monitor borrowers is delegated to the bank. According to Diamond (1984), financial institutions can perform this task more efficiently than households. This logic can also be applied for banks' position in tax policy.

probability λ^*_{fi} the difference between the foreign and domestic tax rate in line with the credit-method. So a full tax credit is given to avoid double taxation of cross-border investments.

Given the world gross interest rate i, the net interest rate has to be equal across countries so that the no-arbitrage condition can be written as:

$$i - \mu - t = i - \mu^* - t^*_w - \delta h - \lambda^*_{fi}(t - t^*_w) \tag{1}$$

Tax policy affects the country-specific net returns through tax rates (t, t^*_w). Moreover, the probability of detection (λ^*_{fi}) determines whether the depositor has to pay taxes on foreign investment to the domestic tax authority. The conditions in the banking sector also influence the net income through the interest margin (μ, μ^*) and through the unit cost of a foreign bank account (δ).

It is assumed that the alternative banks are identical from the depositor's perspective in this basic model. This implies that the household faces identical interest spreads $\mu = \mu^*$. Consequently, households deposit savings abroad for tax reasons only. Political or macroeconomic reasons for a foreign bank account are not considered here. This approach is chosen to relate cross-border depositing to cross-border tax evasion.

Rearranging the no-arbitrage condition for capital market equilibrium determines the indifferent household in the domestic country as:

$$\widehat{h} = \frac{(1 - \lambda^*_{fi})(t - t^*_w)}{\delta} \tag{2}$$

This cut-off point divides the population of the domestic country in $1-\widehat{h}$ residents depositing at a domestic bank and $\widehat{h}$ households with a foreign bank account. In addition to tax rates and transaction costs, the key variable of this model, namely the probability of detection, determines the worldwide savings allocation in the following way:

$$\widehat{h} = \begin{cases} 0, & \text{if } \lambda^*_{fi} = 1. \\ \frac{t - t^*_w}{\delta}, & \text{if } \lambda^*_{fi} = 0. \end{cases}$$

If tax evasion is always detected, i.e. $\lambda^*_{fi} = 1$, then households do not deposit abroad, i.e. $\widehat{h} = 0$. Under this scenario, the government can tax completely residents' worldwide capital income. Hence, households prefer a domestic bank

account over a foreign one because the latter incurs transaction costs δ in addition to tax payments, which are then identical in both countries.

On the contrary, households have a tax incentive (with $t_w^* < t$) for a cross-border bank account in case of a non-cooperative bank providing concealment services, i.e. $\lambda_{fi}^* = 0$. In this case, domestic households have to pay only the withholding tax on foreign savings income. The larger the difference between the domestic tax rate and the withholding tax is and the smaller transaction costs are, the more residents of the domestic country deposit in the foreign country.

The resident of the foreign country makes her portfolio choice based on the net returns in the two countries. Assuming that depositors pay the same cost per unit of foreign deposit ($\delta = \delta^*$), the indifferent household is respectively in the foreign country:

$$\widehat{h}^* = \frac{(1 - \lambda_{fi})(t^* - t_w)}{\delta} \tag{3}$$

This equation determines the shares of residents of the foreign country who deposit at home ($1 - \widehat{h}^*$) and abroad ($\widehat{h}^*$). Financial capital flows between the two symmetric countries in both directions.

Equations (2) and (3) illustrate that the difference between the tax rates, the probability that tax evasion is detected, and transaction costs determine savings allocations. The first element is determined by the country-specific tax policy. The second one is chosen by the financial institution. The third one is exogenously given throughout the analysis.

The following conclusion can be drawn:

RESULT: *There are less cross-border depositors, (i) the lower the difference between the tax rate on savings income in the residence country and the non-resident tax abroad is, (ii) the higher the probability of detecting tax evasion is, and (iii) the higher transaction costs for a bank account abroad are.*

2.2 Financial Institution

The global financial industry is represented with one bank in each country. The two identical banks decide whether international tax cooperation takes place. The foreign bank chooses the probability that cross-border income of residents of the domestic country can be taxed. The domestic financial institution makes

a discrete decision on λ_{fi} for foreigners $\widehat{h}^*$. The banking sector can influence international savings allocations through this choice as can be seen in equations (2) and (3). Cross-border investments decrease in the probability that tax evasion is detected.

