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

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Abstract

With (automatic) exchange of tax information among countries now common, tax evaders have had to find new ways to hide their offshore holdings. One such way are citizenship-by-investment programs, which offer foreigners a new passport for a local investment or a fixed fee. We show analytically that high-income individuals acquire a new citizenship to lower the probability that their tax evasion is detected through information exchange. Using data on cross-border bank deposits, we find that deposits in tax havens increase after a country starts offering a citizenship-by-investment program, providing indirect evidence that tax evaders use these programs.

Keywords: Citizenship-by-investment programs, tax havens, tax evasion

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1 Introduction

Over the last decade, the OECD and G20 countries launched various initiatives to promote international tax transparency. In the wake of these activities, countries have signed more than 3000 bilateral tax information exchange treaties; more than 100 countries have committed to automatic exchange of tax information. The exchange of tax information between countries has become the main policy instrument to enforce the taxation of capital income across borders.

Several recent papers show that while tax information exchange decreases offshore tax evasion at the bilateral level, a large share of tax evaders does not repatriate their funds, but instead finds other ways to hide their money (see e.g. Johannesen and Zucman, 2014; Miethe and Menkhoff, 2019). However, previous literature did not identify *how* tax evaders circumvent tax information exchange. Our paper fills this gap by suggesting that one such strategy is the use of citizenship-by-investment programs.

Citizenship-by-investment (CBI) programs offer citizenship rights in return for a financial investment in the country or for a donation as low as US$100,000. If a tax evader uses the acquired citizenship to open a bank account in a tax haven, the tax haven will exchange tax information with the country of acquired citizenship, not the true country of (tax) residency.[1] Thus, CBI programs enable tax evaders to escape tax information exchange.

We first illustrate the interplay between tax information exchange and citizenship-by-investment programs in an analytical model. The model frames tax evasion as a rational decision. Individuals can evade taxes by transferring money to a tax haven. The risk that the home country detects this tax evasion depends on whether the tax haven exchanges tax information with it, and on whether the individual has acquired a foreign citizenship. We model the agreement to exchange tax information as a Nash bargain between the individual's home country and the tax haven. We show that high-income individuals evade taxes and the richest evaders acquire a new citizenship to lower the detection probability when evading taxes. The existence of CBI programs has two effects on tax evasion: First, these programs decrease individual detection probabilities (and thus, from the high-tax country's point of view, expected fines). Second, they make it less likely that countries exchange tax information, as part of the potential revenue gain from information exchange is siphoned off by the CBI country.

We then provide indirect empirical evidence that CBI programs are indeed

[1] In principle, tax information exchange under most tax information exchange agreements or the OECD's Common Reporting Standard should be based on tax residency, not on citizenship. However, passports can be easily used to pretend tax residency. For example, when opening a bank account online, passports are usually accepted as proof of tax residency.

(mis)used to circumvent tax information exchange. To do so, we use bilateral, quarterly information on cross-border bank deposits provided by the Bank for International Settlements (BIS). Consider the example of a German who acquires Dominican citizenship for US$100,000 and uses her new passport to open a bank account in Switzerland. With the new citizenship, her deposits in Switzerland will appear in the BIS data as a deposit from Dominica (instead of Germany), even though she continues to live in Germany and is still tax resident in Germany. We thus expect that the deposits in tax havens originating from countries offering CBI programs increase after such programs have been installed. Using regressions with country-pair fixed effects and an event study approach, we find that tax haven deposits from CBI countries increase by about half after the introduction of CBI programs, compared to deposits from countries not offering CBI. Our results are robust to using a large number of country-level control variables and different samples. We find no effect for residency-by-investment programs, potentially because they are less suited to circumvent tax information exchange.

Our paper adds to two strands of literature. First, it contributes to the literature on individual tax evasion (see Sandmo, 2005; Slemrod, 2007; Alm, 2012, for reviews). Recently, several papers in this literature have evaluated the success of tax information exchange as an instrument to fight offshore tax evasion. TIEAs (Johannesen and Zucman, 2014; Hanlon et al., 2015; Heckemeyer and Hemmerich, 2020; Ahrens and Bothner, 2020), the EU Savings Directive (Johannesen, 2014; Caruana-Galizia and Caruana-Galizia, 2016), the U.S. Foreign Account Tax Compliance Act (FATCA, De Simone et al., 2020), and the OECD's Common Reporting Standard (Miethe and Menkhoff, 2019; Casi et al., 2020) all decreased offshore tax evasion at the bilateral level. However, several of these studies have found that many tax evaders did not repatriate their funds, but relocated the money to other, non-compliant countries (Johannesen, 2014; Johannesen and Zucman, 2014; Casi et al., 2020) or invested in alternative assets not subject to reporting, such as residential real estate and artwork (De Simone et al., 2020). Overall, there is no evidence that information exchange led to a transition to legality. Our paper contributes to this literature by pointing out a novel way in which tax evaders can circumvent information exchange.

Closest to our paper, Ahrens et al. (2021) analyze whether tax evaders engage in regulatory arbitrage to circumvent tax information exchange from a political science perspective. They study citizenship- and residency-by-investment programs as well as anonymous trusts and shell corporations as options for such regulatory arbitrage. In contrast to our paper, they find little evidence that CBI programs are used to circumvent tax information exchange. The fundamental difference in the results can be explained by several factors: First, Ahrens et al. (2021) look at over forty citizenship-

and residency-by-investment programs together, while we focus on a subset of "high-risk" CBI programs defined by the OECD. Second, they use a smaller sample, focussing on investments in twelve major financial markets, while we focus on investments in tax havens. Thus, while the overall topic is similar, our paper is more narrowly focused on the use of CBI for offshore tax evasion and reaches rather different conclusions.

As a second contribution, our paper also adds to the small literature studying the economic implications of CBI programs. Xu et al. (2015) discusses recent developments and implications of such programs for the real economy, i.e. risks to macroeconomic and financial stability for the mostly small countries offering such programs. Konrad and Rees (2020) focus on CBI programs in the European Union. Because of free movement in the EU, these programs automatically give a right to settle in any country within the EU. The authors argue that individual EU countries sell their citizenship at prices lower than what would be optimal from an EU perspective, as they do not consider the effect of their CBI programs on other European countries. Parker (2017) points out that such a conflict is inherent in the idea of 'post-national' citizenship championed by the EU. Our analytical model argues that the proliferation of tax information exchange made it attractive to offer CBI for tax reasons, and points out that individuals acquiring citizenship do not necessarily relocate to their new country. This idea complements the literature above, which mostly focused on the implications of people relocating after acquiring the new citizenship.

Section 2 provides some background information on tax information exchange and citizenship-by-investment programs, and Section 3 illustrates their interplay in a simple model. Section 4 presents the empirical setting, including some descriptive evidence. Section 5 discusses the results, and Section 6 concludes.

2 Background

2.1 Tax Information Exchange

After the financial crisis of 2007–2008, the OECD and G20 countries launched various initiatives to fight offshore tax evasion. A major focus of these initiatives were tax information exchange agreements (TIEAs). In 2009, the G20 decided to sanction tax havens as long as they had not concluded at least twelve TIEAs. Since then, more than 3000 such treaties have been signed worldwide (Miethe and Menkhoff, 2019). Bilicka and Fuest (2014) show that tax havens mostly signed TIEAs with countries with whom they have strong economic ties. Johannesen and Zucman (2014) examine this first wave of tax information exchange and confirm that it had some of the intended effect: The

treaties led to fewer deposits in the reporting tax havens. However, funds were not repatriated, but instead shifted to less compliant havens.

Critics found fault with these early information exchange agreements as they only included information exchange on request. In this context, building on the principle of the U.S. Foreign Account Tax Compliance Act (FATCA), the OECD developed the Common Reporting Standard (CRS) Multilateral Competent Authority Agreement (MCAA). While countries agreed to this reporting standard multilaterally, they sign up bilaterally, enabling automatic exchange of bank data for tax purposes. As of August 2020, there are over 4200 bilateral exchange relationships within the CRS.[2] Miethe and Menkhoff (2019) and Casi et al. (2020) document that signing up for automatic tax information exchange reduced bank deposits in reporting tax havens significantly. However, their results also point out that tax evaders found new ways to hide their true income.

In 2017, the OECD started to investigate arrangements circumventing tax information reporting. In this process, the OECD (2018a,b) identified citizenship-by-investment programs as a major risk for information exchange under the CRS. In fact, citizenship- and residency-by-investment programs are the only channel for circumventing the CRS that the OECD discusses on its website.

