Escaping the Exchange of Information: Tax Evasion via Citizenship-by-Investment*

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Abstract. Since the fight against international tax evasion became a priority of the OECD and G20, many countries have signed up to (automatic) exchange of tax information. At the same time, more and more countries have (re-)introduced Citizenship-by-Investment programs (CBIPs), which offer a path to citizenship in return for financial transfers; and which can be misused to escape tax information reporting. Our study is the first attempt to assess the relevance of CBI in a tax evasion context: We model the tax evasion and CBI decisions of individuals facing the risk of insecure detection probabilities due to information exchange. In line with predictions from our model, we provide empirical evidence suggesting that CBI schemes are misused for tax evasion.

Keywords. tax evasion, citizenship-by-investment, tax information exchange

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1 Introduction

Tax information exchange has become the main policy instrument to enforce personal capital income taxes across borders; but sharing tax and banking information is ineffective if tax evaders find new means to hide income and assets offshore, e.g. by means of Citizenship-by-Investment programs (CBIPs). As a result of the implementation and widespread adoption of the Common Reporting Standard (CRS) for automatic exchange of financial account information in tax matters among jurisdictions worldwide,\(^1\) tax evaders have come under increased pressure.\(^2\) However, the OECD (2018a,b) and the EU (Knobel, 2018) recognized that identifying and addressing loopholes to the reporting under the CRS as well as offshore structures which can be used to hide beneficial owners is a key challenge; and identified CBIPs, whose number has risen in recent years, as one major loophole. CBIPs offer a path to citizenship in return for financial transfers; and can be misused to circumvent tax information reporting: Individuals have to disclose all their jurisdictions of tax residence by self-certification to their financial institutes when opening a financial account or when they are required to a residence address test for pre-existing accounts. Individuals can abuse documents (ID-cards, passports) obtained under a country’s CBIP to pretend tax residency exclusively in that country, even if they not (only) reside there. The information collected under the CRS will then falsely sent to the CBI country (mostly offering low personal income tax rates); or, if the CBI country has chosen to send, but not to receive information (voluntary secrecy) or has not adopted the CRS, account information will not be reported at all.

The question at the core of our study is whether the international efforts to combat tax evasion, the desire of tax evaders to find new paths to hide money, and the introduction of CBIPs are complementary and mutually reinforcing. In more detail, we study CBIPs as a new option for tax evaders: We develop an equilibrium framework for the decision of rational individuals whether evading taxes, and whether the option to obtain a new citizenship via a CBIP affects their tax evading behavior. We model this decision in the interplay of a high-tax country’s effort to combat tax

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\(^1\) Over the last decade, the OECD and G20 countries launched various initiatives to promote international tax transparency. In 2008, the OECD and G20 countries agreed to intensively combat cross-border tax evasion. In 2009, the G20 initiative abolished banking secrecy with regard to taxes and tax havens were forced to sign at least 12 TIEA’s. International and EU level agreements and mechanisms for a standardized exchange of tax information were implemented starting in 2010 (Multilateral Competent Authority Agreement on Automatic Exchange of Financial Account Information (MCAA) and the CRS; Directive on Administrative Cooperation in Tax Matters). As of April 2019, 105 Countries signed the MCAA - the vast majority started reporting in 2017/2018 (see https://www.oecd.org/tax/exchange-of-tax-information/MCAA-Signatories.pdf).

\(^2\) See, e.g. Johannesen (2014); Johannesen and Zucman (2014); Miethe and Menkhoff (2019).
evasion by implementing a Tax Information Exchange Agreement (TIEA); and a tax haven’s decision whether it adopts this agreement and, complementary, whether it introduces a CBIP. We test the hypothesis that individuals use CBIPs to hide income and assets offshore also empirically. Our results show that deposits of residents from CBI offering countries held in other countries, and especially in tax havens, increased substantially after the introduction of a CBIP. This suggest CBIPs are used to circumvent tax information reporting.

Specifically, we model tax evasion as a rational decision of individuals who face moral (psychic) cost when evading taxes. There are different probabilities of being caught and fined, determined by the outcome of the negotiations for an TIEA between the countries and whether a CBIP is introduced. The implementation of a TIEA increases the detection probability; if also a CBIP is introduced by the tax haven, individuals can acquire a new citizenship to escape information exchange. Our model shows that the implementation of tax information exchange mechanisms reduces the number of individuals who evade taxes. However, some individuals are using CBI as a new mean to evade taxes by escaping tax information exchange, i.e. tax evasion serves as a motive to acquire a new citizenship. Our model also illustrates that the recent introduction of CBIPs and the international efforts to combat tax evasion do not just happen simultaneously by coincidence. There is a structural relationship between the increasing number of CBIPs, the number of citizenships granted and the intensified international efforts to combat tax evasion: This can be explained by the revenue maximising behavior of the high-tax as well as the tax haven government’s given the optimal tax evasion decision of individuals.

For the empirical tests of the results of our model we use CBIP introduction dates and Locational Banking Statistics (LBS) provided by the Bank of International Settlements (BIS). We analyze how the deposits in countries reporting to the BIS, held by citizens of countries which introduced a CBIP, have changed compared to deposits of citizens from countries which did not introduce CBI. Our results show that deposits of citizens from CBI offering countries held in countries reporting to the BIS increased on average by about 20% after the introduction of a CBIP; in particular, deposits in other low tax jurisdictions sharply increase by about 40% on average. This suggests that new citizens, which acquired citizenship via CBI using bank accounts abroad to deposit their money and using their new citizenship documents to proof tax residence in the CBI jurisdiction when opening new bank accounts or when they are required for a residence address test for pre-existing accounts. Thus, our paper provides first evidence that CBIPs are (mis-)used by
individuals to avoid reporting of tax information under the CRS in order hide income and assets offshore, unrecorded by competent fiscal authorities. The results of our paper also suggest that CBIPs are used to keep or re-allocate deposits in CRS compliant tax havens. Instead of re-allocating deposits to non-compliant tax havens, what has become increasingly difficult and expensive, a new citizenship can be used to keep the money in any desired jurisdiction circumventing information exchange.

Our paper adds to two strands of literature. First, it contributes to the literature on individual tax evasion (see Slemrod (2007) for a overview and Sandmo (2005) for a review of the theoretical literature). While it has been proven difficult to measure tax evasion, there is also a large empirical literature (see Alm (2012) for a summary). Close to our paper is the recent tax evasion literature that evaluates the success of TIEA’s, suggesting that tax evaders search for new paths to hide income and assets offshore, rather than becoming compliant. Johannesen (2014); Johannesen and Zucman (2014); Hanlon et al. (2015); Caruana-Galizia and Caruana-Galizia (2016) and De Simone et al. (2018) provide evidence that tax evaders re-allocate deposits to non-compliant tax havens. The results of Sharman (2010); Johannesen (2014); Miethe and Menkhoff (2019) and Omartian (2017) suggest that tax evaders also search for regulatory loopholes in non-haven countries and that they hide beneficial ownership via offshore structures which are formally consistent with regulatory requirements, e.g. sham corporations.3 Second, our paper contributes to literature studying CBIPs in economic dimensions. There is some literature on the implications of CBIPs for offering countries. Xu et al. (2015) discusses recent developments and implications of CBIPs for the real economy, i.e. risks to macroeconomic and financial stability, for the predominantly small countries which offer such programs. Dzankic (2012) discusses investor citizenship programs worldwide in a comparative perspective and highlights the distinction between residence by investment and citizenship by investment programs.

The insights of our paper are relevant in the light of the ongoing fight against international tax evasion. Addressing the potential misuse of CBI is one key challenge to ensure the functioning of financial account information exchange. Empirical evidence in useful for the formulation of counterstrategies and will make policy instruments aimed to prevent the abuse of CBIPs more targeted and effectively.

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3The widespread use of offshore structures is also exemplified by the ‘Panama’ and ‘Paradise’ papers released by the International Consortium of Investigative Journalists (ICIJ), see https://www.icij.org/investigations/panama-papers/ and https://www.icij.org/investigations/paradise-papers/.
The remainder of this paper proceeds as follows. Section 2 provides details on citizenship by investment programs and discusses the relevance of CBIPs in the context of tax evasion. Section 3 provides a model of tax evasion in the interplay of the implementation of a tax information exchange agreement and the introduction of a CBI program. Section 4 describes the data and the empirical research design; and it also presents basic results. Section 5 provides several robustness tests and falsification exercises. Section 6 concludes.

2 Citizenship by Investment

Principally, individuals can acquire citizenship in four ways: i) birth within a certain territory; ii) descent from a citizen’s parent; iii) marriage to a citizen; and iv), naturalisation. While most countries require language skills and knowledge of the country, and usually also family relationships or several years of residence before they grant citizenship by naturalization, some countries offer fast-track naturalisation to foreign investors. Citizenship-by-Investment programs provide a structured path for foreign individuals to obtain a country’s citizenship for a financial investment in its economy or a contribution to its public sector.

Purchaseable citizenships are not a new phenomenon. During the 1980s, 1990s and early 2000s, a number of countries introduced CBIPs, including e.g. Dominica (1993-today), St. Kitts and Nevis (1984-today), Austria (1985-today), Cyprus (2002-today), Ireland (1988-1998), Belize (1985-2002), Grenada (1996-2001), Peru (1992-1993), Nauru (1998-2003) and Tonga (1982-1996). The market for citizenship in its early years was primarily associated with small tax haven states in the Caribbean and the Pacific. These early programs provoked serious controversies and criticisms because they were associated with fraud, corruption and money laundering. The US and EU were strongly concerned about these programs. As a result of international and domestic pressure and the threat of economic sanctions, all CBI offering countries either reformed or shut their programs down.


5See e.g. Simpson (2003), Seneviratne (1998) and Shachar (2017).