The bank's decision on this variable reflects the following strategies towards cross-border tax evasion:

- $\lambda_{fi} = 0$, if the financial institution provides concealment services to evaders.
- $\lambda_{fi} = 1$, if the financial institution impedes tax evasion (= tax compliance).

It is assumed that the government observes the true value of λ_{fi} and thus knows the bank strategy towards tax evaders. Hence, a non-compliant bank cannot pretend to be compliant. In other words, the bank is expected to report truthfully on foreign clients' capital income to the foreign tax authority if it agrees to cooperate. Therefore, the bank determines the probability that household's tax evasion is detected. Consequently, λ_{fi} is the probability that the government can tax residents' worldwide savings income.

The financial institution faces a trade-off. Neither uncooperative behaviour nor tax compliance is costless for the financial intermediary. The bank has no intrinsic motivation to be tax compliant because cooperation with foreign tax authorities deters potential clients from abroad. Instead, the bank intends to provide concealment services to attract foreigners. However, the government imposes a fine f on banks abroad if they support residents' tax evasion.

The amount of the fine depends on the volume of cross-border depositing $\widehat{h}^*$. The government chooses this "stick approach" to make financial institutions cooperate for tax purposes. The probability of bank punishment κ (with $0 < \kappa \leq 1$) depends on the bank's willingness to cooperate with the foreign tax authority and thus on the probability that non-resident bank clients' tax evasion is detected (λ_{fi}). The financial institution has to make a decision on its position towards international tax cooperation, which causes tax compliance costs.

The domestic bank manages the wealth of residents $1 - \widehat{h}$ and of foreigners $\widehat{h}^*$ in order to make a profit P. On the one hand, the financial institution earns a profit rate μ per unit of deposit on wealth management.[8] On the other hand,

[8]Note that this profit rate is identical to the interest margin, which the depositor faces according to equation (1).

it risks to faces a fine for the support of tax evasion. The bank profit is obtained as:

$$P(\lambda_{fi}) = \mu(1 - \widehat{h}) + (\mu - \kappa(\lambda_{fi})f)\widehat{h}^*(\lambda_{fi}) \tag{4}$$

The banking sector decides on the probability of detection λ_{fi} based on expected profits. This can be interpreted as a discrete choice due to the bank's intermediary position. The domestic bank as a tax intermediary faces a trade-off whether to cooperate with the foreign tax authority, i.e. $\lambda_{fi} = 1$, or whether to provide concealment services to foreign households, i.e. $\lambda_{fi} = 0$. The alternative strategies determine the bank profit in the following ways.

On the one hand, the bank may behave in an uncooperative manner so that it generates the following profit:

$$P(0) = (\mu - \kappa f)\frac{t^* - t_w}{\delta} + \mu(1 - \widehat{h}) \tag{5}$$

If the domestic bank supports tax evasion, it attracts non-resident depositors. Consequently, the amount of cross-border depositing and in turn bank profits increases in the domestic country. However, profits from offshore wealth management are reduced with some probability κ as the foreign tax authority may impose a fined on the bank (= "concealment effect"). In addition, the bank makes a profit per resident served.

If the financial institution chooses the compliant strategy and cooperates for tax purposes, it looses non-resident clients but does not risk to face a fine (= "compliance effect"). As a result, the compliant bank generates a profit from residents only as shown in equation (6).

$$P(1) = \mu(1 - \widehat{h}) \tag{6}$$

The domestic bank cooperates only if the resulting net profit is sufficiently large, i.e. if

$$P(1) \geq P(0)$$
$$\mu(1 - \widehat{h}) \geq \mu(1 - \widehat{h}) + (\mu - \kappa f)\tfrac{t^* - t_w}{\delta}.$$

The domestic financial institution prefers the compliant strategy if this generates a larger net profit than the uncooperative behaviour. Comparing the alternative bank profits shows that this condition is fulfilled only if

$$\kappa f \geq \mu.$$

The tax intermediary is compliant only if the expected fine is at least as large as the profit made. The bank profit rate determines the bank strategy and is exogenously given in the basic model. The bank has to pay the fine only with some probability reflecting the risk that the support of tax evasion is detected. Hence, the domestic financial institution has an incentive to provide concealment services even in the presence of fines if the probability of bank punishment is sufficiently low. The same logic applies to the foreign financial institution.