2.2 Citizenship-by-Investment Programs

Citizenship-by-investment (CBI) programs offer a structured path to obtain a country's citizenship for a financial investment in its economy or a contribution to its public sector. At the end of 2018, twelve jurisdictions offered a well-defined path to citizenship via investments.[3] Most of the current programs were launched or fundamentally reformed after 2013, that is after the first wave of TIEAs described above.[4]

At the end of 2018, the OECD (2018a,c) published a list of eight CBI programs it deemed to be a high risk to tax information reporting. This list included all programs that do not require individuals to spend a significant amount of time in the jurisdiction,

[2]See www.oecd.org/tax/automatic-exchange/international-framework-for-the-crs.

[3]Table 1 and footnote 5 list those countries. Several other countries have legal provisions that allow for CBI (e.g. Austria, Bulgaria, Cap Verde, Croatia, or Romania), but in these countries, the requirements to obtain citizenship are not well-defined or require very long waiting periods. For example, Austria considers people with "outstanding" achievements for citizenship; Bulgaria requires a 3-5 year waiting period. We do not study these programs further.

[4]Already during the 1980s, 1990s and early 2000s, a number of countries—mostly small island states in the Caribbean and the Pacific—ran programs selling passports. These early programs were widely associated with fraud, corruption and money laundering (see Shachar, 2017). As a result of international and domestic pressure and the threat of economic sanctions, these countries either shut their programs down or reformed them fundamentally.

and that give access to favorable tax treatments. The OECD defines a favorable tax treatment as giving access to a personal income tax rate of less than 10% on offshore financial assets; or exempting foreign source income or giving a beneficial tax treatment for foreign investors that have obtained residence or citizenship by such programs; and/or the respective jurisdictions having chosen not to receive CRS information. In our empirical analysis, we focus on the countries from this OECD list.[5]

Table 1 gives an overview over these programs, including the requirements for citizenship. All these programs have no or only ceremonial requirements in addition to the monetary investment. The required investments differ substantially. Some programs grant citizenship in return for investments in the local economy (e.g. Cyprus). Other programs require donations to government accounts or quasi-governmental funds (e.g. the National Development Fund in Antigua and Barbuda). Some programs require combinations of economic investments and donations; others allow investors to choose between different options. In all programs, applicants have to pay fees for application and registration, to cover processing and due diligence. The total cost of obtaining a new citizenship ranges from about US$100,000 (Dominica, St. Lucia) to about €2.5 million (Cyprus).

Some of the countries in Table 1 have had CBI programs for a long time, but recently carried out reforms that made these programs (more) attractive for tax evaders. In these cases, Table 1 lists the requirements and application numbers after the reform. In particular, the reforms significantly lowered the required minimum investment (in Cyprus from about €25 million in 2007 to €2.5 million in 2013) or abolished residency requirements (Vanuatu) or personal interviews (Dominica).

High net-worth individuals from all over the world are on the demand side of citizenship-by-investment. Accurate statistics on numbers and origins of applicants are sparse. Xu et al. (2015) identify two main groups of applicants: Individuals from China, Russia and the Middle East interested in visa-free travel or searching for a safe haven in the context of a deteriorating geo-political climate; and individuals from high-income countries motivated by tax planning. The last column of Table 1 gives an overview over the existing estimates on the uptake of CBI programs. The available data indicates that about 40,000 individuals have used these programs to acquire citizenships between 2013 and 2018/2019. While this is not a very high absolute number, given the very

[5]There are four countries that offered well-defined CBI programs during our observation period but are not on the OECD list (Cambodia, Jordan, Moldova, and Turkey). All these programs also have some characteristics that make them less attractive for evaders seeking to circumvent information exchange. For example, Cambodia requires knowledge of Khmer history and language; Jordan requires that individuals relinquish all other nationalities (making it the only CBI country not allowing dual citizenship).

high net worth[6] of many tax evaders and the low population of many countries offering CBI programs, it is plausible that the deposits of these individuals are visible in the aggregate data discussed in Section 4.1.

How can CBI programs be used for tax planning? Most countries offering such programs tax personal income at low rates or even exempt foreign source income. However, individuals are supposed to pay capital income tax in their country of (tax) residence, which is unaffected by acquiring a new citizenship (assuming the individual does not relocate to their new 'homeland'). Similarly, tax information exchange under the CRS is based on tax residence, not on citizenship. Therefore, acquiring a new citizenship without moving to the respective country does not affect the tax legally owed to an individual's true country of residence. It does, however, facilitate tax evasion by providing the individual with the means to circumvent tax information exchange.[7]

The CRS requires that taxpayers provide self-certification of their tax residence when opening a new bank account or when a residence test is required for a pre-existing account. If an individual does not disclose their actual tax residence, they can misuse residency supporting documents (such as passports) obtained via a CBI program to pretend tax residency in that country. As a consequence, the account information collected under the CRS in the country where they invested will then be falsely sent to the CBI jurisdiction (or, if the CBI country has not adopted the CRS or chosen not to receive CRS information, no account information will be reported). Thus, CBI programs offer tax evaders a tool to undermine the CRS due diligence procedures and to circumvent tax information reporting.

[6] Alstadsæter et al. (2019) show that the top 0.01% of the wealth distribution own about half of the total deposits in tax havens.

[7] Note that a home country prohibiting dual citizenship does not necessarily make this strategy impossible. The tax evaders may simply choose not to report the new passport to their home country (analogously to not reporting their offshore wealth despite the legal requirement to do so).

	Program operative in...	Minimum investment	Lang. test?	Residence requirement?	Issued passports
Antigua and Barbuda	2013:Q2	$150,000 donation to the National Development Fund or $200,000–1.5m investment (government-approved real estate or business projects)	No	Five days on Antigua or Barbuda within five years of obtaining citizenship	4,373 (as of 2019)
Cyprus	Orig. 2002, major reform in 2013:Q2*	2014: €2m investment (government-approved building, land development, infrastructure projects, in companies or alternative investment funds) *and* €500,000 real estate	No	Applicants must be registered as residents for at least 6 months before obtaining citizenship (but no physical residency necessary)	2,657 (2014–2019)
Dominica	Orig. 1993, major reform in 2014:Q4**	2014: $100,000 donation (Economic Diversification Fund) or $200,000 investment (government-approved real estate)	No	No	6,000–10,000 (as of 2018)
Grenada	2014:Q1***	$150,000 donation (National Transf. Fund) or $350,000 investment (government-approved real estate)	No	No	2,894 (as of 2019)
Malta	2014:Q1	€650,000 donation to the National Development and Social Fund *and* €350,000 purchase or €16,000 p.a. rent of real estate *and* €150,000 investment in government bond, stocks, or special purpose vehicles	No	Establishing official residence a year before application by purchasing or leasing property; no physical residency if buying property	3,708 (as of 2019)
St. Kitts and Nevis	1984:Q1	$150,000 donation (Sust. Growth Fund) or $400,000 investment (government-approved real estate)	No	No	16,544 (as of 2018)
St. Lucia	2016:Q1	$100,000 donation (National Economic Fund) or investment of $300,000 (government-approved real estate projects) or of $500,000 (government bonds) or of $3.5M (government-approved enterprise projects)	No	No	631 (as of 2019)
Vanuatu	2017:Q1****	$130,000 contribution (Development Supporting Program)	No	No	1,000-3,000 (as of 2018)

* Frequent reforms between 2007 and 2013. In May 2013, the minimum investment was lowered to €2 million (before: up to €25 million). Application numbers significantly increased thereafter. The program was discontinued at the end of 2020.
** Reform abolished interview requirements, added more investment options, and lowered prices for some applicants.
*** Legislation approved in Aug. 2013, but applications only possible from Jan. 2014 onwards.
**** Several earlier programs, but these either had waiting periods of several years, residency requirements, or tight quotas on application numbers. The Vanuatu Development Support Program started in 2017 is also the first of these programs with a substantial number of applications.

TABLE 1: HIGH-RISK CBI PROGRAMS

Note: List includes only CBI programs classified as high-risk CBI programs by OECD (2018a,c). Information on required investments is for a single main applicant. In each program, additional government, processing and passport fees apply (in most cases $25,000–$50,000). *Sources:* Antigua and Barbuda: Antigua and Barbuda Citizenship by Investment Act, 2013; Cyprus: Section 111A of the Civil Registry Laws of 2002-2019; Dominica: Commonwealth of Dominica Citizenship by Investment Regulations, S.R.O. 37 of 2014; Grenada: Grenada Citizenship by Investment Act 2013; Malta: Maltese Individual Investor Programme, Legal Notice 47 of 2014; St. Kitts and Nevis: 1984 Citizenship Act, Part II Section 3 (5); St. Lucia: St. Lucia Citizenship-by-Investment Act No. 14 of 2015; Vanuatu: Chapter 112 of Vanuatu's Citizenship Act and Government Regulation No 215. Information on issued passports from IMI (2020), Nesheim (2018) and official statistics.