6A study on the political and economic implications and consequences of CBI focussing on the early programs in the Pacific is provided by Van Fossen (2007). A in-depth summary about the arguments in favor and against citizenship for sale as well as a summary of the historical evolution of such programs can be found in Shachar (2017).
However, since 2008 more and more countries have newly introduced or re-enacted CBI as standardized and comparatively transparent programs, which include due diligence checks, and regulatory bodies. On this basis, the programs are able to counteract many of the concerns that discredited earlier forms of such programs. Working closely together with law and consulting firms which designed and implemented those programs on behalf of governments, CBI has been redefined to a product for residence and citizenship management.7

By the end of 2018, there were 16 jurisdictions worldwide offering CBIPs.8 In 2008 and 2009, Comoros and Bulgaria officially launched new citizenship programs. In 2013 Antigua and Barbuda and Cambodia implemented a new program, and Grenada re-enacted its previously abrogated program. Malta introduced its CBIP in 2014, St. Lucia in 2016, Vanuatu and Turkey in 2017 and Moldova and Jordan in 2018 and Montenegro in 2019. The four older programs still existing are implemented in St. Kitts and Nevis in 1984, in Austria in 1985, in Dominica in 1993 and in Cyprus in 2002. Though, still small in number, CBIPs are spreading, and the number of granted citizenships has surged. Estimates based on official CBIP reports, government or competent commission statements and IMF and World Bank data suggest that more than 80,000 individuals acquired a new citizenship via a CBIPs as of 2017 and spent a total of approximately US $10.75 billion.9

CBIPs are very different with respect to their design, conditions, requirements and costs.10 There are two broad categories of CBIPs depending on the form of the qualifying investment. First, programs that grant citizenship in return for investment amounts for these countries can be found in Nesheim (2018b). Cambodia 1,068 (see https://citizenshipbyinvestment.ch/index.php/2018/06/01/1068-foreigners-obtained-cambodian-citizenship-by-investment/) and Comoros 42,000-66,000, of which most are stateless Bidoons from Arabian countries (see Lewis and Ahmed (2018)) With a assumed family size of four, including the main applicant (US $45,000), the spouse (US $20,000) and two children (US $10,000 each) and additionally US $2,000 for naturalization per person, the total capital inflow in Comoros can be estimated at US $1 billion. Further, with a minimum investment of about US $250,000, total capital inflow in Cambodia can be estimated at US $250 million. 10

7As intermediaries, those firms are also highly engaged as promoters and service providers to citizenship customers, e.g. Henley & Partners (see https://www.henleyglobal.com/) or CS GLOBAL Partners (see https://csglobalpartners.com/).
8Several other countries have legal provisions that allow for CBI, e.g. Romania, Croatia and Cap Verde. Observers of the industry note that other countries may implement CBI in the near future, e.g. Albania, Georgia, Mauritius, Tuvalu, Belize, Samoa, St. Vincent and the Grenadines, Serbia and Macedonia (see http://globalresidenceindex.com/2018/05/09/next-cbi/).
9All time approvals by country: Antigua and Barbuda 3,000 (Estimations based on average family size of 2.5); Cyprus 3,300; Grenada 1,460; Dominica 6,000-10,000; Malta 2,101; St. Kitts and Nevis 16,544; St. Lucia 195; Vanuatu 1,000-3,000 and Belize, Bulgaria, Ireland, Jordan, Turkey, Cape Verde, Cambodia, and Austria combined 1,000-3,000 (Nesheim, 2018a,b). The estimated numbers for investment amounts for these countries can be found in Nesheim (2018b). Cambodia 1,068 (see https://citizenshipbyinvestment.ch/index.php/2018/06/01/1068-foreigners-obtained-cambodian-citizenship-by-investment/) and Comoros 42,000-66,000, of which most are stateless Bidoons from Arabian countries (see Lewis and Ahmed (2018)) With a assumed family size of four, including the main applicant (US $45,000), the spouse (US $20,000) and two children (US $10,000 each) and additionally US $2,000 for naturalization per person, the total capital inflow in Comoros can be estimated at US $1 billion. Further, with a minimum investment of about US $250,000, total capital inflow in Cambodia can be estimated at US $250 million.
10For a overview of programs conditions, requirements and costs see e.g. http://cbiindex.com.
vestments in the local economy: Applicants are required to invest in either private sector assets like real-estate for residential or commercial use, or in government-approved real-estate or infrastructure projects. Another option in some programs is to purchase or participate in businesses in the country. Some programs also allow to deposit money in bank accounts or to invest in a investment portfolio in the country. Regularly, investments in the private sector must be held for lengthy periods of time, i.e. can sold or redeemed only after a required holding period of mostly 3-5 years. For business investments it is often required that they create a certain number of permanent jobs in the country. Second, programs that grant citizenship on the basis of financial transfers to the government: Programs of this type require flat, non-refundable contributions (donations) directly to government accounts or to quasi-government funds. Such public funds which hold the investment in trust and which are created to promote and finance the economic and social development of the country are a common arrangement.\textsuperscript{11} Some programs also allow (or require) to buy public debt instruments, i.e. to purchase government bonds which must be held for specified period (3-5 years), and which may not return a rate of interest.

Some “hybrid type” programs require a combination and yet others allow to choose between alternatives. In all programs, additional contributions including registration and application fees as well as fees to cover processing and due diligence costs have to be paid by the applicants.

CBI offering countries seem to be aware of the value of their citizenship compared to the citizenship of competitors, i.e. how much the target group is willing to pay - for example due to visa-free travel to the US or the EU and with regard to beneficial tax treatment. To attract investors, the countries compete with regard to conditions, prices and advertising. Most existing programs were revised several times to improve its appeal, e.g. by reducing costs or processing times and simplifying conditions.\textsuperscript{12}

\textsuperscript{11}The National Development and Social Fund in Malta, the National Development Fund in Antigua and Barbuda, the Economic Diversification Fund in Dominica, the National Transformation Fund in Grenada, the Sugar Industry Diversification Fund in St. Kitts and Nevis, the National Economic Fund in St. Lucia and the Public Investment Fund in Moldova.

\textsuperscript{12}For example, Antigua and Barbuda reduced the qualifying contribution to the “National Development Fund” from US $200,000 to US $100,000 in 2017 (also other Caribbean countries recently lowered the minimum contributions). Cyprus amended its program in 2013 and now allows other investment options e.g. the purchase of government bonds. Dominica introduced a real estate investment option in 2015 and reduced the processing time for applications. The EU countries offering CBI, i.e. Malta, Cyprus, Austria and Bulgaria, are charging comparatively much higher prices and require substantial financial investment. Regarding the most recent programs, Montenegro as a candidate for the enlargement of the EU by 2025 and already using the Euro as its currency also requires comparatively high investments while Moldova want to attract investors with low investment requirements and fast processing times.
High net-worth individuals from all over the world are on the demand side of CBI. Accurate statistics on numbers and origins of applicants are sparse; however, program reports, official statements and press reports indicate that most applicants are originally from China, Russia and the Middle East. While individuals from those countries represent the major share of applicants to most CBIPs, there is still a sizeable number of citizens from high-income countries which represent a significant share of applicants for certain programmes (Xu et al., 2015).

There is a number of legitimate motives for individuals to consider the acquisition of new citizenship rights, e.g. international mobility through visa-free travel (USA, EU, Schengen-Area), political and economic stability, avoid dependence from a single government and oppression from a political regime, family security by escaping political or ethnic persecution, investment and business opportunities in the jurisdiction as well as better education, social security, infrastructure and job opportunities. While these reasons are likely important factors for the rising demand of individuals from low- and middle-income countries, all applicants interested in acquiring a new citizenship, in particular citizens from advanced countries, may be also motivated by favorable tax regimes and/or to become “invisible” for competent tax authorities. The five Caribbean countries and Vanuatu marketed their CBIP with clear reference to their favorable tax treatment of individuals and firms.\textsuperscript{13} Also Malta, Cyprus and Bulgaria advertised their CBIPs with comparatively more favorable tax regimes within the EU for individuals and resident firms.\textsuperscript{14}

On the demand of the G7 countries Finance Ministers in 2017, the OECD started to investigate arrangements designed to circumvent information reporting under the CRS. Regarding the ongoing challenges to ensure the functioning of the CRS, the OECD (2017) and the EU (Knobel, 2018) highlighted the importance to identify and address loopholes to information reporting under the CRS as well as non-transparent offshore structures which can be used to hide actual beneficial owners. On February 19, 2018, the OECD (2018b) released a consultation document on “Preventing abuse of residence by investment schemes to circumvent the CRS”. In this document, CBI (and Residency-by-Investment) schemes are identified as one major risks for information exchange under the CRS.

\textsuperscript{13}The five Caribbean countries have no capital income taxes, inheritance taxes or wealth taxes. Vanuatu has no income taxes, corporate taxes, capital gains taxes, inheritance or wealth taxes.