Note that a fine on the tax intermediary may substitute the punishment of the tax evader. If the expected bank fine is sufficiently high, concealment services are not supplied. This implies that households cannot evade taxes. As a result, fines on dishonest persons become redundant.

Taking into account a high probability of bank punishment, an infinitively high fine on non-compliant financial institutions prevents certainly the provision of concealment services. However, it can be questioned whether it is reasonable that governments may impose an infinite fine rate on uncooperative banks. The seminal paper on the economics of enforcement by Becker (1968) demonstrates that the most efficient way to prevent crime is to impose the severest possible penalty with the lowest possible probability. Hence, the question arises how high the severest possible penalty is in the present model.

The principle of proportionality and the bankruptcy constraint ($P(\lambda_{fi}) \geq 0$), which are linked to each other, can explain why no infinite fines are observable. Governments intend to discourage financial institutions from supporting tax evasion and not to make punished banks go bankrupt. Thus, the punishment should bear a reasonable relation to the crime committed and to the profits arising from concealment services. The bank fine does not have to be infinitely high to deter the support of tax evasion. It is sufficient to set the fine rate at a sufficiently high level. The condition for a successful prevention of tax flight can be expressed as:

$$\kappa f = \mu$$

The government has to set up the punishment mechanism to prevent tax evasion such that the fine to be expected by non-compliant financial institutions equals the bank profit rate. The bankruptcy constraint makes the tax authority

choose a fine rate in proportion to the bank profit. The limit on the fine rate can be expressed as:

$$\overline{f} = \frac{\mu}{\kappa}$$

The relationship between the bank profit and the probability of punishment determines the maximum fine for helping households evade savings income taxes. For a given probability of punishment, the tax authority chooses a higher fine rate on a more profitable bank because the financial institution can afford to pay a higher penalty without going bankrupt. Taking the bank profit rate as given, the fine rate increases with a lower probability of punishment.[9] If the penalty is imposed on the foreign financial institution with certainty $\kappa = 1$, the fine rate equals the marginal profit:

$$\overline{f} = \mu$$

The insight can be summarised as follows:

RESULT: *Excluding infinite bank fines based on the bankruptcy constraint and on the principle of proportionality, the bank is forced to cooperate for tax purposes only if the expected fine for the support of tax evasion equals the marginal profit.*

2.3 Government

The domestic government decides on tax policy to maximize the social surplus of its country. While the government optimally chooses the non-resident withholding tax t_w, the tax rate on residents' domestic savings income t is exogenously given.

$$\max_{t_w} S$$

[9]It is assumed that the probability of punishment is strictly positive, i.e. $\kappa > 0$ so that infinite fines are excluded. This assumption is reasonable because the "stick approach" towards non-compliant banks is feasible only if it is indeed enforced with a positive probability. Note that the model ignores enforcement costs and assumes that non-compliant banks can be identified.

The social surplus S is the sum of the aggregate net-of-all costs income I of residents, tax revenues T weighted by the marginal costs of public funds ρ, bank profits P, and of the fine on the non-cooperative financial institution. The amount of the fine is dependent on the probability of bank punishment κ, the fine rate f, and on the amount of offshore wealth management of the foreign bank, which is reflected in $\widehat{h}$. The government assigns the weight ι to the residents' income I and π to the domestic bank profit P. The social surplus is given by:

$$S = \iota I + \rho T + \pi P + \kappa f \widehat{h} \tag{7}$$

Firstly, the government cares about the welfare of the population and sets a positive weight for residents' income. To simplify, policymakers are assumed to give residents' income I a positive weight $\iota = 1$ in the social welfare equation (7). Residents earn capital income when they deposit savings either at home or abroad. Households receive a net return which depends on tax payments and on transaction costs. Assuming identical banks in the symmetric countries, households face the same interest margin, i.e. $\mu = \mu^*$. The government takes into account the aggregate net-of-all costs income I, which can be expressed as:

$$I = (1 - \widehat{h})(i - \mu - t) + \textstyle\int_0^{\widehat{h}} [i - \mu - t_w^* - \delta h - \lambda_{fi}^*(t - t_w^*)] dh$$