3 Model

We illustrate the interplay between tax information exchange and CBI in a simple model where we represent tax evasion and the purchase of a new citizenship as rational decisions (following Allingham and Sandmo, 1972). We focus on individuals living in a high-tax country. These individuals can evade capital income taxes by transferring money to a tax haven. To fight against this form of tax evasion, the government of the high-tax country can attempt to negotiate tax information exchange with the tax haven, if required paying a compensation to the tax haven. Individuals can sidestep these detection efforts by acquiring the citizenship of a third country.[8] Our model abstracts from all non-tax reasons to acquire a new citizenship.

In more detail, the high-tax country and the tax haven first negotiate whether to exchange tax information. This may be in the form of a TIEA, or about signing up the CRS. For simplicity, we will call both options "TIEAs" in the following. We model this negotiation as a Nash bargain. Depending on the outcome of this negotiation ($s \in \{\text{TIEA}, \text{no TIEA}\}$), the tax haven sets a revenue-maximizing fee f_s for hiding a tax evader's account. A third country ("CBI country") observes the negotiation outcome and offers its citizenship for a donation c_s. Based on the tax haven fee f_s and the cost of citizenship c_s, individuals—who differ in their income—decide whether to evade taxes and/or to acquire a new citizenship.

Tax information exchange and the acquisition of citizenship influence the probability with which tax evasion is detected. Without a TIEA, tax authorities in the high-tax country have no information about accounts held in the tax haven, so the detection probability is low. With a TIEA, tax authorities obtain information on haven accounts of their citizens, which increases the detection probability. Signing up to the CRS can be interpreted as an even larger increase in the detection probability. If the tax evader acquires the citizenship of the CBI country, the information does not reach the high-tax country's tax authorities, bringing the detection probability back to the level without tax information reporting. To summarize,

$$\begin{aligned} p_{\text{no TIEA, no CBI}} &= p_L, & p_{\text{no TIEA, CBI}} &= p_L, \\ p_{\text{TIEA, no CBI}} &= p_H, & p_{\text{TIEA, CBI}} &= p_L, \end{aligned} \tag{1}$$

with $p_L < p_H$.

[8] In principle, the tax haven could also offer the citizenship itself (instead of a third country doing so). Such a model yields very similar results. The main difference is that if tax haven services and CBI are offered by the same country, the high-tax country and the haven will always conclude a TIEA, as there is always a surplus to share. We opt for modelling the tax haven and the CBI country as separate countries to link the model more closely to our empirical strategy.

We solve the model by backward induction and start by considering individuals' decisions whether to evade taxes and/or to acquire a new citizenship.

Individual decisions. Individuals decide by maximizing their expected utility, which—depending on their decisions—is

$$EU(\text{no evasion, no CBI}) = y_i - ty_i, \tag{2a}$$

$$EU(\text{no evasion, CBI}) = y_i - ty_i - c_s, \tag{2b}$$

$$EU(\text{evasion, no CBI}) = y_i - p_{\text{s, no CBI}} \cdot Fty_i - f_s, \tag{2c}$$

$$EU(\text{evasion, CBI}) = y_i - p_{\text{s, CBI}} \cdot Fty_i - f_s - c_s. \tag{2d}$$

y_i is capital income of individual i, t the applicable tax rate, and F is the fine which is imposed on the amount of evaded tax when detected. As is standard in the literature, we assume that $p_H F < 1$, i.e. that tax evasion is worthwhile in expectation in the absence of fixed cost. s denotes the state of the world determined by the outcome of the TIEA negotiations between the individual's home country and the tax haven. For simplicity, we assume risk-neutral individuals.[9]

Citizenship decision. First consider the decision to acquire a new citizenship. Note that when not evading taxes, individuals will not acquire a new citizenship, as $EU(\text{no evasion, no CBI}) \geq EU(\text{no evasion, CBI})$. Individuals who evade taxes will buy a new citizenship if the expected gain from reducing detection probabilities is higher than the cost of citizenship. Comparison of eqs. (2c) and (2d) shows that a tax evader will acquire a new citizenship if

$$y_i > \frac{c_s}{(p_{\text{s, no CBI}} - p_{\text{s, CBI}})\, Ft} \equiv \widehat{y}_{CBI}. \tag{3}$$

As acquiring a new citizenship entails a fixed cost, only individuals with sufficiently high income do so (in line with empirical evidence, see Alstadsæter et al., 2019; Londoño-Vélez and Ávila-Mahecha, 2021).

There is only an incentive to buy a citizenship when there is a TIEA in place.[10]

[9] This assumption not only allows for analytical tractability, but also reflects the fact that many tax evaders are very wealthy (Alstadsæter et al., 2019) and are thus likely not very risk averse when facing small risks (relative to their wealth). In addition, we only model capital income; the degree of risk aversion also depends on the income from other sources insofar as risk aversion varies with income and/or wealth. This modelling choice also follows prior literature, e.g. Srinivasan (1973); Kleven et al. (2011); Langenmayr (2017).

[10] To see this in eq. (3), note that when there is no TIEA, $p_{\text{no TIEA, no CBI}} = p_{\text{no TIEA, CBI}} = p_L$. In this case, $\widehat{y}_{CBI} \to \infty$.

Acquiring a new citizenship is only beneficial in the tax evasion context if it lowers detection probabilities, and in the absence of information exchange, the new citizenship is not necessary. Correspondingly, if there is a TIEA, more individuals acquire a new citizenship to hide tax evasion if the TIEA increased detection probabilities by more (i.e. when $p_H - p_L$ is high). For example, if tax information is exchanged automatically (i.e. the countries sign up to the CRS), detection probabilities will be higher than under tax information exchange on request; and correspondingly the incentive to acquire a new citizenship is stronger under the CRS.

Evasion decision. We first consider the case in which the marginal evader does not acquire a new citizenship (case 1). Comparing eqs. (2a) and (2c) shows that individuals will evade taxes if

$$y_i > \frac{f_s}{\left(1 - p_{\text{s, no CBI}} F\right) t} \equiv \widehat{y_e}. \tag{4}$$

More individuals evade taxes when the tax rate t is higher or when the fine for tax evasion F or the tax haven fee f_s are lower.

Next, consider the case in which the marginal evader does acquire a new citizenship (case 2). Comparing eqs. (2a) and (2d) shows that in this case, individuals will evade taxes if

$$y_i > \frac{f_s + c_s}{\left(1 - p_{\text{s, CBI}} F\right) t} \equiv \widehat{y}_{eCBI}. \tag{5}$$

We will discuss which case is relevant after deriving the optimal tax haven fee f^* and cost of citizenship c^*, to which we turn next.

Citizenship-by-investment program. The CBI country observes whether the high-tax country and the haven conclude a TIEA and anticipates that some individuals from the high-tax country will acquire its citizenship if tax information is exchanged between the other two countries. Issuing an additional passport has a small cost, δ, which can be interpreted as the cost of processing, due diligence and the passport itself. The CBI country sets a fee for citizenship, c_s, that maximizes fiscal revenues,

$$T^{\text{CBI}} = \begin{cases} \int_{\widehat{y}_{CBI}}^{\infty} c_s - \delta \; dG(y_i) = (c_s - \delta)\left[1 - G\left(\widehat{y}_{CBI}\right)\right] & \text{in case 1,} \\ \int_{\widehat{y}_{eCBI}}^{\infty} c_s - \delta \; dG(y_i) = (c_s - \delta)\left[1 - G\left(\widehat{y}_{eCBI}\right)\right] & \text{in case 2,} \end{cases} \tag{6}$$

where $G\left(y_i\right)$ denotes the cumulative distribution function of income y_i.

Maximizing eq. (6) yields the first-order condition describing the optimal required

donation for citizenship

$$\frac{\partial T^{\text{CBI}}}{\partial c_s} = \begin{cases} [1 - G\left(\widehat{y}_{CBI}(c_s^*)\right)] - \frac{(c_s^* - \delta) g\left(\widehat{y}_{CBI}(c_s^*)\right)}{\left(p_{\text{s, no CBI}} - p_{\text{s, CBI}}\right) F t} = 0 & \text{in case 1,} \\ [1 - G\left(\widehat{y}_{eCBI}(c_s^*)\right)] - \frac{(c_s^* - \delta) g\left(\widehat{y}_{eCBI}(c_s^*)\right)}{\left(1 - p_{\text{s, CBI}} F\right) t} = 0 & \text{in case 2.} \end{cases} \tag{7}$$

These equations illustrate the key tradeoff for the CBI country: A higher cost of the citizenship brings in additional revenue from those buying it (first term of eq. 7), but the country also looses revenue because fewer people buy the citizenship (second term of eq. 7). Implicit differentiation of eq. (7) shows that the CBI country can require a higher donation if t is high, as then the potential gain from decreasing detection probabilities is high. If the marginal evader chooses CBI, the CBI country lowers its fee in response to an increased fine, to make evasion and thus CBI more attractive. If the CBI decision is independent of the evasion decision, a higher fine in the high-tax country leads to a higher fee for CBI, as the higher fine makes lowering detection probabilities more attractive.