\textsuperscript{14}Cyprus has a corporate tax rate of 12.5%. Malta offers shareholders of Maltesian resident companies a generous tax refund on dividend income (6/7 of the total amount of taxes paid, including taxes paid abroad; total refund is limited to taxes paid in Malta, so the effective tax rate paid is a max. 5\%). In 2008, Bulgaria introduced a 10\% flat tax rate on all income levels. Malta, Cyprus and Bulgaria have no inheritance or wealth taxes.
In detail: Most CBI jurisdictions offering low personal income tax rates on off-shore financial assets or exempting foreign source income. However, tax liability of capital income normally depends on the beneficiary owners country of residence; also reporting under the CRS is based on tax residence, not on citizenship or the right to reside in a country. While CBI laws provide a right of citizenship and to reside in a country, they generally do not grant tax residence. Even if individuals gain tax residence through a CBI law, this does not affect their tax residence status in their actual country of residence. The CRS requires that taxpayers provide self-certification of all their jurisdictions of residence for tax purposes, e.g. when opening a new bank account or when a residence address test is required for a pre-existing account. Hence, information is reported inaccurately or incompletely if individuals not disclose all their actual jurisdiction(s) of tax residence to their financial institution: Individuals may abuse citizenship supporting documents (residence certificates, ID-cards, passports) obtained under a country’s CBIP to pretend tax residency exclusively in that country, even if they actually not or not only reside there. Their account information collected under the CRS in the country where they located their deposits will then be falsely sent to the CBI jurisdiction; or, if the CBI country has chosen to send, but not to receive CRS information (“voluntary secrecy”) or has not adopted the CRS, they would be classified as a non-reportable person account information will not be reported at all. Thus, CBIPs offer tax evaders a tool to undermine the CRS due diligence procedures and to circumvent information reporting under the CRS. The OECD (2018b) gives examples of how individuals may falsely self-certifies tax residency and supplies a residence certificate in support for newly opened accounts and pre-existing accounts and announced to collect a list of high-risk CBI laws with regard to potential abuse.\footnote{The OECD (2018a,c) published the result of this analysis. The following criteria were used to classify CBI (and RBI) schemes which present a high risk of potentially being misused to circumvent information reporting under the CRS: i) that they give access to a low personal income tax rate of less than 10% on offshore financial assets or exempting foreign source income or beneficial tax treatment for foreign investors that have obtained residence or citizenship by such programs and/or that respective jurisdictions not receiving CRS information ii) that individuals are not required to (physically) spend a significant amount of time in the jurisdiction offering the scheme, i.e. at least 90 days per year. These thresholds are based on two assumptions about the individuals seeking to circumvent the CRS via CBI programs: first, that they wish to avoid income tax on their offshore financial assets in the CBI jurisdiction. Second, that most of them are not willing to leave their original country of residence and relocating to the CBI country. The most risky CBI schemes are currently operated by Antigua and Barbuda, Cyprus, Dominica, Grenada, Malta, St. Kitts and Nevis, St. Lucia, Vanuatu; the most risky RBI schemes by Antigua and Barbuda, Bahrain, Barbados, Cyprus, Malaysia, Malta, Qatar, Saint Kitts and Nevis, Seychelles, Turks and Caicos Islands, United Arab Emirates and Vanuatu.}
Historically, the OECD, G20 and EU classified most (micro-)states which now offer CBI as tax havens. The increased pressure by the OECD and G20 countries since 2008 forced these tax havens to cooperate with other countries in tax matters and to comply with international reporting standards. Cyprus, Austria, Malta, Bulgaria, Antigua and Barbuda, St. Lucia, St. Kitts and Nevis, Grenada and Vanuatu signed the MCAA, adopted the CRS and started sharing of tax and banking information in 2017/18. Comoros, Dominica, Cambodia, Montenegro and Moldova had refused. However, all countries which comply with information exchange also introduced their CBIP before the date of first exchange.

3 Model

We model the tax evasion decision of individuals in the interplay of international efforts to combat tax evasion by tax information exchange and the introduction of CBIPs.

In our model, tax evasion is a rational decision of individuals who face moral (psychic) cost when evading taxes. Individuals are tax resident in a high-tax country with tax rate \( t \); but they may evade capital income taxes by transferring money to an offshore account in a tax haven (that does not collect income taxes) and not declaring the income derived from it. Not all individuals have the same willingness to evade taxes. We model this heterogeneity with individual-specific moral costs of tax evasion \( \alpha_i \in [0; A] \).

The governments of the high-tax country and the tax haven maximize fiscal revenues. Initially, the tax haven offers tax sheltering services to individuals; in return, it charges a fixed fee \( f \) for hiding money. The tax haven also has the possibility to introduce a CBIP, which allows individuals to obtain citizenship for a fixed donation (investment) \( c \) to the tax haven’s government. The source of fiscal revenues of the high-tax country are taxes on individual income \((ty)\). If the tax authorities of the high-tax country detect that an individual evades taxes, the individual has to pay a fine \( F > 1 \) that is proportional to the evaded tax. We treat this fine for tax evasion as exogenous, assuming that it is set in an appropriate relation to punishments for other crimes.\(^\text{16}\) The government of the high-tax country can improve tax enforcement by signing a TIEA with the tax haven. To get the tax haven to sign the

\(^{16}\) We base this assumption on Kolm (1973), who shows that the government optimally sets the fine for tax evasion to the maximum level that is still in line with moral and legal constraints.
agreement, the high-tax country has to compensate it by an amount $C'$. Otherwise the tax haven would refuse to exchange financial account information.

The individuals face different probabilities $p_s$ of being caught and fined, which depend on the outcome of the negotiation for a TIEA. In the initial situation without tax information exchange, the probability of being detected as a tax evader is relatively low, denoted by $p_L$. If the tax haven decides to share information on offshore bank accounts with the high-tax country and adopts the TIEA, the probability of being detected increases to a high level, denoted by $p_H$. In this situation, tax evading individuals who have concealed income are worse off than they had been if they paid capital income taxes in their residence country.\footnote{Regarding individuals with zero moral costs, this still holds given $F > 1$, that $p_H$ is (realistically) close to or equal $1$ and $f$ is a relevant fee.} If the tax haven introduces a CBIP, individuals have the possibility to acquire the tax haven’s citizenship, which enables the individual to hide otherwise taxable capital income from its residence country despite the TIEA. If an individual makes use of the program, the detection probability decreases to $p_L$ again (given that there is still an certain probability for an information leak on offshore accounts).

Individuals decide about evading taxes and acquiring a new citizenship by maximising expected utility. We assume risk neutral individuals, whose utility $U_i$ is

$$U_i = y - ty + 1 \left[ (1 - p_s F)ty - \alpha_f - f \right],$$

where $y - ty$ is the after-tax capital income, $(1 - p_s F)ty$ is the expected tax saving from evasion and $\alpha + f$ are the costs of evasion. $1$ is an indicator function that is equal to one if the individual evades taxes and zero otherwise. As a result of the linear structure of the individuals utility function, it is never optimal to declare only a share of the true income.

We describe this setting as a six-stage game in a perfect information framework and solve it by backward induction. In the first stage, the government of the tax haven set concealment service fees (we assume that the high-tax country’s tax rate $t$ is exogenously determined).\footnote{Tax rate is set to solve the optimal income tax problem.} In the second stage, the governments of the high-
tax country and the tax haven negotiate on a TIEA.\textsuperscript{19} The tax haven will sign this agreement if it is (more than) compensated for revenue loss due to the abandonment of its secrecy regime. In the \textit{third stage}, individuals choose whether to pay taxes in their high-tax residence country or to allocate their income to the tax haven. In the \textit{fourth stage}, the government of the tax haven decides about introducing a CBIP by comparing the sum of revenues from concealment services and CBI donations (investments) with and without such a program. In the \textit{fifth stage}, individuals decide about whether they acquire a new citizenship to circumvent information exchange. In the \textit{sixth stage}, taxes, fines, fees and compensations are paid.

\subsection*{3.1 Benchmark Model Without Citizenship by Investment}

As a benchmark, consider first the case that CBI programs are not possible, i.e. the game excluding the fourth and the fifth stage.

\textbf{Third Stage:} Individuals base their evasion decision on the detection probability, that in turn depends on whether the countries have signed a TIEA. Expected utilities are

\begin{equation}
EU_{is} = \begin{cases} 
  y - ty & \text{if individual } i \text{ does not evade} \\
  y - p_s F ty - \alpha_i - f & \text{if individual } i \text{ evades}
\end{cases}
\end{equation}

with $p_s \in [p_L, p_H]$.

Comparing individuals’ expected utilities shows that individuals with moral costs $\alpha_i < \alpha^{p_s}$ evade taxes if the detection probability is $p_s \in [p_L, p_H]$, with $\alpha^{p_s}$ given by

\begin{equation}
\begin{aligned}
\alpha^L &= ty - p_s F ty - f & \text{if } p_s = p_L, \\
\alpha^H &= ty - p_s F ty - f & \text{if } p_s = p_H.
\end{aligned}
\end{equation}

\textsuperscript{19}There are some papers that study the determinants of treaty signature theoretically. Bacchetta and Espinosa (2000) study which countries are more likely to sign a TIEA. Eggert and Kolmar (2002) show that voluntary information exchange is an equilibrium in a small-country model of tax competition, but may not be an equilibrium when the size of the financial sector and the wage structure of an economy are positively linked. Huizinga and Nielsen (2003) study withholding taxes and information exchange as alternative tools to enforce interest income taxes internationally. There are also papers that study these determinants empirically. Ligthart et al. (2011) show that countries primarily sign bilateral double income tax treaties to reduce the double taxation of cross-border income; but also to provide a legal instrument for tax information exchange between national fiscal authorities. Elsayyad (2012) shows that haven’s bargaining power and good governance are the most important determinants of tax information exchange treaty signing and that it is easier to renegotiate existent treaties to include information exchange than to sign new treaties. Bliicka and Fuest (2014) show that tax havens sign more TIEAs with countries to which they are economically stronger connected, i.e. tax havens do not systematically undermine tax information exchange by signing TIEA’s with countries where information exchange unlikely matter.
Lemma 1 The number of tax evaders is higher the higher the potential gain from tax evasion (ty); and the number is lower the higher the expected fine (pFty) and the fee (f) for the concealment service of the tax haven. When a Tax Information Exchange Agreement (TIEA) is signed, fewer individuals evade taxes: Since \( p_H > p_L \rightarrow \alpha^H < \alpha^L \).