The first term reflects the residents with an account at a domestic bank. The second term considers residents who are clients of a foreign bank. Rewriting the income function yields:

$$I = i - \mu - t + (1 - \lambda_{fi}^*)\widehat{h}(t - t_w^*) - \frac{\delta \widehat{h}^2}{2} \tag{8}$$

Secondly, the government raises tax yield T from the taxation of savings income in this simple model.[10] Levying taxes is linked to the marginal cost of public funds from an alternative source of state revenue ρ. Therefore, tax yields have a positive weight with the parameter ρ (≥ 1) in the social surplus equation (7). Savings tax revenue is obtained as:

$$T = (1 - \widehat{h})t + \widehat{h}^* t_w + \lambda_{fi}^* \widehat{h}(t - t_w^*) \tag{9}$$

[10]Note that other taxes in the financial sector such as the corporate income tax are also important sources of state income but are ignored here to focus on the savings income tax policy.

State revenue arises from residents' at the domestic bank (first term) and from offshore wealth management of the domestic financial industry (second term). In addition, tax authorities can tax residents' capital income abroad with probability λ^*_{fi} depending on the foreign bank's cooperation for tax purposes (third term).

The "credit method" is implemented. This implies that the domestic tax authority gives a credit to the residents' tax obligations at home as the household has already paid withholding taxes abroad. In this way, double taxation of cross-border income is prevented. Consequently, the government's tax revenue from residents' foreign investment is determined by the difference between the domestic and foreign tax rate.

Thirdly, the government considers profits of the domestic bank in its maximization problem. It is implicitly assumed that the financial institution is owned by domestic shareholders so that domestic bank profitability accounts for domestic social welfare. To simplify, policymakers give domestic bank profits a positive weight $\pi = 1$ in the social surplus equation (7). The domestic bank profit is equal to:

$$P = \mu(1 - \widehat{h}) + \mu\widehat{h}^* - \kappa f\widehat{h}^* \tag{10}$$

The financial institution manages domestic wealth (first term of equation (10)) and foreign wealth (second term) with a unit profit rate μ. The domestic bank risks to pay a penalty if it supports foreigners to evade taxes as illustrated in the third term.

While the domestic government has no impact on the probability that the domestic bank is punished, it imposes with some probability a fine on the non-compliant foreign financial institution. This "stick approach" towards the foreign banking sector is reflected in the last element of the social surplus equation (7) of the domestic country.

Inserting the elements of the social surplus, namely equations (8), (9), and (10) into equation (7) gives the government's objective function as:

$$\begin{aligned} S = \underbrace{i - \mu - t + (1 - \lambda^*_{fi})\widehat{h}(t - t^*_w) - \frac{\delta\widehat{h}^2}{2}}_{I} + \rho\underbrace{[(1 - \widehat{h})t + \widehat{h}^* t_w + \lambda^*_{fi}\widehat{h}(t - t^*_w)]}_{T} \\ + \underbrace{\mu(1 - \widehat{h}) + (\mu - \kappa f)\widehat{h}^*}_{P} + \kappa f\widehat{h} \end{aligned} \tag{11}$$

In the symmetric-country model, the governmental choice in the domestic country is illustrated only as the foreign government makes the same decision. The domestic government determines the non-resident withholding tax rate t_w such that it maximizes the social welfare of the domestic country. The first order condition reveals the different effects of a change in tax policy on the domestic surplus.

$$\frac{\partial S}{\partial t_w} = \rho(\frac{\partial \widehat{h}^*}{\partial t_w} t_w + \widehat{h}^*) + (\mu - \kappa f)\frac{\partial \widehat{h}^*}{\partial t_w} = 0 \tag{12}$$

A marginal increase in the non-resident withholding tax rate t_w leaves residents' aggregated income unchanged but it influences the households of the foreign country in their international savings allocation. These foreign households determine the amount of offshore wealth in the domestic country, which leads to tax yield and bank profits.

The first term of equation (12) reflects the "tax revenue effect". The government chooses strategically the withholding tax as a lower non-resident withholding tax rate reduces tax yields (= "rate effect") but attracts more foreigners (= "base effect"). This variation in the amount of offshore wealth in turn influences net profits of the domestic bank. This "bank profit effect" is illustrated in the second term of equation (12). These effects sum up to zero at the local maximum.