Tax Haven Services. The tax haven (or banks within it) sets a fee for hiding accounts. It chooses this fee to maximize revenues,

$$T^{\text{Haven}} = \begin{cases} \int_{\widehat{y}_e}^{\infty} f_s \, dG(y_i) = f_s \left[1 - G\left(\widehat{y}_e\right)\right] & \text{in case 1,} \\ \int_{\widehat{y}_{eCBI}}^{\infty} f_s \, dG(y_i) = f_s \left[1 - G\left(\widehat{y}_{eCBI}\right)\right] & \text{in case 2.} \end{cases} \tag{8}$$

The first-order condition that implicitly determines the optimal fee is

$$\frac{\partial T^{\text{Haven}}}{\partial f_s} = \begin{cases} [1 - G\left(\widehat{y}_e(f_s^*)\right)] - \frac{f_s^* g\left(\widehat{y}_e(f_s^*)\right)}{\left(1 - p_{\text{s, no CBI}} F\right) t} = 0 & \text{in case 1,} \\ [1 - G\left(\widehat{y}_{eCBI}(f_s^*)\right)] - \frac{f_s^* g\left(\widehat{y}_{eCBI}(f_s^*)\right)}{\left(1 - p_{\text{s, CBI}} F\right) t} = 0 & \text{in case 2.} \end{cases} \tag{9}$$

Again, in both cases the first term shows how the fee revenue from existing evaders changes when the fee is changed, and the second term the change arising from the change in the number of evaders. The fee is lower if the detection probability for tax evasion is higher (see Appendix 1).

We are now in the position to describe the equilibrium behavior of individuals and determine which of the two cases is relevant. As we show formally in Appendix 1, whether the marginal evader also acquires a new citizenship depends on whether the CBI country faces costs for issuing passports. If there are no such costs ($\delta = 0$), the symmetry of the maximization problems of the CBI country and the tax haven imply that $c^* = f^*$ if there is a TIEA. Both countries maximize their revenue by offering a

passport/a tax evasion opportunity to all those individuals who would also evade taxes if there was no CBI. Thus, if $\delta = 0$, case 2 is relevant and the marginal evader acquires a new passport.

If there is a positive cost of issuing new passports ($\delta > 0$), it is no longer optimal for the CBI country to set the fee so low that all evaders acquire a passport. Thus, the marginal evader no longer acquires one (case 1). We summarize these results in Proposition 1.

Proposition 1 (Tax evasion and citizenship-by-investment decisions)**.**

1. *If there is no TIEA, individuals with income* $y_i > \widehat{y}_e = \frac{f_s^*}{(1-p_L F)t}$ *evade taxes.*
2. *If there is a TIEA and the cost of issuing passports for the CBI country is positive, individuals with income* $y_i > \widehat{y}_e = \frac{f_s^*}{(1-p_H F)t}$ *evade taxes. The marginal evader does not acquire a new passport. Individuals with income* $y_i > \widehat{y}_{CBI} = \frac{c_s^*}{(p_H - p_L)Ft}$ *acquire the citizenship of the CBI country.*
3. *If there is a TIEA and passports can be issued without cost, individuals with income* $y_i > \widehat{y}_{eCBI} = \frac{f_s^* + c_s^*}{(1-p_L F)t}$ *evade taxes and acquire a new citizenship.*
4. *In equilibrium, the number of individuals evading taxes is independent of the detection probability.*

Proof. See Appendix 1. □

Note that in equilibrium, the number of individuals evading taxes is independent of the detection probability. This is the case because the tax haven always takes the same share of the gain from evading taxes. If the detection probability rises, the tax haven lowers its fee correspondingly. Given the linearity of the utility function, it is always the same individual who is indifferent between evading taxes or not.[11]

To summarize, high-income individuals evade taxes. If tax information is exchanged, the richest evaders acquire the citizenship of the CBI country to lower the detection probability to pre-TIEA levels. Without tax information exchange, there is no incentive to acquire a new citizenship. Figure 1 illustrates individual behavior in equilibrium.

[11] While $\frac{d\widehat{y_e}}{dp} = 0$, $\frac{d\widehat{y_{eCBI}}}{dp} = \frac{\delta F}{(1-pf)^2 t}$, i.e. $\frac{d\widehat{y_{eCBI}}}{dp}$ is only zero when $\delta = 0$, but this is the only case in which case 2 occurs in equilibrium.

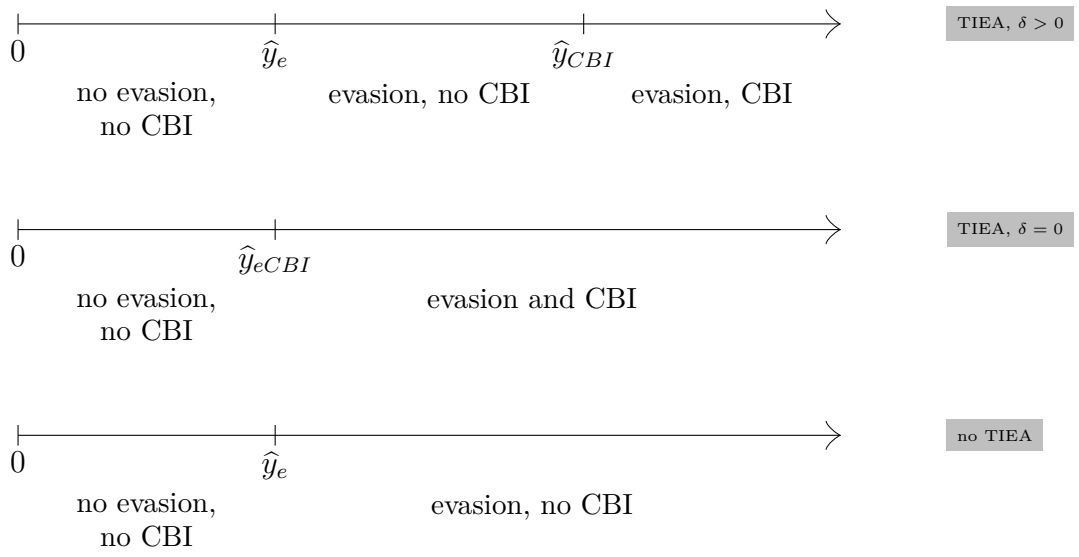

FIGURE 1: EVASION AND CBI DECISIONS

Note: Figure summarizes individual decisions for individuals with different income y_i, taking into account how f^* and c^* are set in equilibrium.

Tax Information Exchange. We model the treaty negotiations as a Nash bargaining problem and assume that both countries maximize their revenues. To entice the haven to sign the treaty, the high-tax country can pay a compensation C to the haven.[12] The outside option for each country is the situation without a TIEA, and the high-tax country has a bargaining weight $\beta \in (0, 1)$. The surpluses of the high-tax country and the tax haven are

$$S^{\text{High-tax}} = T^{\text{High-tax}}_{\text{TIEA}} - T^{\text{High-tax}}_{\text{no TIEA}} - C, \tag{10a}$$

$$S^{\text{Haven}} = T^{\text{Haven}}_{\text{TIEA}} - T^{\text{Haven}}_{\text{no TIEA}} + C. \tag{10b}$$

Maximizing the Nash product $\left(S^{\text{High-tax}}\right)^{\beta}\left(S^{\text{Haven}}\right)^{1-\beta}$ yields the optimal compensation payment,

$$C^* = \beta\left(T^{\text{High-tax}}_{\text{TIEA}} - T^{\text{High-tax}}_{\text{no TIEA}}\right) - (1-\beta)\left(T^{\text{Haven}}_{\text{TIEA}} - T^{\text{Haven}}_{\text{no TIEA}}\right). \tag{11}$$

If an agreement is reached, it always entails a positive compensation payment (as $T^{\text{Haven}}_{\text{TIEA}} < T^{\text{Haven}}_{\text{no TIEA}}$). With equal bargaining weights, the high-tax country compensates the haven for half of the haven's revenue loss and gives in addition half of its own surplus to the tax haven.

[12] We follow Elsayyad and Konrad (2012) and assume for analytical clarity that the high-tax country compensates the tax havens rather than threatening them with retaliatory actions that are costly for the high-tax country itself.

Note that the two countries can only reach an agreement if the gain for the high-tax country is higher than the revenue loss of the tax haven. This would hold trivially if there was no CBI.[13] With CBI in place, part of the additional fee and fine payments after a TIEA are siphoned off by the CBI country. Thus, the tax haven and the high-tax country will not always conclude a TIEA. A TIEA is more likely when the revenue gain of the high-tax country is higher (e.g. because the difference between p_L and p_H is large). Corollary 1 summarizes the effects that tax information exchange and CBI have in our model.