Second Stage: Governments observe the individuals’ tax evasion decision. We assume that there is a mass \( M \) of taxpayers with moral costs \( \alpha_i \) distributed uniformly in the interval \([0, A]\). The revenues of the high-tax country and the tax haven if there is no TIEA are

\[
T_{\text{High-tax}}^{\text{noTIEA}} = \int_0^{\alpha^L} p_L Fty \, dG(\alpha_i) + \int_{\alpha^L}^A ty \, dG(\alpha_i),
\]

\[
T_{\text{Haven}}^{\text{noTIEA}} = \int_0^{\alpha^L} f_{\text{noTIEA}} \, dG(\alpha_i),
\]

with \( G(\alpha_i) \) denotes the cumulative distribution function of \( \alpha_i \).

Lemma 1 implicates that the high-tax country’s tax revenues are larger if a TIEA is in place. However, the tax haven has no incentive to sign the treaty, because it then looses the revenues from the concealment service fees. Therefore, the high-tax country has to compensate the tax haven by the paying a amount \( C^+ \). The revenues of the high-tax country and the tax haven in the situation with an TIEA are

\[
T_{\text{High-tax}}^{\text{TIEA}} = \int_0^{\alpha^H} p_H Fty \, dG(\alpha_i) + \int_{\alpha^H}^A ty \, dG(\alpha_i) - C^+,
\]

\[
T_{\text{Haven}}^{\text{TIEA}} = C^+ + \int_0^{\alpha^H} f_{\text{TIEA}} \, dG(\alpha_i),
\]

Appendix 6 derives the conditions that both countries benefit from signing a TIEA. The high tax country implements the TIEA if (6) > (4). The tax haven accepts the TIEA if (7) > (5).
**First Stage:** The government of the tax haven maximize fiscal revenues by choosing the optimal concealment service fee $f$. The revenue maximising fees $f$ for the tax haven in the situation without and with a TIEA are

$$f^*_{\text{noTIEA}} = ty\left(1 - p_L F\right),$$
$$f^*_{\text{TIEA}} = ty\left(1 - p_H F\right) / 2.$$  \hspace{2cm} (8)

**Lemma 2** The revenue maximising fees $f$ are higher in the situation without a TIEA then in the situation with a TIEA since $f^*_{\text{TIEA}} < f^*_{\text{noTIEA}}$.

**Equilibrium:** In the benchmark equilibrium, we have three different groups of individuals (see Figure 1): Two groups have clear cut decisions. First, the group of “no-evaders”, who have such high moral costs, that they never evade taxes. Second, “evaders” who evade taxes no matter which detection probability occurs. The third group of individuals with intermediate moral costs $\alpha^H < \alpha_i < \alpha^L$ are tax evaders if no TIEA is signed, i.e. they do not evade taxes if the countries do sign a TIEA.

![Figure 1: Equilibrium behavior of individuals with different moral costs $\alpha_i$ depending on TIEA signature](image)

### 3.2 Citizenship by Investment

Now consider the case that the tax haven can introduce a CBIP and that individuals can acquire a new citizenship for a fixed investment $c$ (let $CBI_p$ denote the government decision to introduce such a scheme and $CBI$ denote the individuals decision to acquire a new citizenship). In addition to avoiding information exchange, individuals have benefits $b$ from acquiring a new citizenship e.g. by increasing international mobility (visa-free travel). Further, as a new citizen, they do not have to pay concealment service fees. They can use a normal bank account in the tax haven or the high-tax country to deposit and hide money using the new citizenship documents to pretend to have tax residence in the tax haven. However, individuals bear higher moral costs by evading taxes via changing citizenship, modeled by $\delta\alpha_i$ with $\delta \leq 1$.  

13
**Fifth Stage:** Tax evaders now take into account the possibility to acquire a new citizenship in order to escape information reporting (and have detection probability of $p_L$) but also the associated additional costs and benefits. Expected utilities are

$$EU_{ia} = \begin{cases} y - p_L Fty - \delta \alpha_i - c + b & \text{if individual } i \text{ evades, using CBI} \\ y - p_s Fty - \alpha_i - f & \text{if individual } i \text{ evades, not using CBI} \end{cases}$$

with $p_s \in [p_L, p_H]$. \hspace{1cm} (9)

Comparing the expected utilities for the decision of no-evaders whether to acquire a new citizenship ($y - ty$ and $t - ty - c + b$) shows that they would do so if $c < b$. However, we assume that individuals from the high-tax country do not significantly benefit from a new citizenship, e.g. from visa-free travel opportunities provided by the new passport compared to what their original countries passport provides them, i.e. we assume that $c > b$. Further, we assume that the costs for acquiring a new citizenship are significantly higher than concealment service fees $c > f$.\(^{20}\) As a result of our assumptions, it is never optimal for tax evaders with sufficiently low moral costs ($\alpha_i < \alpha_H$) and individuals with high moral costs ($\alpha_i > \alpha_L$) to acquire a new citizenship.

So, the expected utilities for the tax evasion decision of individuals in the situation without a TIEA and with or without the introduction of a CBIP remain unchanged compared to Stage 3 (or to the benchmark model in Section 3.1). However, comparing the expected utilities for the tax evasion decision in the case that the TIEA and the CBIP are implemented shows that individuals with moral costs $\alpha_H < \alpha_i < \alpha_t$ evade taxes using CBI as a tool to circumvent information exchange, with $\alpha_t$ given by

$$\alpha_t = \frac{(p_H - p_L) Fty + b + f - c}{\delta - 1}$$

For individuals behavior in the situation with and without a TIEA and with a CBIP (and given $c > b$ and $c > f$) it follows that

**Lemma 3** The number of tax evaders is higher the higher the potential gain from tax evasion using CBI ($((p_H - p_L)ty)$; and the number is lower the higher the expected

\(^{20}\)Comparing the expected utilities for the tax evasion decision and whether to use CBI for the case that the TIEA is not implemented shows that individuals with moral costs $\alpha_i < \frac{b + f - c}{\delta}$ would evade taxes and acquire a new citizenship. However, this is ruled out by the assumptions that $c > b$ and $c > f$, such that individuals with $\alpha_i < \alpha_L = ty - p_L Fty - f$ simply evade taxes without acquiring a new citizenship.
fine \((p_H - p_L)Fty\) and the investment costs \((c)\) for the acquiring the citizenship (or the lower \(b + f - c\) respectively) of the tax haven.

**Proposition 1** Individuals with moral costs \(\alpha_i \leq \alpha_H\) evade taxes by transferring money to an offshore account and paying the concealment service fee \(f\). Individuals with moral costs \(\alpha_i > \alpha_L\) do not evade taxes in any case and also not acquire a new citizenship. Individuals with moral costs \(\alpha_i \in [\alpha_H, \alpha_L]\) do evade taxes if no TIEA is signed. However, while individuals with moral costs \(\alpha_H < \alpha_t < \alpha_i < \alpha_L\) stop evading taxes if a TIEA is signed, individuals with moral costs \(\alpha_H < \alpha_i \leq \alpha_t\) still evade taxes but obtain a new citizenship to circumvent information exchange.

**Proposition 2** When the high-tax country and the tax haven sign a Tax Information Exchange Agreement (TIEA), fewer individuals evade taxes even if the tax haven introduces a CBIP that allows tax evaders to circumvent information exchange: \(p_H > p_L \rightarrow \alpha_H < \alpha_t < \alpha_L \rightarrow \frac{\alpha_{H_M}}{A} < \frac{\alpha_{i_M}}{A} < \frac{\alpha_{L_M}}{A}\).

**Fourth Stage:** Comparing revenues of the tax haven from the decision about whether to introduce a CBIP or not, it becomes clear that it is optimal to introduce a CBIP, independent from the decision whether to sign a TIEA or not, because \(0 < c(\alpha_t - \alpha_H)\) and \(c > f\).

**Third Stage:** Individuals base their evasion decision on the detection probability, that in turn depends on whether the countries have signed a TIEA. The expected utilities for the initial tax evasion decision of individuals in the situation with and without a TIEA remain unchanged compared to the benchmark model (Section 3.1). Expected utilities are

\[
EU_{is} = \begin{cases} 
  y - ty & \text{if individual } i \text{ does not evade} \\
  y - p_s Fty - \alpha_i - f & \text{if individual } i \text{ evades}
\end{cases}
\]  

(11) with \(p_s \in [p_L, p_H]\).

Comparing individuals’ expected utilities shows that still individuals with moral costs \(\alpha_i < \alpha_{p_s}\) evade taxes when the detection probability is \(p_s \in [p_L, p_H]\), with \(\alpha_{p_s}\) given by

\[
\alpha^L = ty - p_s Fty - f & \text{if } p_s = p_L, \\
\alpha^H = ty - p_s Fty - f & \text{if } p_s = p_H.
\]

(12)

**Second Stage:** The revenues of the high-tax country and the tax haven for the situation with and without a TIEA and without the introduction of a CBIP remain unchanged compared to the benchmark model (Section 3.1).
The revenues of the high-tax country and the tax haven for the situation with and without a TIEA and with the introduction of a CBIP are

\[ T_{\text{High-tax}}^{\text{no TIEA}} = \int_0^{\alpha^L} p_L Fty \, dG(\alpha_i) + \int_{\alpha^L}^A ty \, dG(\alpha_i), \]
\[ = p_L Fty \frac{\alpha^L M}{A} + ty \frac{(A - \alpha^L)M}{A}. \]  
(13)

\[ T_{\text{Haven}}^{\text{no TIEA}} = \int_0^{\alpha^t} c \, dG(\alpha_i) + \int_{\alpha^t}^{\alpha^L} f_{\text{no TIEA}} \, dG(\alpha_i), \]
\[ = c \frac{\alpha^t M}{A} + f_{\text{no TIEA}} \frac{(\alpha^L - \alpha^t)M}{A}. \]  
(14)

\[ T_{\text{High-tax}}^{\text{TIEA}} = \int_0^{\alpha^H} p_H Fty \, dG(\alpha_i) + \int_{\alpha^H}^{\alpha^t} p_L Fty \, dG(\alpha_i) + \int_{\alpha^t}^A ty \, dG(\alpha_i) - C^+, \]
\[ = p_H Fty \frac{\alpha^H M}{A} + p_L Fty \frac{(\alpha^t - \alpha^H)M}{A} + ty \frac{(A - \alpha^t)M}{A} - C^+. \]  
(15)

\[ T_{\text{Haven}}^{\text{TIEA}} = C^+ + \int_0^{\alpha^H} f_{\text{TIEA}} \, dG(\alpha_i) + \int_{\alpha^H}^{\alpha^t} c \, dG(\alpha_i), \]
\[ = C^+ + f_{\text{TIEA}} \frac{\alpha^H M}{A} + c \frac{(\alpha^t - \alpha^H)M}{A}. \]  
(16)

Lemma 3 implicates that gross tax revenues of the high-tax country are larger if a TIEA is in place even if the tax haven introduces a CBIP that allows tax evaders to circumvent information exchange. However, the tax haven has no incentive to sign the treaty, because it then looses the revenues from the concealment service fees. Therefore, the high-tax country has to compensate the tax haven by the paying a amount \( C^+ \).