Rearranging the first order condition and using equation (3), the optimal withholding tax rate is obtained as:

$$\widetilde{t_w} = \frac{t^*}{2} + \frac{\kappa f - \mu}{2\rho} \tag{13}$$

The domestic government sets a higher non-resident withholding tax, the higher the tax rate in the foreign country is. It chooses a positive withholding tax for foreigners, which is smaller than the tax rate in the foreign country, to attract non-residents. The decision on the tax rate is a strategic choice because foreigners allocate savings dependent on the difference between the expected tax payments at home and abroad as illustrated in equation (3).

The tax authority imposes a higher tax on non-residents, the higher the probability of bank punishment κ and the fine rate f are. Hence, the introduction of the "stick approach" towards financial institutions allows governments to increase tax rates on cross-border capital income. An increase in the expected bank fine

discourages banks from supporting tax evaders so that cross-border depositing is less attractive and governments can set higher taxes. Hence, the involvement of banks in international tax cooperation has a similar strategic effect on tax policy as the intergovernmental information exchange regime.

Inserting the optimal withholding tax rate into equation (3) yields the indifferent household in the foreign country as:

$$\widetilde{\widehat{h}}^* = \frac{1-\lambda_{fi}}{\delta}\frac{t^*\rho - \kappa f + \mu}{2\rho} \tag{14}$$

If the expected fine on the support of tax evasion is high enough to make the financial institution cooperate ($\lambda_{fi} = 1$), there are no cross-border depositors $\widetilde{\widehat{h}}^* = 0$.

Inserting equations (13) and (14) into equation (11) gives the social surplus in equilibrium as:

$$\begin{aligned}\widetilde{S} = i - t(1-\rho) - \frac{\delta\widehat{h}^2}{2} + \widehat{h}[(t-t_w^*)(1-\lambda_{fi}^* + \rho\lambda_{fi}^*) - \rho t - \mu + \kappa f] \\ + \frac{1-\lambda_{fi}}{\delta}\frac{t^*\rho - \kappa f + \mu}{2\rho}\left(\frac{t^*\rho + \kappa f - \mu}{2} + \mu - \kappa f\right)\end{aligned} \tag{15}$$

The main insight can be summarised as follows:

RESULT: *The optimal tax on non-resident depositors influences the amount of offshore wealth, which in turn determines the tax revenues and bank profits in the country. The government does not only base the choice of the non-resident withholding tax rate on the tax policy of the other country but also on the banking conditions in wealth management.*

3 Extensions

This section discusses the following extensions of the basic model:

- Asymmetric countries of different population size
- Heterogeneous banking sector with different profit margins

- Continuous bank choice on the probability of detection

3.1 Asymmetric Countries

The basic model considers two symmetric countries. However, it is more realistic to take into account that jurisdictions have different population sizes. Hence, it is assumed that the foreign country is $n \geq 1$ times larger than the domestic country.

The adjusted domestic bank profit function can be written as:

$$P(\lambda_{fi}) = \mu(1 - \widehat{h}) + (\mu - \kappa(\lambda_{fi})f)n\widehat{h}^*(\lambda_{fi}) \tag{16}$$

Allowing for a difference in the country sizes, the alternative bank strategies generate the following profits:

$$\begin{aligned} P(0) &= \mu(1 - \widehat{h}) + (\mu - \kappa f)n\frac{t^* - t_w}{\delta} \\ P(1) &= \mu(1 - \widehat{h}) \end{aligned} \tag{17}$$

The condition for a cooperative financial institution can be derived with $P(1) \geq P(0)$ as

$$\kappa f \geq \mu.$$

This bank compliance condition is identical to the one obtained in the basic model with symmetric countries. Thus, the success of the "stick approach" is independent of the relative population size. The adverse effects of uncooperative behaviour, namely the attraction of foreigners combined with a higher risk of punishment, are intensified to the same extent in the asymmetric country model. Therefore, the bank's strategic decision does not differ from the basic model.