Corollary 1 (Tax revenue effects of tax information exchange and citizenship-by-investment programs)**.**

1. *If the CBI country has a positive cost of issuing new passports, tax information exchange does not affect the number of tax evaders. Nevertheless, tax information exchange increases expected tax revenue in the high-tax country as it increases expected fines.*

2. *CBI programs that have a positive cost for issuing new passports do not affect the number of tax evaders. However, CBI programs decrease the detection probability for some evaders and thus decrease expected tax revenues in the high-tax country.*

4 Empirical Setting

4.1 Deposit Data

To test empirically whether tax evaders use CBI programs to disguise their origin and dodge tax information exchange, we use bilateral data on cross-border bank deposits from the Locational Banking Statistics (LBS) of the Bank for International Settlements (BIS). As of 2017, the LBS cover 94% of the cross-border interbank relationships (BIS, 2019). The publicly available data contains information on foreign deposits in 48 countries (as of 2018), stemming from over 200 jurisdictions around the world. We use the information on deposits of the non-bank sector (available at the bilateral level for 30 countries), as deposits of financial institutions do not represent individual tax evasion. Thus, an example observation in our data set would be the deposits of Maltese residents held in Switzerland in the first quarter of 2018.

[13] Without CBI, a TIEA implies that the high-tax country detects evaders with a higher probability. Evaders thus pay more fines (in expectation). Therefore, there is always a surplus to be shared between the two countries.

This data has been widely used as a proxy for offshore tax evasion (see e.g. Johannesen and Zucman, 2014; Langenmayr, 2017; Miethe and Menkhoff, 2019; Casi et al., 2020) and is the major source of information on money in tax havens. However, it also has limitations. First, as the BIS allocates deposits to origin countries on immediate counterparty basis, the data does not show the ultimate beneficiary of deposits (IMF, 2013; BIS, 2019). For example, if a Maltese resident has a (shell) company in Panama, which in turn owns a Swiss bank account, the BIS assigns the deposits to Panama. Second, it is not possible to distinguish between individuals or entities within the non-financial sector, and not all deposits are used for tax evasion.[14] Zucman (2013) suggests that at least 50% of the deposits held in tax havens belong to households. While there are few reasons to hold money in tax havens besides tax evasion, some of the capital income received on these deposits may be declared and taxed in the investor's home country. Third, the LBS only include bank deposits and do not cover portfolio securities, which are the largest form of offshore wealth (Zucman, 2013; Alstadsæter et al., 2018). For these reasons, quantitative interpretations of the results are difficult. Nevertheless, this data is the best available bilateral data source for the wealth hidden offshore.

We use a balanced panel of 36 quarters, ranging from 2010:Q1 to 2018:Q4. We start our analysis in 2010 because the bilateral coverage is worse beforehand, and because deposit data may be affected by the financial crisis of 2007–2008. 30 countries included in the BIS data set report bilateral data for different counterparty sectors. Among these countries are 10 tax havens (following the definition of Johannesen and Zucman, 2014).[15] For country pairs lacking information on deposits for parts of the sample period, we impute deposits by inverse distance weighted interpolation.[16]

The vast majority of the 30 jurisdictions in our analysis adopted the CRS and signed many TIEAs. The data includes the deposits held in these countries by citizens from six countries with high-risk CBI programs (Cyprus, Dominica, Grenada, Malta, St. Lucia, Vanuatu); data on deposits from Antigua and Barbuda and St. Kitts and

[14] Johannesen and Zucman (2014) show effects that are consistent with the extensive use of shell companies for tax evasion purposes. Consequently, parts of the deposits of the non-bank sector in the LBS likely belong to corporations or shell companies.

[15] We show that our results are robust to other definitions of tax havens by excluding each tax haven individually (see Table A5 in the appendix).

[16] For the interpolation, we use Stata's mipolate idw command by Cox (2015). In a robustness check, we re-run our main regressions excluding all interpolated observations and find very similar results (see Table 4).

Nevis are not available.[17] In Table A1 in the appendix, we list all 30 reporting countries in our sample and provide descriptive statistics on cross-border bank deposits in each.

Table 2 shows some country-average descriptive statistics on cross-border bank deposits. The average deposit per origin country (i.e., at the bilateral level) is $1.21 billion. When considering all origin countries, the average bilateral deposits in non-tax-haven countries is about twice as large ($1.51 billion) than the average in tax havens ($717 million). This relationship reverses when we only consider deposits stemming from citizens of countries offering CBI programs: For these, the bilateral deposits in havens ($309 million) are more than twice as large as the deposits in non-havens ($148 million). This pattern is similar in the full sample and in the sample for which we have information on country-level control variables (discussed in Section 4.2). The total foreign deposits in one of the BIS reporting countries in our sample average $210 billion.

Table 2: Descriptive Statistics for Deposit Data

Deposits in:	All reporting countries			Havens		Non-Havens	
Variable	Obs.	Mean	SD	Obs.	Mean	Obs.	Mean
Full sample							
Average bilateral deposits (million US$)	171,360	1,211.0	12,998.9	64,908	716.5	106,452	1,512.5
Thereof: Deposits from CBI countries	5,616	213.2	993.6	2,268	309.1	3,348	148.3
Sample with control variables available							
Average bilateral deposits (million US$)	128,904	1,285.1	13,377.1	48,348	845.2	80,556	1,549.1
Thereof: Deposits from CBI countries	4,248	278.4	1,134.7	1,692	409.2	2,556	191.8

Note: This table shows descriptive statistics on bilateral foreign deposits in million US$ in the reporting countries considered in our analysis (all and split into tax havens and non-havens according to the definition by Johannesen and Zucman, 2014). Data from 2010:Q1 to 2018:Q4. *Data:* BIS Locational Banking Statistics 2019.

4.2 Estimation Strategy

To understand our estimation strategy, consider the following example. A French woman has money in a bank account in the Cayman Islands. She does not declare the capital income received on this money to the French tax authorities, evading capital income taxes. In the BIS statistics, this deposit is part of the French deposits in the Cayman Islands.

While France and the Cayman Islands have had a tax information exchange agreement since 2009, our tax evader found the probability of being detected very low, as

[17] All countries with high-risk CBI programs also adopted the CRS. In our main analysis we do not consider Cambodia, Jordan, Turkey and Moldova, i.e., countries with CBI programs that were not classified as high-risk programs by the OECD (see the discussion in Section 2.2). Including these countries in the treatment group does not change our results qualitatively.

the agreement only enabled exchanging information on request, and she was certain that the French tax authorities had no knowledge of her Cayman Islands account. In 2016, she realized that both France and Cayman Islands had signed up to the OECD's common reporting standard and would start exchanging information on bank accounts automatically. In this process, her Cayman Islands bank account would likely come to light.

To avoid this, she acquires a citizenship of St. Lucia for $100,000. She opens a new bank account in the Cayman Islands, using her St. Lucia passport for identification and ticking the box that she is tax resident there.[18] She transfers the money from the old account to the new account and closes the old account. In the BIS data, the deposits are now counted as a St. Lucian deposit in the Cayman Islands. When St. Lucia starts receiving tax information in 2018, it learns about the Cayman Islands tax account, but as St. Lucia only taxes individuals with a permanent home in St. Lucia (or who are present there for more than 183 days/year), it does not impose capital income taxes.

If CBI programs are routinely used in this way, we should see an increase in deposits in tax havens originating from CBI countries after these countries introduced their CBI programs. We employ two strategies to test this empirically: First, we estimate the average effect of the introduction of CBI programs on deposits using a two-way fixed effects approach. Second, we implement an event study approach with control group to analyze the dynamics of the response to the introduction of CBI programs. Both approaches exploit the evolution of deposits over time (before vs. after the introduction of the citizenship-by-investment program) and across countries (CBI countries vs. countries which did not implement such a program).

In the two-way fixed effects approach, we estimate the regression equation

$$ln(deposits)_{ijt} = \alpha_1 CBIP_{it} + \alpha_c' X_{it} + \gamma_{ij} + \lambda_t + \epsilon_{ijt}, \tag{12}$$

where $ln(deposits)_{ijt}$ represents deposits held by residents of jurisdiction i in jurisdiction j at the end of quarter t. ϵ_{ijt} denotes the error term. We cluster standard errors by country pair.

Our main variable of interest is $CBIP_{it}$, an indicator equaling one if country i offers a CBI program suitable for hiding information from tax information exchange in quarter t. We consider only programs that have well-defined criteria for gaining citizenship and that were listed as high-risk schemes by OECD (2018c). We thus use all programs listed in Table 1 (except for Antigua and Barbuda and St. Kitts and Nevis, for which we observe no deposit data). For countries that carried out major reforms of

[18] She may also use a bank account in St. Lucia, but this would not be observable in the BIS data.

long-existing programs (Cyprus, Dominica and Vanuatu), we code only the after-reform quarters as observations with $CBIP_{it} = 1$ (see Table 1 for details). In a robustness test we also re-estimate eq. (12) using information on high-risk residency-by-investment programs (see Section 5.3).