Appendix 6 derives the conditions that both countries benefit from signing a TIEA. The high tax country implements the TIEA if (15) > (13). The tax haven accepts the TIEA if (16) > (14).

First Stage: The government of the tax haven maximize fiscal revenues by choosing the optimal concealment service fee \( f \). The revenue maximising fees \( f \) for the tax haven in the situation without and with a TIEA are

\[ f_{\text{no TIEA}}^* = \frac{ty(1 - p_L F)}{2} + \frac{[(2p_L - p_H)F - 1]ty - b + 2c}{2\delta}, \]
\[ f_{\text{TIEA}}^* = \frac{ty(1 - p_H F)}{2} + \frac{c}{\delta - 1}. \]  
(17)

Proposition 3 The revenue maximising fees \( f \) are higher in the situation without a TIEA than with a TIEA as long as \( p_H F\delta + \frac{2c}{ty} > 1 + \frac{b}{ty} + p_L F(\delta - 1) \). The difference between revenue maximising fees is smaller the smaller difference between \( p_H \) and \( p_L \) and the smaller the difference between \( b \) and \( c \). If the differences become very small,
it is optimal to have higher fees $f$ in the situation with a TIEA. In this situation there are only a few evaders using CBI. Since $c > f$ it is then optimal to get more individuals into the “CBI evader” group by increasing $f$, i.e. that more “evader” become “CBI evaders”.

**Equilibrium:** The equilibrium in the situation with or without a TIEA and without the introduction of a CBIP is the same as in the benchmark model shown in 1) (Section 3.1). The equilibrium in the situation without a TIEA and with the introduction of a CBIP is shown in 2. Given our assumptions about costs and benefits of a CBIP, no individual would use CBI in that case. So, it is *de facto* the same as the benchmark model equilibrium without a TIEA.

![Figure 2: Equilibrium behavior of individuals with different moral costs $\alpha_i$ in the situation without a TIEA](image)

However, if the countries do sign a TIEA and the tax haven implements the CBIP, there are four different groups of individuals in equilibrium (see Figure 3): There are still two groups with clear cut decisions. First, the group of “no-evaders”, who have such high moral costs, that they never evade taxes. Second, “evaders” who evade taxes even if the high detection probability occurs. The other two groups of individuals with intermediate moral costs decide differently if the countries sign a TIEA given the opportunity of CBI. While the third group of “evader if no TIEA” do not use CBI and stops to evades taxes if the countries sign a TIEA, the fourth group of “CBI-evaders” still evades taxes but obtains a new citizenship as a tool to escape information exchange, i.e. to reduce the detection probability.

![Figure 3: Equilibrium behavior of individuals with different moral costs $\alpha_i$ in the situation with a TIEA](image)
4 Data and Empirical Research Design

In the following we test the relevance of CBI in the context of tax evasion empirically.

4.1 Data and Sample

For the empirical analysis of our paper we use Locational Banking Statistics (LBS) published quarterly by the Bank of International Settlements (BIS) since 1977. This dataset contains aggregated information on claims and liabilities of banks from (currently) 48 reporting jurisdictions\(^{21}\) reported by the jurisdictions’ national central banks to the BIS. The LBS are used previously in the economics literature to approximate tax evasion (e.g. by Huizinga and Nicodème, 2004; Johannesen, 2014; Johannesen and Zucman, 2014; Langenmayr, 2017; Miethe and Menkhoff, 2019).

According to balance of payments conventions, the LBS by residence of counterparty are compiled with respect to the immediate counterparty, not the ultimate beneficiary of deposits (IMF, 2013; BIS, 2019). The LBS data is aggregated on the country and sector of immediate counterparty level, and distinguishes non-banks and banks deposits. We can not distinguish between individuals or shell companies as depositors. For our purposes, it would be optimal to only observe individuals; however, the non-bank counterparty sector captures the deposit of individuals which may react to the introduction of CBIPs. The results of Zucman (2013) suggest, that at least 50% of the deposits held in tax havens likely belong to households. Not every country reporting to the BIS allows publication data at the bilateral (country-to-country) level. Further, not every country reporting to the BIS reports data on every counterparty. However, the BIS publishes from 30 jurisdictions bilateral deposits of the non-bank sector, of which 10 are classified as tax havens. These 30 jurisdictions report to the BIS against a bilateral dimension of up to 220 jurisdictions.

For our empirical analysis we use a balanced panel of 36 quarters, ranging from 2010:Q1 to 2018:Q4. For country pairs lacking information on deposits for the sample period, we impute deposits by inverse distance weighted interpolation.\(^{22}\)

\(^{21}\)EU: Austria, Belgium, Cyprus, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain; other European countries: Denmark, Norway, Sweden, Switzerland, United Kingdom; Non-European developed countries: Australia, Canada, Japan, United States; Caribbean offshore: Bahamas, Bermuda, Cayman Islands, Netherlands Antilles, Panama, Curacao; Asian offshore countries: Hong Kong SAR, Macao SAR, Singapore; European offshore countries: Guernsey, Isle of Man, Jersey; Other offshore countries: Bahrain; Developing countries: Russia, Turkey, Brazil, Chile, Mexico, South Africa, China, Chinese Taipei, India, Malaysia, South Korea; Other countries: Indonesia, Philippines.

\(^{22}\)Using Stata’s mipolate idw command, provided by Cox (2015).
However, our results are robust to the exclusion of all country pairs without original BIS information on deposits for the whole sample period (see Section 5.3).

4.2 Empirical Approach

The basic idea of our empirical analysis is to exploit panel variation in total deposits held by the non-bank sector of a CBI country in banks of BIS reporting countries over time (we refer to the non-bank sector in the following as “residents”). In more detail, we analyze how the total deposits in countries reporting to the BIS, held by residents of countries which introduced a CBIP have changed compared to deposits of residents from countries which did not introduce CBI.

Our empirical strategy assumes that individuals who evade taxes by means of a CBIP (in detail see Section 2), locate their deposits (at least parts of them) in accounts outside the CBI jurisdiction, i.e. they prefer other financial centers and tax havens over the CBI jurisdiction to domicile their assets. So, rather than to relocate (all) deposits to the CBI country, they (also) keep or newly open accounts in other jurisdictions. This is likely for the following reason: First, due to reasons of diversification or economic uncertainties and financial risks of the banking sector in the CBI country. Second, this is possibly even a strategy in an attempt to make the trace of money more intransparent to fiscal authorities. Regarding the identifying variation, we exploit that 20 financial centers and 10 tax havens are reporting countries in the BIS data. The vast majority of BIS reporting countries adopted the CRS. They report the total bilateral liabilities of their banks to residents of up to 220 other jurisdictions including CBI countries to the BIS, i.e. the deposits held by residents of other jurisdictions. The deposits of accounts of individuals who evade taxes by means of a CBI scheme are newly reported to the BIS as a international liability of BIS reporting countries banks to citizens of the respective CBI country. This provides the variation that we use for the analysis of the relevance of CBI in the context of tax evasion.

23Cyprus and Dominica reformed their existing programs in 2014 drastically, e.g. Cyprus reduced minimum investment requirements from 15 million Euro to 2 million Euro. Therefore, we consider the CBIPs of Cyprus and Dominica in 2014 as a “new” programs.

24The BIS contains the deposits held in BIS reporting countries by residents of Dominica, Grenada, Jordan, Cambodia, Comoros, St. Lucia, Moldova, Montenegro, Malta, Cyprus, Vanuatu, Austria, Turkey and Bulgaria. Unfortunately, deposits held by residents of Antigua and Barbuda and St. Kitts and Nevis are not observable. In fact, we can only observe the non-bank sector in the BIS data. Parts of these deposits may belong to corporations or shell companies. However, the results of Zucman (2013) suggest, that at least 50% of the deposits held in tax havens likely belong to households.
In line with the results of our model, the main hypothesis we are testing is that (some) individuals use CBIP to circumvent tax information reporting under the CRS to hide income and assets offshore. In more detail: First, we are testing whether a significant number of individuals evades taxes by means of a CBIP but using accounts outside the CBI jurisdiction. In that case, total foreigner’s bilateral deposits from CBI jurisdictions held in BIS reporting countries should significantly increase after the introduction of a CBIP compared to foreigner’s bilateral deposits from other countries which did not introduce a CBIP. Second, if CBIP are mainly used to hide accounts already existing in classical tax havens, total foreigner’s bilateral deposits from CBI jurisdictions held in BIS reporting tax havens should increase in particular. An issue for our empirical strategy would be that the native citizens of the CBI countries had substantial increases in income or wealth. If native citizens have opened accounts and accumulated deposits abroad, the variation in BIS deposits can not be associated to foreign tax evaders using CBI. However, in our regressions, we control for gross domestic product per capita. This should account, at least partly, for changes in prosperity of the CBI country’s native citizens.