In addition, the optimal tax policy with different population sizes is examined. The domestic surplus in the asymmetric country model can be expressed as:

$$\begin{aligned} S = \underbrace{i - \mu - t + \widehat{h}(t - t_w^*) - \frac{\delta\widehat{h}^2}{2}}_{I} + \rho\underbrace{[(1 - \widehat{h})t + n\widehat{h}^* t_w + \lambda_{fi}^*\widehat{h}(t - t_w^*)]}_{T} \\ + \underbrace{\mu(1 - \widehat{h}) + (\mu - \kappa f)n\widehat{h}^*}_{P} + \kappa f\widehat{h} \end{aligned} \tag{18}$$

The government chooses the withholding tax on non-residents such that it maximizes the social surplus of its country.

$$\max_{t_w} S$$

The optimal tax rate can be found with

$$\frac{\partial S}{\partial t_w} = \rho n(\frac{\partial \widehat{h}^*}{\partial t_w} t_w + \widehat{h}^*) + (\mu - \kappa f) n \frac{\partial \widehat{h}^*}{\partial t_w} = 0 \tag{19}$$

as:

$$\widetilde{t}_w = \frac{t^*}{2} + \frac{\kappa f - \mu}{2\rho} \tag{20}$$

The optimal non-resident withholding tax rate is identical to the one obtained in the basic model. Therefore, the country size has no impact on the tax rate on cross-border savings income in equilibrium. The government's strategic decision on tax policy has adverse effects on non-residents' savings allocation. While an increase in the tax rate rises tax yields, a higher rate discourages foreigners from depositing in this country.

The difference in population size intensifies equally the rate effect and base effect of a change in the withholding tax rate so that the optimal tax level is the same as with symmetric countries. The number of residents of the other country scales up or down the social surplus to be maximized. The scale factor n cancels out in equation (19).

The model of two asymmetric countries with different population size leads to the following conclusion:

RESULT: *The relative population size does not influence optimal decisions on international tax cooperation and on tax policy as the country difference leads to an equal intensification of the opposing effects of the bank choice and of the non-resident withholding tax rate. The number of residents of the other country scales up or down the domestic bank profit and tax revenue and thus the social surplus to be maximized.*

3.2 Heterogeneous Banking Sector

Returning to the simple model with symmetric countries, this part allows for heterogeneity in the banking sector. In the basic model, the assumption is made that the global financial industry is homogeneous with an exogenously given profit rate μ per unit of deposit. μ can be interpreted as an average for the marginal profit of banks. However, this approach cannot comprehensively reflect the strategy of all banks because financial institutions differ with respect to profit rates, i.e. $\mu_i \neq \mu_j$.

Each bank cooperates with the tax authority abroad only if the expected fine for supporting tax evasion equals the marginal profit. It is assumed that there are two types of banks: Bank i imposes a low interest margin on clients and bank j generates a high profit margin so that:

$$\kappa f = \mu_i \text{ and } \kappa f < \mu_j$$

Hence, bank i agrees to cooperate with the foreign tax authority and is not attractive for cross-border depositors anymore. The "stick approach" is more effective towards the financial institution of type i. While bank j can afford to pay higher fines, small rates are sufficient to make offshore wealth management unattractive for this bank. Thus, heterogeneity in profit margins implies different positions towards cross-border tax evasion.

Penalties might make some financial institutions leave the market for offshore wealth management. Consequently, the competitive situation within the banking sector might change but tax flight is not prevented. Profit margins of the remaining banks go up so that the government has to signal even higher fines to prevent financial institutions from providing concealment services.

The main insight from the extended model can be summarised as follows:

RESULT: *Allowing for heterogeneous banks suggests that a fine for supporting tax evasion per se is not sufficient to close the loophole for tax flight. Instead, a fine, which does not discourage all banks, can even aggravate the situation.*

3.3 Continuous Bank Choice

The assumption of a discrete choice in the basic model can be justified as the financial institution faces a trade-off due to its intermediary position. However, the bank decision on the probability of detecting cross-border tax evasion cannot only be modeled as a discrete choice but also as a continuous choice. It can be argued that the probability of detecting tax evasion is a matter of degree so that the financial institution makes a continuous choice on this variable. This alternative model is used as a robustness test for the basic model result.