We include country-pair fixed effects γ_{ij} in our regression to capture time-invariant country-pair specific factors (e.g. distance, language, etc.). We also incorporate a full set of time fixed effects λ_t. In several regressions, we also control for time-varying origin-country-specific characteristics and events, X_{it}, which may be associated with changes in cross-border capital flows. In particular, we use information on economic variables such as GDP and GDP per capita (to control for the international investment possibilities) and the consumer price index (to control for high inflation as a reason for capital flight). Furthermore, country characteristics such as capital account openness (Chinn and Ito, 2006, 2008), banking crises (Laeven and Valencia, 2018) and financial sector development influence whether individuals can and want to invest abroad. In addition, previous literature has shown that oil and gas rents, political systems, political stability and corruption (Andersen et al., 2017) or armed conflicts and natural disasters (Andersen et al., 2020) influence cross-border deposits. All these factors affect the incentive to deposit money abroad and may confound the effect of the introduction of CBI programs. Following Andersen et al. (2017), we also control for exchange rate fluctuations to alleviate mismeasurement of deposits (which are reported in US-$). Table A2 in the appendix describes how we measure these factors and provides data sources, and Table A3 provides descriptive statistics.

In our main analysis, we limit our sample to deposits held in tax havens. For these countries, we expect that our coefficient of interest, α_1, is positive, indicating that the introduction of a CBI program increases deposits in tax havens. We also provide results for non-haven deposit countries, which are less likely to be used for tax evasion, for example because these countries levy withholding taxes on capital income. We therefore interpret these results as a placebo test.[19]

To further explore the dynamics of introducing a CBI program, we also estimate an event study with control group,

$$ln(deposits)_{ijt} = \sum_{q=-8}^{16} \beta_q CBI_{it+q} + \beta_c' X_{it} + \gamma_{ij} + \lambda_t + \epsilon_{ijt}, \tag{13}$$

with variables as defined above. CBI_{it+q} is an indicator variable that is equal to one if country i introduces a CBI program $q \in [-8, 16]$ quarters away. The specification allows for eight $(\beta_{-1}, \beta_{-2}, ..., \beta_{-8})$ pre-treatment (lead) effects and sixteen $(\beta_{+1}, \beta_{+2}, ..., \beta_{+16})$

[19]Investors using CBI for non-tax reasons may of course invest in non-haven countries.

post-treatment (lag) effects. We estimate eq. (13) only for the four countries which introduced their programs sufficiently early (Malta, Cyprus, Dominica, Grenada), so that data on sixteen post-reform quarters is available. This choice allows us to analyze long-run dynamics. In Figure A1 in the appendix, we re-estimate eq. (13) for all six countries, but with only eight post-treatment quarters. In all estimations, we cluster standard errors by country pair.

The β_q coefficients capture the differential deposit trend between treatment and control groups for each quarter $q \in [-8, 16]$ quarters away from the introduction of the CBI program. We drop the last pre-treatment indicator from the regression, standardizing the coefficient β_{-1} to 0. Thus, all other β_q coefficients measure deposit changes compared to the level of deposits in the quarter before the introduction of the CBI program. Since the introduction of a CBI program is a country-specific point in time, we have to limit the effect window to a finite number of leads and lags; we bin the endpoints of the time window.[20]

If CBI programs are (mis-)used to avoid tax information reporting, the estimated β_q-coefficients will be positive for quarters after the program's introduction. We expect that the effect on deposits increases over time, as more tax evaders take advantage of the programs over time. Time lags may occur because application and approval times vary among programs (and applicants), or because the incentives to use such programs change when tax evaders' home countries conclude TIEAs or start automatic information exchange under the CRS. The lead coefficients shed light on the common trend in deposits between the residents of CBI countries (treatment) and residents of non-CBI countries (control) group before the introduction of CBI programs; insignificant pre-treatment coefficients are indicative of a common trend before the programs' introduction.

A recent literature points out that two-way fixed effect models may lead to misleading results due to heterogeneous treatment effects across groups and over time (Goodman-Bacon, 2018; Sun and Abraham, 2021; de Chaisemartin and D'Haultfœuille, 2020a,b). Such problems originate from negative weights in the computation of the average treatment effect. Negative weights can arise when 'already-treated' observations act as control group (Goodman-Bacon, 2018). As we have only six treated countries and about two hundred control countries, we rarely compare 'treated' with 'not yet treated', or 'now treated' with 'already treated in the past'. Consequently, variation in treatment timing should be of low relevance for our results. Nevertheless, following de Chaisemartin and D'Haultfœuille (2020b), we test for the presence of negative

[20] To bin the last lead (lag) dummy implies that the indicator *q-8* (*q+16*) stands for treatment at time *q-8* (*q+16*) or more quarters in the past (in the future).

weights within our estimator, finding that only approximately 10% of the weights are negative (with a sum of -0.026). Additionally, following Goodman-Bacon (2018), we decompose our estimator into its sources of variation (see Figure A2 and Table A4 in the appendix).[21] The decomposition confirms that our estimates rely almost exclusively on the comparison of treated with never-treated groups. Overall, the results of these test suggests that variation in treatment timing and heterogeneous treatment effects are not a substantial issue in our setting.

4.3 Descriptive Evidence

Before turning to the regression results, we provide descriptive evidence on the evolution of foreign deposits over time for different country groups.

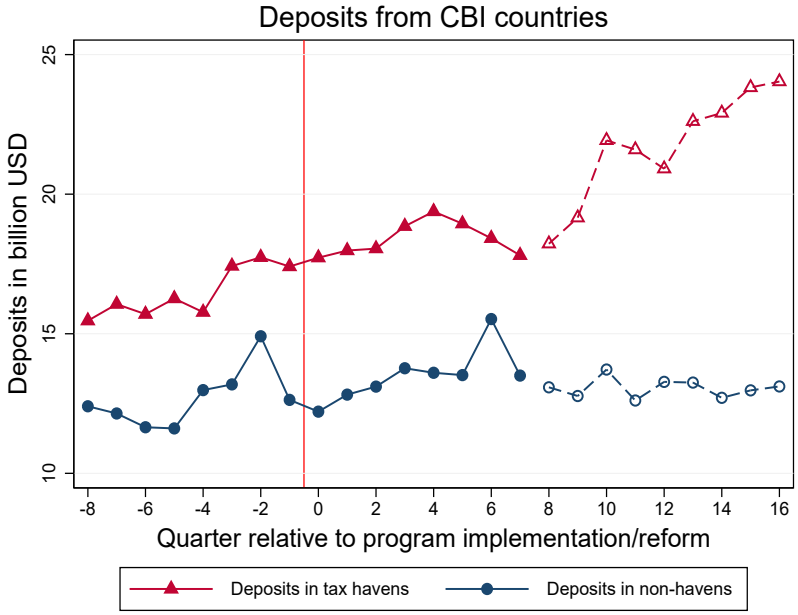

FIGURE 2: TIME TRENDS OF FOREIGN DEPOSITS FROM CBI COUNTRIES

Note: Graph shows the evolution over time of aggregated deposits from CBI countries held in the tax havens (red line) and non-havens (blue line) of our sample. The quarter of the introduction/major reform of a country's CBI program is set to 0. Introduction/reform dates of the CBI programs: Grenada 2014:Q1, Malta 2014:Q1, Cyprus 2013:Q2, Dominica 2014:Q4, St. Lucia 2016:Q1, Vanuatu 2017:Q1. The solid line represents deposits originating in all these CBI countries. The dashed line shows deposits only for programs introduced/reformed in 2013/2014. *Data:* BIS Locational Banking Statistics 2019.

We plot the development of aggregate deposits (in tax havens and non-haven-countries) originating from countries that introduced a CBI program during our sample

[21] In more detail, Goodman-Bacon (2018) proposes decomposing the two-way fixed effect estimator into all possible 2x2 difference-in-differences estimators that compare timing groups with each other or with the control group. Figure A2 shows the estimated average treatment effect for each 2x2 difference-in-difference estimate and its weight in the overall two-way fixed effect estimate.

period. If tax evaders acquired new citizenships with the help of CBI programs, and used the new citizenship to circumvent tax information exchange, we should see deposits from CBI countries in tax havens increase after the countries introduced a CBI program.