5 Results

5.1 Graphical Evidence

We start our empirical analysis by graphically depicting the evolution of deposits held by residents from CBI offering countries in countries reporting on country-to-country basis to the BIS. In Figure 4 we show the aggregated deposits of CBI countries held in banks of non-haven and haven countries. For CBI countries which introduced their program before 2015 as well as for countries which implemented it in or after 2015, we observe a sharp increase of deposits held in tax havens starting after the introduction of the CBIP. At the same time, we do not observe large changes in the deposit amounts held in non-haven jurisdictions.
In Figure 5 we investigate the heterogeneity of deposit trends. We focusing on the percentage changes of deposits held by residents of all countries in our dataset in banks of non-haven and haven countries reporting on country-to-country basis to the BIS after the introduction of a CBIP (“after” for non-CBI countries is 2014:Q3). Additionally we compare the average relationship of deposit changes in havens and non-havens for different country groups, i.e. the OECD, CBI countries, other tax havens and all other countries. The graph provides two key insights: First, while residents of the majority of countries - OECD countries, tax havens and other countries - decreased their deposits in tax havens, residents of almost all CBI offering countries (except Turkey and Vanuatu) increased their deposits in tax havens. The increase of deposits of residents from CBI countries ranges from about 10% up to 70% after the introduction of their CBIP; however, there is no clear picture for changes of deposits in non-havens. Second, for OECD and all other countries except tax havens we observe a positive relation between changes of deposits in havens and non-havens, i.e. deposits increase or decrease goes on average in the same direction. For tax havens except CBI countries there is no clear relationship between deposit changes in non-haven and haven countries. Though, for CBI countries the relation is that while on average deposits held in non-havens decreased, deposits in haven countries increased after the introduction of a CBIP.
Figure 5: Countries bank deposits changes in non-havens/havens

Note: Own calculations. The figure charts average changes (in %) of deposits of the non-bank sector of countries held in banks of non-haven and haven countries reporting on country-to-country basis to the BIS, before and after introduction of the CBI program. “After” for non-CBI countries is 2014:Q3. Source: BIS Locational Banking Statistics 2019.

In Figure 6 we show that the residents of the most CBI countries increased their total bank deposits abroad after the introduction of a CBIP. This is especially driven by higher bank deposits in tax-havens. The percentage increase in total deposits after the introduction of a CBIP is most pronounced for Grenada with about 35% and Cyprus with about 30%. However, also Vanuatu (about 15%), Moldova (about 12%), Jordan (about 9%), Malta (about 8%) and Cambodia (about 6%) experienced an increase in total deposits. The gains of deposits in tax havens and losses in deposits in non-havens result in a about zero-sum total deposit increase of Dominica and St. Lucia. Turkey is the only country with a total average decrease of deposits due to only slight increases in deposits in non-havens and losses of deposits in havens.25

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25 We are mainly interested in relative changes. However, CBI countries are very heterogenous with respect to the amount of deposits held by their residents abroad. Therefore, Figure A1 in the Appendix provides a more detailed overview of the changes of deposits of residents from CBI countries.
Figure 6: CBI countries bank total deposits changes

Note: Own calculations. The figure charts the total changes (in %) of deposits of the non-bank sector of CBI offering countries held in banks of countries reporting on country-to-country basis to the BIS, after introduction of the CBI program. Source: BIS Locational Banking Statistics 2019.

In sum, the graphical evidence suggests that deposits held by residents of CBI countries responded to the introduction of CBIP, in particular deposits held by banks of haven countries reporting to the BIS. This suggests that new citizenship is used to shift deposits to tax havens, unobserved by financial authorities.

5.2 Regression Based Evidence

The central question we want to address is whether the introduction of a CBIP has had a statistically significant impact on the deposits of citizens of countries which introduced a CBIP which they held in banks of BIS reporting countries, compared to deposits of citizens from countries which did not introduce CBI. We continue to investigate this question econometrically. The OLS regression model we are estimating is:

\[
\log(\text{deposits})_{ijt} = \alpha + \beta CBI_{\text{program}_{it}} + \theta_1 X'_{it} + \theta_2 X'_{jt} + \gamma_{ij} + \lambda_t + \epsilon_{ijt},
\]  

(18)

with the dependent variable \(\log(\text{deposits})_{ijt}\) representing deposits (bank liabilities) held by residents (non-bank counterparty) of jurisdiction \(i\) with banks of jurisdiction \(j\) at the end of year-quarter \(t\); \(CBI_{\text{program}_{it}}\) is a dummy equalling one if country \(i\) has introduced a CBIP in year-quarter \(t\) (post-introduction), zero otherwise; \(\gamma_{ij}\)
denotes country-pair fixed effects, and $\lambda_t$ denotes time fixed effects. The inclusion of country-pair fixed effects accounts for time-invariant characteristics of country pairs (e.g. distance); the inclusion of time fixed effects accounts for all common time trends affecting the deposits in BIS reporting countries (e.g. international macroeconomic shocks). Further, we incorporate time-varying country specific covariates represented by the vectors $X_{it}$ and $X_{jt}$ in our regression model. The set of controls includes the following country level characteristics, which are expected to have a high explanatory power for deposit trends: quarterly gross domestic product in domestic currency (accounting for a country’s economic relevance), quarterly gross domestic product per capita in domestic currency (accounting for the prosperity of the residents of a country), and quarterly consumer price index as percentage change (accounting for inflation).\footnote{See Appendix 6 for a description from where we get the data on covariates and how we (partly) impute quarterly observations.} The coefficient of interest, $\beta$, is the estimator for the effect of the introduction of a CBI program on deposits. If CBIPs are (mis-)used by individuals to avoid reporting of tax information under the CRS, i.e. for tax evasion purposes as described above, $\beta$ should be positive and statistically different from zero. All our regressions have robust standard errors clustered at the country-pair level.

In the following we present regression results which show how deposits of citizens from CBI offering countries held in BIS reporting countries increased after the introduction of the respective CBIP. If CBIPs are used by individuals to avoid reporting of tax information under the CRS, i.e. for tax evasion purposes, our estimated $\beta$-coefficients should be positive and significantly different from zero. Table 1 (columns 1-6) shows our baseline results: The first column of Table 1 shows our estimates of equation (18) using the complete panel of country pairs for which we have bilateral deposit data for residents, i.e. the non-bank sector. We find that the deposits of CBI offering countries are significantly higher, i.e. about 22% on average, after the official launch of the program relative to the deposits of the countries without a CBIP. Further, we investigate the heterogeneity of deposit increases with respect to the countries where those deposits are held. In column 2 and 3 we restrict the country pair sample such that we estimate the change of deposits held in banks of BIS reporting countries defined as non-havens and defined as havens. Column 2 shows that a CBIP has a positive effect for deposits held in non-haven bank countries; however, the coefficient is insignificantly measured. In line with the insights from our graphical analysis, column 3 shows that deposits held by residents of CBI offering countries in banks of BIS reporting haven countries increase substantially,
i.e. by about 40% on average. In columns 4-6 we continue our analysis with the sample of jurisdiction-jurisdiction pairs for which data on covariates is available. The inclusion of covariates changes our estimates only modestly and confirms our previous results.

Table 1: Basic Results: Panel Regressions of Bilateral Bank Deposits on CBI Program Introduction

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Note: Clustered standard errors (countrypair) in parentheses, *** p < 0.01, ** p < 0.05, * p < 0.1. Dependent variable is the log stock of deposits held by savers of jurisdiction i in banks of BIS reporting jurisdiction j at the end of year-quarter t. The unit of observation is the jurisdiction-jurisdiction pair (i, j). The sample period is from 2010:Q1 to 2018:Q4. We consider the deposits held by residents (non-banks) of up to 220 saving countries i in up to 30 jurisdictions j. CBIprogram is a dummy equal to 1 if there exists a CBI program in jurisdiction i in year-quarter t. Column 1-3 consists of the full BIS country-by-country sample; column 4-7 consists of the full BIS country-by-country sample for which quarterly data on macro-covariates (from 2010 to 2018) is available. The full bank country sample includes 30 bank jurisdictions i; Non-haven bank country sample includes 20 bank jurisdictions i; Haven bank country sample includes 10 bank jurisdictions i (see the country list in Appendix A1). Additional controls for bank and saver country: Nominal GDP in domestic currency, Nominal GDP per capita in domestic currency; Consumer Price Index as percentage change. Source: BIS Locational Banking Statistics 2019; IMF, International Financial Statistics 2019; World Bank, World Development Indicators 2019; UNSTATS 2019.

Our first results show that the deposits of citizens from CBI offering countries held in other countries substantially increased after the introduction of a CBIP; this suggests that the increases are strongly correlated to the introduction of a CBIP. Total foreigner’s bilateral deposits from CBI countries increase in BIS reporting countries; and especially in tax havens reporting to the BIS. Our baseline results suggest that the increase in deposits of citizens from CBI offering countries held in BIS reporting countries and especially in tax havens are strongly correlated to the introduction of a CBI program. However, most CBI offering countries are also tax havens, i.e. in our baseline regressions we compare the deposits held by residents of CBI countries with the deposits held by residents of a sample that mainly consists of non-havens. Our results may lead to false conclusions if it is a general trend that
residents from tax havens increased their deposits in BIS reporting countries during the observed period.