Hereafter, it is assumed that the financial institution chooses $\lambda_{fi} \in [0;1]$ such that it maximizes its profits

$$\max_{\lambda_{fi}} \; P(\lambda_{fi}) = \mu(1-\widehat{h}) + (\mu - \kappa(\lambda_{fi})f)\widehat{h}^*(\lambda_{fi})$$

whereas profits should be non-negative

$$PC : P(\lambda_{fi}) \geq 0$$

so that the first order condition is obtained as:

$$\frac{\partial P(\lambda_{fi})}{\partial \lambda_{fi}} = (\mu - \kappa(\lambda_{fi})f)\frac{\partial \widehat{h}^*}{\partial \lambda_{fi}} - \frac{\partial \kappa}{\partial \lambda_{fi}} f\widehat{h}^*(\lambda_{fi}) = 0 \tag{21}$$

The first order condition illustrates the opposing effects of a change in the probability of detection on bank profits, which sum up to zero in equilibrium. On the one hand, a higher probability makes the bank less attractive to cross-border depositors and thus decreases bank profits (= first term of equation (21)). On the other hand, more cooperation with a foreign tax authority diminishes the bank risk to pay a fine for the support of tax evasion (= second term of equation (21)).

Rearranging the first order condition and using equation (3) yields the optimal probability of detection as:

$$\widetilde{\lambda_{fi}} = \frac{\mu - \kappa(\widetilde{\lambda_{fi}})f}{\kappa' f} + 1 \tag{22}$$

The second order condition can be derived as:

$$\frac{\partial^2 P(\lambda_{fi})}{\partial \lambda_{fi}^2} = -\kappa' f\widehat{h}^{*\prime} - \kappa'' f\widehat{h}^* < 0 \tag{23}$$

Both terms are positive with $\kappa' < 0$, $\widehat{h}^{*\prime} < 0$, and $\kappa'' > 0$ so that the second order condition is negative overall. Thus, $\widetilde{\lambda_{fi}}$ maximizes the bank profit as $\frac{\partial^2 P(\lambda_{fi})}{\partial \lambda_{fi}^2} < 0$ is obtained.

Tax flight is prevented only if $\widetilde{\lambda_{fi}} = 1$, and thus if

$$\frac{\mu - \kappa f}{\kappa' f} = 0.$$

The denominator is always negative as the probability of bank punishment decreases with more cooperation, i.e. with a higher probability of detection. The numerator depends on the relationship between the marginal profit and the expected bank fine, which determines bank's strategy towards tax evasion as follows:

- if $\mu = \kappa f \rightarrow \widetilde{\lambda_{fi}} = 1$
- if $\mu > \kappa f \rightarrow \widetilde{\lambda_{fi}} < 1$
- if $\mu < \kappa f \rightarrow \widetilde{\lambda_{fi}}$ is not defined.

The condition for an effective governmental "stick approach" towards uncooperative financial institutions is fulfilled only if the profit margin equals the expected fine for the support of tax evasion, i.e. $\mu = \kappa f$.

The following conclusion can be derived:

RESULT: *Independent of the type of bank choice (continuous or discrete) the "stick approach" towards financial institutions prevents households' tax evasion only if the bank fine is sufficiently high and equals the bank profit margin.*

4 Policy Implications

The innovative feature of FATCA – compared to the projects of the OECD and of the European Union – consists of its approach to put pressure on financial institutions rather than on governments. The "stick approach" towards banks is shown to be successful only if the expected bank fine equals the marginal profit.

The recent case of the oldest Swiss bank Wegelin indicates that a positive probability of bank punishment has no deterrence effect if it is not sufficiently

high. Wegelin supported American tax evaders, who were former UBS clients, although the bank was probably aware of the risk to face a fine like the one paid by the UBS. Wegelin was charged to pay $74 million in 2013 and was put out of business (NZZ, 2013).

Allowing for heterogeneous banks, the amount of the fine is especially important for a successful anti-tax evasion project. Governments intend to prevent the supply of concealment services. On the contrary, relatively low fines reduce only the supply because some banks with low profit margins are forced to leave the market. In such cases, there is less competition in the market so that profit margins of the remaining financial institutions rise. Consequently, bank fines have to be even higher to make these banks cooperate. The problem of sequential agreements – as in the OECD initiative – does not occur in the implementation of FATCA as a "big-bang" approach is applied, i.e. the US tax authority asks all financial institutions to register until a certain deadline before the bank compliance programme starts.