Figure 2 shows that tax haven deposits owned by citizens of high-risk CBI countries increase after the introduction of the CBI program, while their non-haven investments remain relatively constant. Note that for Cyprus, Dominica, Grenada and Malta, which introduced or reformed their CBI programs in 2014, we observe at least 16 quarters with the program in place. For St. Lucia and Vanuatu, which introduced their CBI programs in 2016 and 2017, we observe only at least 7 post-reform quarters. Thus, Figure 2 shows information for all high-risk CBI programs in our sample for the 8 pre-reform and 7 post-reform quarters (solid lines), and information for only Cyprus, Dominica, Grenada and Malta for the remaining post-reform quarters (dashed lines).

We will now explore this data further to see whether CBI programs are used to facilitate tax evasion.

5 Results and Discussion

5.1 Regression Evidence

Table 3 presents results from estimating the fixed effects specification described in eq. (12). In col. (1), we report the results for deposits in tax havens for all country pairs for which we have bilateral deposit data for the non-bank sector. In this specification, we do not use country-level control variables (but include country-pair and quarter fixed effects). We find a positive and significant coefficient of about 0.4, showing that bank deposits from CBI countries in tax havens increase after the introduction of a CBI program. In col. (2), we estimate the same specification, but for the smaller sample of origin countries for which our control variables are available. The effect is unchanged, indicating that using the smaller sample does not introduce selection issues. In col. (3), we add the country-level control variables to control for other time-varying country characteristics that may influence tax haven deposits. In col. (4), we additionally control for time-varying characteristics of the tax havens by adding country j–quarter fixed effects. The estimated effect remains very similar across all specifications. Translating the log changes into marginal effects, bank deposits from CBI countries in tax havens increase by 48–55% after the introduction of a CBI program in all specifications.

Is this a large effect? The additional deposits in tax havens from CBI countries correspond to about a quarter of the GDP of the CBI countries—certainly a large change for these countries. In absolute numbers, deposits in tax havens from CBI countries

Table 3: Panel Regressions: Citizenship-by-Investment Programs

Sample	Full	Controls available			
Deposits in		Havens			Non-havens
	(1)	(2)	(3)	(4)	(5)
CBIP	0.439***	0.414***	0.417***	0.389***	0.031
	(0.132)	(0.133)	(0.131)	(0.129)	(0.126)
Add. controls	–	–	✓	✓	✓
Country-pair FE	✓	✓	✓	✓	✓
Time FE	✓	✓	✓	–	✓
Time×country j FE	–	–	–	✓	–
Obs.	64,908	48,816	48,816	48,816	81,252
R^2	0.040	0.033	0.037	0.104	0.007

Note: Table shows results of OLS panel regressions. Dependent variable is the *ln* of foreign deposits held by individuals from jurisdiction i in BIS reporting jurisdiction j at the end of year–quarter t. We consider the deposits held by residents (non-banks) of up to 220 countries i in 10 haven and 20 non-haven jurisdictions j (see the country list in Table A1). Sample period from 2010:Q1 to 2018:Q4. $CBIP = 1$ if there is a (reformed) CBI program in jurisdiction i in year–quarter t. Additional controls as described in Table A2. Column (1) uses the full BIS country-by-country sample; cols. (2)–(5) the sample for which data on control variables is available. Standard errors (clustered by country pair) in parentheses, *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. *Data:* BIS Locational Banking Statistics 2019.

increased by around $9 billion after the introduction of the CBI programs. This corresponds to about 0.66% of the total offshore bank deposits in 2008 as estimated by Zucman (2013). Note, however, that our sample comprises only 10 tax havens (compared to 52 havens on the Johannesen and Zucman (2014) list). We also do not observe deposits held in the CBI country itself. Thus, the 0.66% of total tax haven deposits noted above are a lower bound of deposits hidden via CBI; the true number is likely substantially higher. Unfortunately, the available data does not allow for a more exact estimate.

As a placebo test, we also consider bank deposits in non-haven countries. If CBI programs are indeed used to circumvent tax information exchange, the effect should be limited to tax havens. However, if individuals use their newly acquired citizenship for foreign investments for non-tax reasons, we would observe a similar pattern also for deposits in non-haven countries. Col. (5) reports results for deposits in non-haven countries. For these deposits, the effect of CBI programs is a relatively precisely estimated zero (90% confidence interval [-.10, .17]).

Next, we investigate whether the observed deposit increase is a common trend for tax havens, and not specific to CBI countries (those in our sample are all also tax havens). To do so, we restrict the origin countries in our sample to tax havens, using

the tax haven list from Johannesen and Zucman (2014). Column (1) of Table 4 shows the results for deposits among tax havens, finding a similar coefficient as in Table 3. Thus, the increase of tax haven deposits from CBI countries after the introduction of the program cannot be explained by a common trend among tax havens. Col. (2) provides the placebo test of deposits in non-havens for this sample, again finding no significant effect.

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 data. In col. (3) and (4) of Table 4 we provide results for the samples without imputation. Col. (3) shows that the effect on deposits in tax havens in this sample is very similar to the larger sample with imputation. The placebo test in col. (4) finds no effect again.

Table 4: Panel Regressions: Robustness

Specification	Tax haven origin countries		No imputation	
Deposits in	Havens	Non-havens	Havens	Non-havens
	(1)	(2)	(3)	(4)
CBIP	0.354**	0.073	0.418***	-0.056
	(0.151)	(0.138)	(0.126)	(0.138)
Add. Controls	✓	✓	✓	✓
Country-pair FE	✓	✓	✓	✓
Time FE	✓	✓	✓	✓
Obs.	7,812	12,672	37,962	57,294
R^2	0.042	0.018	0.032	0.010

Note: Table shows results of OLS panel regressions. Dependent variable is the ln of foreign deposits held by individuals from jurisdiction i in BIS reporting jurisdiction j at the end of year–quarter t. We consider the deposits held by residents (non-banks) of up to 220 countries i in 10 haven and 20 non-haven jurisdictions j (see the country list in Table A1). Sample period from 2010:Q1 to 2018:Q4. $CBIP = 1$ if there is a (reformed) CBI program in jurisdiction i in year–quarter t. Additional controls as described in Table A2. Regressions in cols. (1)–(2) only include deposits originating from tax havens; cols. (3)–(4) consider the full BIS country-by-country sample for which original deposit data (not imputed) and data on control variables are available. Standard errors (clustered by country pair) in parentheses, *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. *Data:* BIS Locational Banking Statistics 2019.

To investigate potential heterogeneity between the tax havens in our sample, we re-estimate eq. (12) but drop one reporting country j at a time (starting again from the Johannesen and Zucman (2014) tax haven list as in our main test). If a single country is highly relevant for our results, the coefficient for our sample excluding that country should be of smaller magnitude. This may be the case if banks in only some of the tax havens in our sample do not 'correctly' check the tax residency of their account holders

(e.g. by accepting passports as proof of tax residency).[22] In these regressions, we again find very similar results compared to our main results (see Table A5 in the appendix). All estimates are not significantly different from each other, indicating that results are not driven by a single tax haven.

One may be also concerned that a particular CBI country drives our results. We assess the sensitivity of our results in this direction by re-estimating eq. (12) and dropping one CBI country at a time. We additionally test the joint relevance of the European CBI countries Cyprus and Malta. In a further test, we exclude the CBI countries where the treatment dummy indicates a reform (and not the introduction) of a CBI program (Cyprus, Dominica and Vanuatu). As before, if a single CBI country or the excluded group of CBI countries is highly relevant for our results, the coefficient for the sample excluding these countries would be of smaller magnitude. We find qualitatively similar results in all eight subgroups (see Table A6 in the appendix). While the estimated coefficients excluding Malta appear somewhat smaller, none of the estimates is significantly different from the others.

5.2 Event Study

Figure 3 depicts the results of estimating eq. (13). The left panel shows the results from regressions in the full sample without country-level control variables, and the right panel results from regressions with these control variables. We drop St. Lucia and Vanuatu from this analysis, as they introduced CBI programs too close to the end of the sample period to investigate long-term dynamics (Figure A1 in the appendix shows our results for re-estimating eq. (13) including Vanuatu and St. Lucia but for eight post-treatment quarters only).

In both panels, the estimated coefficients for the pre-treatment period are close to zero and statistically insignificant for deposits in both havens (red line) and non-havens (blue line). After the introduction of CBI programs, we find that foreign deposits in tax havens increased significantly, while they did not change in non-haven countries. While the coefficients are already significantly different from zero in the first quarter after the introduction of the programs, the effect also increases over time.

[22] Indeed, when following online options to open bank accounts in tax havens, they usually verify citizenship via online video identification, but only require that the applicant checks a box that they are tax resident in this country.