To investigate whether the observed deposit increase is a common trend for tax havens, we restrict the country pair sample such that we only estimate the deposit changes of residents from tax havens in banks of BIS reporting countries. For our tax haven sample restriction we use the haven list employed by Johannesen and Zucman (2014) (without Ireland). This list includes all CBI offering countries except Turkey and Cambodia which we exclude from the analysis. We estimate equation (18) using this sample to investigate whether there is still a significant difference in deposit trends due to the introduction of a CBIP. If the observed deposit trends are related to the introduction of a CBIP, residents of the comparable tax haven sample should have not experienced such significant increases in deposits abroad, i.e. our estimated $\beta$-coefficients should be still positive and significantly different from zero.

Table 2 (columns 1-6) shows the results of this analysis: The first column of Table 2 shows our estimates using the complete panel of (BIS reporting) country-haven pairs for which bilateral deposit data for the non-bank sector is available. We still find that the deposits of CBI offering countries are significantly higher after the official launch of the program, i.e. about 22% on average, relative to the deposits of other tax havens without a CBI program. In column 2 and 3 we restrict the sample to non-haven-haven and haven-haven country pairs, again in order to investigate in which country’s banks the residents of havens increase their deposits after the introduction of a CBIP. Column 2 shows that a CBIP has a positive but insignificant effect for deposits held in non-haven bank countries. Column 3 shows that deposits held by residents of CBI offering countries in banks of haven countries increase substantially, i.e. by about 42% on average. In columns 4-6 we continue our analysis with the sample of BIS reporting country-haven pairs for which covariates are available. The inclusion of covariates increases the magnitude of our $\beta$-coefficient in all three regressions. However, the magnitude of the $\beta$ coefficients in our regressions with and without covariates are comparable to our baseline results, i.e. our results hold if we compare the CBI countries deposit trends with those of highly comparable countries, i.e. tax havens. This confirms that the observed deposit increase of CBI countries residents after the official launch of their program cannot be explained by a common trend of tax havens.
### Table 2: Savers from Tax Havens: Panel Regressions of Bilateral Bank Deposits on CBI program Introduction

<table>
<thead>
<tr>
<th>Dep. Var: ln(deposits)</th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
<th>(6)</th>
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</thead>
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<tr>
<td></td>
<td>Full BIS sample</td>
<td>BIS sample - covariates available</td>
<td>Full BIS sample</td>
<td>BIS sample - covariates available</td>
<td>Full BIS sample</td>
<td>BIS sample - covariates available</td>
</tr>
<tr>
<td>Bank country sample</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CBI program</td>
<td>0.2181**</td>
<td>0.0960</td>
<td>0.4166***</td>
<td>0.2537***</td>
<td>0.1482</td>
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<tr>
<td></td>
<td>(0.0885)</td>
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<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>Observations</td>
<td>35.640</td>
<td>22.032</td>
<td>13.608</td>
<td>32.796</td>
<td>19.764</td>
<td>13.032</td>
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<tr>
<td>R-squared</td>
<td>0.0082</td>
<td>0.0063</td>
<td>0.0288</td>
<td>0.0113</td>
<td>0.0160</td>
<td>0.0371</td>
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</table>

**Note:** Clustered standard errors (countrypair) in parentheses, *** p < 0.01, ** p < 0.05, * p < 0.1. Dependent variable is the log stock of deposits held by savers of (tax haven) jurisdiction i in banks of BIS reporting jurisdiction j at the end of year-quarter t. The unit of observation is the jurisdiction-jurisdiction pair (i,j). The sample period is from 2010:Q1 to 2018:Q4. We consider the deposits held by residents (non-banks) of 40 tax havens as saving countries i in up to 30 jurisdictions j. CBI program is a dummy equal to 1 if there exists a CBI program in jurisdiction i in year-quarter t. Samples: column 1-3 consists of the full BIS country-by-country sample; column 4-7 consists of the full BIS country-by-country sample for which quarterly data on macro-covariates (from 2010 to 2018) is available. Full bank country sample includes 30 bank jurisdictions i; Non-haven bank country sample includes 20 bank jurisdictions i; Haven bank country sample includes 10 bank jurisdictions i (see the country list in Appendix A1). Additional controls for bank and saver country: Nominal GDP in domestic currency, Nominal GDP per capita in domestic currency; Consumer Price Index as percentage change. **Source:** BIS Locational Banking Statistics 2019; IMF, International Financial Statistics 2019; Wold Bank, World Development Indicators 2019; UNSTATS 2019.

### 5.3 Robustness

As we impute missing values of our dependent variable to keep the estimation sample as large as possible, there might be concerns regarding the stability of our results when using only original BIS LBS data. In Table 3 and Table 4 (columns 1-6) we show the results of the estimation of equation (18) using the panels of country pairs as in our baseline regression (Table 1) and our regressions for savers from tax havens (Table 2). However, we keep only country pairs of these samples for which we have original bilateral deposit data for the non-bank sector as provided by the BIS for the entire observation period.

Table 3 shows our estimates using the complete panel of (BIS reporting) country-haven pairs for which original bilateral deposit data for the non-bank sector. Compared to our baseline results, the magnitude of our estimates decreases in all regressions. Due to the lower sample size, our estimates for the whole bank country sample are slightly insignificant. However, the deposits held by residents of CBI
offering countries in banks of haven countries still increase substantially by about 30% and confirm our previous results.

Table 3: Robustness: Panel Regressions of Bilateral Bank Deposits on CBI program Introduction - Non-imputed bank deposits

<table>
<thead>
<tr>
<th>Dep. Var: ln(deposits)</th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
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<tr>
<td>Bank country sample</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CBI program</td>
<td>0.1435</td>
<td>0.0252</td>
<td>0.2980***</td>
<td>0.1485</td>
<td>0.0076</td>
<td>0.2980***</td>
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<td></td>
<td>(0.0914)</td>
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<td>Add. Controls</td>
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<tr>
<td>Observations</td>
<td>69,192</td>
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<td>29,700</td>
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<tr>
<td>R-squared</td>
<td>0.0075</td>
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<td>0.0387</td>
<td>0.0169</td>
<td>0.0308</td>
<td>0.0514</td>
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</table>

Note: Clustered standard errors (countrypair) in parentheses, *** p < 0.01, ** p < 0.05, * p < 0.1. Dependent variable is the log stock of deposits held by savers of jurisdiction i in banks of BIS reporting jurisdiction j at the end of year-quarter t. The unit of observation is the jurisdiction-jurisdiction pair (i, j). The sample period is from 2010:Q1 to 2018:Q4. We consider the deposits held by residents (non-banks) of up to 220 saving countries i in up to 30 jurisdictions j. CBI program is a dummy equal to 1 if there exists a CBI program in jurisdiction i in year-quarter t. Samples: column 1-3 consists of the full BIS country-by-country sample; column 4-7 consists of the full BIS country-by-country sample for which quarterly data on macro-covariates (from 2010 to 2018) is available. Full bank country sample includes 30 bank jurisdictions i; Non-haven bank country sample includes 20 bank jurisdictions i; Haven bank country sample includes 10 bank jurisdictions i (see the country list in Appendix A1). Additional controls for bank and saver country: Nominal GDP in domestic currency, Nominal GDP per capita in domestic currency; Consumer Price Index as percentage change. Source: BIS Locational Banking Statistics 2019; IMF, International Financial Statistics 2019; World Bank, World Development Indicators 2019; UNSTATS 2019.

Table 4 shows our estimates using sample of savers from tax havens for which we have original BIS deposit data. Compared to our previous results for this sample, the magnitude of our estimates decreases in all regressions. Due to the lower sample size, our estimates for the whole bank country sample are slightly insignificant in the regression without covariates; however, by including covariates we measure a significant positive effect. The deposits held by residents of CBI offering countries in banks of haven countries still increase substantially by about 35-36% on average compared to other tax havens.
Table 4: Robustness: Panel Regressions of Bilateral Bank Deposits on CBI program Introduction - Savers from Tax Havens and Non-imputed bank deposits

<table>
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<tr>
<th>Dep. Var: ln(deposits)</th>
<th>(1) Full BIS sample</th>
<th>(2) BIS sample - covariates available</th>
<th>(3)</th>
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<tr>
<td>CBI program</td>
<td>0.1764</td>
<td>0.0547</td>
<td>0.3467***</td>
<td>0.2428**</td>
<td>0.1116</td>
<td>0.3639***</td>
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<td></td>
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<td>(0.1231)</td>
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<tr>
<td>Observations</td>
<td>15,156</td>
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<td>7,632</td>
<td>6,336</td>
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<tr>
<td>R-squared</td>
<td>0.0068</td>
<td>0.0068</td>
<td>0.0326</td>
<td>0.0186</td>
<td>0.0628</td>
<td>0.0476</td>
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</table>

Note: Clustered standard errors (countrypair) in parentheses, *** p < 0.01, ** p < 0.05, * p < 0.1. Dependent variable is the log stock of deposits held by savers of jurisdiction i in banks of BIS reporting jurisdiction j at the end of year-quarter t. The unit of observation is the jurisdiction-jurisdiction pair (i, j). The sample period is from 2010:Q1 to 2018:Q4. We consider the deposits held by residents (non-banks) of up to 220 saving countries i in up to 30 jurisdictions j. CBI program is a dummy equal to 1 if there exists a CBI program in jurisdiction i in year-quarter t. Samples: column 1-3 consists of the full BIS country-by-country sample; column 4-7 consists of the full BIS country-by-country sample for which quarterly data on macro-covariates (from 2010 to 2018) is available. Full bank country sample includes 30 bank jurisdictions i; Non-haven bank country sample includes 20 bank jurisdictions i; Haven bank country sample includes 10 bank jurisdictions i (see the country list in Appendix A1). Additional controls for bank and saver country: Nominal GDP in domestic currency, Nominal GDP per capita in domestic currency; Consumer Price Index as percentage change. Source: BIS Locational Banking Statistics 2019; IMF, International Financial Statistics 2019; World Bank, World Development Indicators 2019; UNSTATS 2019.