Governments do not impose infinitively high fines, which would violate the principle that the punishment should bear a reasonable relation to the crime committed (principle of proportionality). The tax authority wants to discourage banks from supporting tax evasion. The government does not intend to make punished banks go bankrupt (bankruptcy constraint). These issues substantiate the lack of infinite bank fines.

A fine on the tax intermediary can substitute a fine on the tax evader. If the fine for the support of tax evasion is sufficiently high, the financial institution does not provide concealment services. Therefore, households are not able to evade taxes so that the threat to punish households becomes redundant. The bank business with cross-border tax evasion can be restricted either on the demand side or on the supply side.

If a large fine on foreign banks prevents them from serving non-residents, the market for wealth management changes from a global one to a local one. Thus, the banking competition diminishes so that profit margins or interest margins rise. However, this change leaves the social welfare unchanged. While domestic bank profits go up, residents' income is reduced at the same time.

International tax flight cannot be prevented without the participation of financial institutions. While third-party information reporting aims at increasing

the risk that households' tax evasion is detected, banks might choose specific investment strategies for clients to reduce the probability of detection instead. Consequently, the application of this system for savings income taxation might even lower the tax compliance of households in the presence of non-compliant banks.

The access to the US securities market is important for global banks. The FATCA withholding system results in a competitive disadvantage for uncooperative, foreign financial institutions. Therefore, non-US institutions have an incentive to cooperate with the US tax authority (McGill, 2013). However, other governments do not have a comparable position to enforce regulations on foreign banks. Consequently, the probability of bank punishment might be rather low. Therefore, the US FATCA contributes to the fight against tax evasion but is no role model for international tax cooperation. Enforcement problems occur as caveats to implement the governmental "stick approach" towards uncooperative banks on a global level.

Furthermore, there is an information asymmetry between the tax authority in the residence country and the financial institution in the foreign source country. The identification of non-compliant financial institutions is another important issue to ensure that the bank fine has indeed a deterrence effect on the support of tax evasion. The possibility to audit banks is a prerequisite to impose a bank fine but might not be given.

5 Conclusion

This paper explains the role of the banking sector for the taxation of worldwide savings income. It refers to the innovative US approach to fight against tax evasion in the context of FATCA and derives the bank compliance condition. It shows that the governmental "stick approach" towards uncooperative financial institutions can successfully prevent tax flight if the expected fine on banks for supporting tax evaders is equal to the marginal profit. A rise in the expected fine discourages financial institutions from supporting tax evaders so that cross-border depositing is less attractive and governments can set higher taxes.

However, there are two prerequisites for a positive probability of bank punishment. First, the government has to be able to observe the bank strategy towards

tax evaders to identify non-compliance. Second, it has to be able to impose a fine on a foreign financial institution. These aspects are important to ensure the deterrence effect of the "stick approach" and thus the effectiveness of this approach. The US is a special case in so far as it is the only advanced country that implements the citizenship principle to tax worldwide capital income and that is able to enforce an unilateral approach towards the global banking industry. Therefore, FATCA cannot substitute the global standard for automatic information exchange.

The debate on international tax flight mainly concentrates on households, who decide where to deposit savings and whether to pay taxes. However, banks as cross-border tax intermediaries determine whether worldwide interest income is indeed taxed. This implies that the banking sector can either provide a loophole for cross-border tax evasion or it can close it. Financial institutions have to decide whether to be tax compliant, similarly to households.

This model takes into account forced tax compliance. Voluntary tax compliance – as discussed in Prinz et al. (2014) in the case of households – might be present in the future if the code of conduct suggests a compliant behaviour of banks. The deterrence effect of the government's "stick approach" might result in a paradigm shift in bank business practices away from the bank secrecy based norm. The Foreign Account Tax Compliance Act might induce financial institutions to internalize a tax compliance norm, which, in turn, prevents cross-border depositors from evading taxes.

Governments' effort to close loopholes is a never-ending story as long as banks find new ways to conceal foreigners' income from tax authorities. Exempted financial products or non-participating countries might maintain global tax flight. New laws such as bilateral tax treaties might be circumvented so that they do not automatically prevent tax evasion. On the contrary, changing the banks' (or households') attitude towards tax moral can put an end to losses of savings tax revenue.

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