6 Conclusion

Our paper provides some first results on the relevance of CBI in a tax evasion context. The findings of our paper suggest that intensified international efforts to combat tax evasion and an increasing number of CBIPs and citizenships granted did not happen simultaneously by coincidence. Our model illustrates a structural relationship between the introduction of mechanisms for tax and banking information exchange and the introduction of CBIPs. This can be explained by the revenue maximising behavior of high-tax as well as the small low-tax country’s governments, given the optimal tax evasion decision of individuals. Our equilibrium analysis showed that the implementation of tax information exchange mechanisms reduces the total number of individuals who evade taxes; and at the same time serves as a motive to acquire a new citizenship. Our empirical analysis provides first evidence on the misuse of CBIPs. Our findings indicate that “new” citizens of CBI offering countries, naturalized via a CBIP, are opening bank accounts abroad using their new citizenship documents to proof tax residence in the CBI jurisdiction. In line with
the results of our theoretical model, our empirical results suggests that CBIPs are (mis-)used by individuals to hide money offshore, unrecorded by competent fiscal authorities.

The core insight provided by our study is that tax evasion is one important driver for the recently increasing demand and supply in the market for citizenship: our results suggest that this has been in response to the widespread adoption of the CRS as a mechanism for the automatic exchange of tax and banking information. CBIPs provide tax evaders a option to escape the increased pressure induced by the implementation of the CRS. For countries selling citizenship, CBIPs are economically attractive in terms of foreign capital inflows. The CBI offering countries seem to be aware that tax evasion (avoidance) may serve as a motive to acquire a new citizenship - some even advertise their programs in this way. In fact, it seems that the international efforts to combat tax evasion, the desire of tax evaders to find new paths to hide money, and the introduction of CBIPs are complementary and mutually reinforcing.
References


Appendices

Model

Appendix 1: Conditions that both countries benefit from signing a TIEA - Benchmark model

Appendix 6 derives the conditions that both countries benefit from signing a TIEA. The minimum conditions that both countries benefit (are indifferent) from entering into the TIEA are i) that the additional tax revenues of the high-tax country are at least as large as its expenditures to compensate the tax haven, i.e.

\[
C^+ \leq \int_0^{\alpha^H} p_H Fty \, dG(\alpha_i) + \int_{\alpha^H}^{\alpha^L} ty \, dG(\alpha_i) - \int_0^{\alpha^L} p_L Fty \, dG(\alpha_i) - \int_{\alpha^L}^{A} ty \, dG(\alpha_i),
\]

(19)

\[
\leq \left( (p_H \alpha^H - p_L \alpha^L) Fty + (\alpha^L - \alpha^H)ty \right) \frac{M}{A};
\]

(20)

and ii) that the tax haven is at least compensated for the revenue loss from concealment service fees, i.e.

\[
C^+ \geq \int_0^{\alpha^L} f_{noTIEA} dG(\alpha_i) - \int_0^{\alpha^H} f_{TIEA} dG(\alpha_i),
\]

(21)

\[
\geq f_{noTIEA}^* \frac{\alpha^L M}{A} - f_{TIEA}^* \frac{\alpha^H M}{A}.
\]

(22)

Equating both constraints and using (3) and (8) shows that

\[
F > \frac{A(p_H - p_L)}{p_H^2 - p_L^2}.
\]

(23)

Appendix 2: Conditions that both countries benefit from signing a TIEA - CBI model

The minimum condition that the tax haven is willing to sign the TIEA is still that it will be compensated for the revenue loss from concealment service fees net of what can be gained by introducing a CBI program

\[
C^+ > f_{noTIEA}(\alpha^L - \alpha^t) - f_{TIEA} \alpha^H + c\alpha^H.
\]

(24)
The minimum condition that the high-tax country benefits (is indifferent) from implementing the TIEA, i.e. that the additional tax revenues of the high-tax country are at least as large as the compensation expenditures, for the case that the tax haven introduces a CBI program is

\[ C^+ < \left[ (p_H \alpha^H - p_L \alpha^L) F y + ty(\alpha^L - \alpha^H) + p_L F y (\alpha^H - \alpha^L) \right] \frac{M}{A}. \]  

(25)

Equating both constraints and using (3), (10) and (17) shows that

\[ t_{1,2} = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \]

with

\[ a = \left[ (p_H^2 - p_H^2 + p_H p_L) F^2 y^2 + (3 p_{H} - 5 p_L) F y^2 + (p_H^2 - 2 p_L + p_H p_L) F^2 y^2 + (2 p_L - p_H) F y^2 - y^2 \right] \frac{2}{\delta} \]
\[ - \left[ (p_H p_L + 2 p_H^2) F^2 y^2 + (p_H + p_L) F y^2 - y^2 \right] \frac{4}{\delta^2} + \left[ (p_H^2 - p_H^2) F^2 y^2 + (p_L p_H - p_H) F y^2 \right] \frac{\delta - 1}{2 \delta - 2} \]
\[ + \left[ (2 p_H p_L - 2 p_H^2) F^2 y^2 + (6 p_L - 2 p_H) F y^2 - y^2 \right] \frac{2 \delta - 2}{4 \delta^2 - 4 \delta} + \left[ (p_H^2 + 4 p_L^2 - 4 p_H p_L - 4 p_L) F^2 y^2 + (2 p_H F + 1) y^2 \right] \frac{2 \delta^2 - 2 \delta}{4 \delta^3 - 4 \delta^2} \]

\[ b = \left[ \frac{(p_H + p_L - 2 p_L) F y - by + (p_L + 2 p_L C - p_H C - p_H) F y + 3 cy + (p_L F + 1) yc}{\delta - 1} \right] \frac{2}{\delta^2 - 2 \delta + 1} \]
\[ + \frac{(2 p_L C + 2 p_H b + p_H - 2 p_L C - 2 p_L - p_L b) F y + (3 b - 2 c + 1) y}{2 \delta^2 - 2 \delta} + \frac{(p_L F - 1) by + cy}{\delta} \]
\[ + \frac{(p_H + p_L - 2 p_L) F y + (b - 3 c) y}{2 \delta^2 - 2 \delta} + \frac{(3 p_H p_L F y + 3 p_L b - 4 p_L C - 2 p_H b) F y + (c - b) y}{2 \delta^2 - 2 \delta} \]
\[ + \frac{(p_L b - 2 p_L C - 2 p_L) F y + (2 c - b) y}{4 \delta^2 - 4 \delta} + \frac{(2 p_L b + 8 p_L C + 2 p_H b - 4 p_H C) F y + (2 b - 4 c) y}{4 \delta^3 - 4 \delta^2} \]

\[ c = \left[ \frac{b^2 - b + 2 c}{2 \delta} + \frac{c^2 + c}{\delta - 1} - \left( \frac{c}{\delta - 1} \right)^2 - \frac{eb}{\delta} + \frac{3bc - 2c^2 b^2}{2 \delta^2 - 2 \delta} + \frac{4 c^2 + b^2 - 4cb}{4 \delta^3 - 4 \delta^2} \right] \]
Appendix: Tables

**Table A1: BIS Reporting Countries**

<table>
<thead>
<tr>
<th>Non-haven Countries</th>
<th>Haven Countries</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australia</td>
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<tr>
<td>United States</td>
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</table>

*Note:* Countries reporting to the BIS Locational Banking statistic on country-to-country basis with a disaggregation of deposits on the non-banks level.
Variable description

For all covariates, we mainly use IMF International Financial Statistics 2019.

Quarterly nominal GDP, domestic currency:

Annual GDP data is available for the most countries and jurisdictions in the BIS data; however, quarterly data is available for only about 50% of the countries included in the IMF data set. We complete the annual values for countries not covered by the IMF using UNSTATS 2019 data and data provided by the National Statistical Offices in the case of Guernsey, Jersey and the Isle of Man. For years not covered by the IMF data, we impute annual GDP using average GDP growth rates of the respective country. Then, we define continental regions using the UN geoscheme for all continents and calculate average quarterly GDP shares of annual GDP using countries from those continental regions for which quarterly data is available (in order to reflect seasonal differences). Finally, for countries with only annual data available, we impute quarterly values using these average quarterly shares multiplied with annual GDP.

Quarterly nominal GDP per capita, domestic currency:

For GDP per capita we use the constructed quarterly GDP and divide it by population data provided by the World Bank’s World Development Indicators 2019 and data provided by the National Statistical Offices in the case of Guernsey, Jersey and the Isle of Man. For years not covered by the World Bank data, we impute annual population data using average population growth rates of the respective country.

Consumer Price Index (CPI) percentage change:

For most countries, quarterly CPI data is available in the IMF data set. We completed the IMF data by information provided by the National Statistical Offices in the case of Guernsey, Jersey and the Isle of Man as well as by data provided by the CIA World Factbook in the case of Andorra, Argentina, Bermuda, Eritrea, French Polynesia, Liechtenstein, Marshall Islands, Turkmenistan, Turks and Caicos Islands, Tuvalu and Uzbekistan. We impute annual (average) CPI percentage change values for quarters if no quarterly data is available. We impute still missing values (because no annual data available) by nearest neighbor interpolation using Stata’s mipolate idw command, provided by Cox (2015).

\(27\) see the UN Statistics Division methodology description https://unstats.un.org/unsd/methodology/m49/.
Appendix: Figures

Figure A1: CBI COUNTRIES BANK DEPOSITS CHANGES

Note: Own calculations. The figures chart average changes (in % and in total) in deposits of the non-bank sector of CBI offering countries held in banks of non-haven and haven countries reporting on country-to-country basis to the BIS LBS, before and after introduction of the CBI program. Source: BIS Locational Banking Statistics 2019.