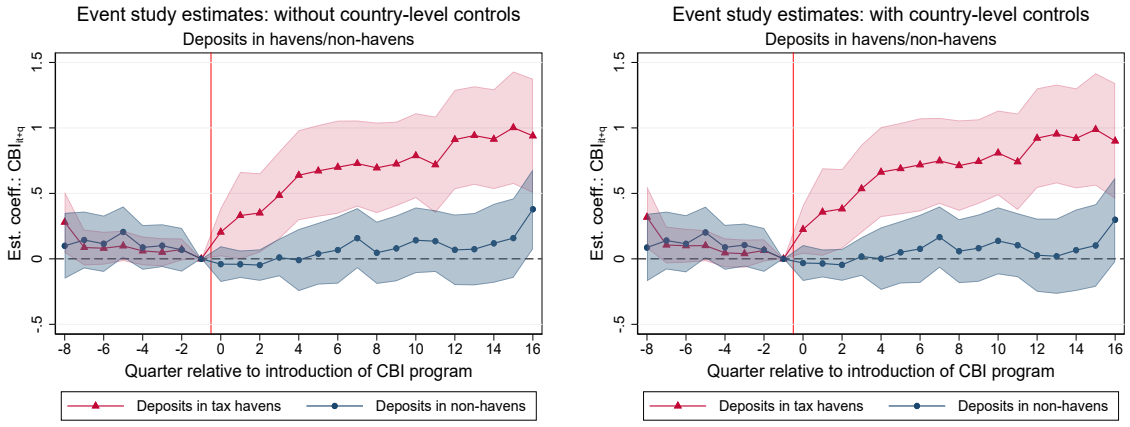

FIGURE 3: EVENT STUDY: CITIZENSHIP-BY-INVESTMENT PROGRAMS

Note: Event study estimates for deposits in non-haven and haven countries from countries that introduced/reformed a CBI program in 2013/2014 (Grenada, Malta, Cyprus, Dominica). Control group: Countries which do not have a CBI program in sample period. Left graph shows results without control variables, right panel with control variables. 90% confidence interval based on standard errors clustered by country pair. *Data:* BIS Locational Banking Statistics 2019.

5.3 Residency-by-Investment Programs

While only a few countries have CBI programs, many more countries have some form of "residency-by-investment" (or "Golden Visa") program, which provides residence rights in return for investments or financial transfers. While there are many motives to make use of residency-by-investment (RBI) programs,[23] individuals could also, in principle, use documents obtained under such a program to pretend tax residency in this country. However, as banks usually require a passport to open an account, doing so with only proof of residence is not as easy as with a passport.

Nevertheless, while many RBI programs in large economies are costly and require actual physical presence, there are also some RBI programs which have the potential to be (mis-)used to circumvent tax information reporting. These schemes are also reported in the OECD (2018a,c) list of high-risk programs. The criteria for high-risk RBI programs are similar to those for CBI programs discussed in Section 2.2. As of October 2018, the OECD list includes RBI programs by the Bahamas, Bahrain, Barbados, Colombia, Malaysia, Mauritius, Monaco, Montserrat, Panama, Qatar, Seychelles, Turks and Caicos Islands and the United Arab Emirates. Among these, Bahrain, Barbados, Colombia, Panama, the Seychelles and the United Arab Emirates introduced or substantially reformed their programs between 2010 and the end of 2018 (i.e. within our sample period). We analyze whether these programs have been misused for tax

[23] In a study of European RBI programs, Surak (2020) finds that mobility and visa-free access are the predominant motives to participate in these programs.

information exchange, estimating specifications analogous to eq. (12).

Table A7 in the appendix show the results. We find no significant increase of the deposits in tax havens after the six countries noted above introduced their RBI programs. Thus, our results suggest that RBI programs are not commonly used to hide deposits in other tax havens from tax information exchange.

6 Conclusion

Our paper argues that CBI programs can be used to circumvent tax information exchange and thus enable tax evasion. Our analytical model suggests that intensifying tax information exchange posed an incentive for several countries to introduce CBI programs during the last decade. Our empirical results provide indirect evidence that CBI programs are indeed misused for tax evasion. Analyzing the deposits of CBI countries in tax havens, we find that these deposits increase by about US$ 9 billion after the introduction of a CBI program. This result is in line with the idea that a number of citizens naturalized under a CBI program use their new citizenship to conceal their true tax residency from tax information exchange. They hide income and assets in offshore bank accounts, unrecorded by competent fiscal authorities.

The insights of our paper are particularly relevant for the ongoing fight against international tax evasion, which is based on tax information exchange. Addressing the potential misuse of CBI programs is one key challenge to ensure the functioning of tax information exchange. Our results underline the necessity to formulate suitable strategies to ensure that tax information is indeed exchanged with the true country of tax residency, and not a third country offering a new form of concealment services. One option to address this challenge would be to ensure that financial institutions in tax havens indeed ascertain the true tax residency of the account holder, e.g. by ensuring they require tax residency supporting documents in addition to passports for individuals with passports from CBI countries. An alternative option would be for CBI countries to inform its new citizen's country of origin about their new citizenship, and pass on tax information to this country if the individual is not tax resident exclusively in the CBI country.

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Appendix

A.1 Proof of Proposition 1

We first study how the detection probability influences the number of evaders, starting with case 1. For ease of notation, we drop all subscripts. We take the total differential of eq. (4) and rearrange it to obtain

$$\frac{d\hat{y}_e}{dp} = \frac{\partial \hat{y}_e}{\partial f}\frac{df}{dp} + \frac{\partial \hat{y}_e}{\partial p} = \frac{1}{(1-pF)\,t}\frac{df}{dp} + \frac{fF}{(1-pF)^2\,t}. \tag{A.1}$$

Implicit differentiation of eq. (9) shows that

$$\frac{df}{dp} = -\frac{fF}{1-pF}. \tag{A.2}$$

Inserting (A.2) in (A.1) shows that $\frac{d\hat{y}_e}{dp} = 0$, i.e. that the number of evaders is independent of the detection probability in case 1.

In case 2, we take the same approach. We rearrange the total differential of (5) to

$$\begin{aligned}\frac{d\hat{y}_{eCBI}}{dp} &= \frac{\partial \hat{y}_{eCBI}}{\partial f}\frac{df}{dp} + \frac{\partial \hat{y}_{eCBI}}{\partial c}\frac{dc}{dp} + \frac{\partial \hat{y}_e}{\partial p} \\ &= \frac{1}{(1-pF)\,t}\frac{df}{dp} + \frac{1}{(1-pF)\,t}\frac{dc}{dp} + \frac{(f+c)F}{(1-pF)^2\,t}.\end{aligned} \tag{A.3}$$

Implicit differentiation of eqs. (9) and (7) shows that

$$\frac{df}{dp} = -\frac{fF}{1-pF}; \quad \frac{dc}{dp} = -\frac{(c-\delta)\,F}{1-pF}. \tag{A.4}$$

Inserting (A.4) in (A.3) shows that

$$\frac{d\hat{y}_{eCBI}}{dp} = \frac{\delta F}{(1-pf)^2\,t} > 0, \tag{A.5}$$

Thus, if the marginal evader does CBI, the number of individuals evading taxes is lower when the detection probability is higher, as long as there is a cost of issuing passports. In this case, the CBI country is not willing to compensate the marginal evader fully for the higher detection probability.

Which of the two cases is the relevant one in equilibrium? First, consider the situation without a TIEA. Then, it holds trivially that marginal tax evader does not acquire a new citizenship; without a TIEA, CBI has no advantage. Formally, if follows from eq. (3) that $\widehat{y}_{\text{CBI}} \to \infty$.

With a TIEA in place, assume for now that $\delta = 0$. Then, $c^* = f^*$, as the maximization problems of the CBI country and the tax haven are identical in case 2 with $\delta = 0$. Next, denote the fee that the tax haven would set in case 1 with $p = p_L$ as $f^1_{p_L}$, and its fee in case 2 with $p = p_L$ as $f^2_{p_L}$ (and $c^2_{p_L}$ denotes the cost of CBI in this case). As $\frac{d\hat{y}_e}{dp} = \frac{d\hat{y}_{eCBI}}{dp} = 0$ with $\delta = 0$, it follows from comparing eqs. (4) and (5) that $f^1_{p_L} = f^2_{p_L} + c^2_{p_L}$. Thus, with $\delta = 0$, the marginal evader is indifferent between acquiring a new citizenship or not. Thus, with $\delta = 0$, case 2 is relevant.

This situation changes when $\delta > 0$. Then, comparison of eqs. (7) and (9) shows that $f^1_{p_L} < f^2_{p_L} + c^2_{p_L}$, i.e. for the same detection probability, more individuals are willing to evade taxes in case 1. Thus, with $\delta > 0$, case 1 is relevant.

A.2 Additional Tables and Figures

Table A1: Descriptive Statistics on Foreign Deposits

Country	Obs.	Avg. foreign deposits by origin country, m. US$	Total foreign deposits (avg. 2010–2018), m. US$
Non-haven countries			
Australia	7,272	478.32	96,620.77
Brazil	2,304	71.94	4,604.00
Canada	6,840	597.13	113,455.30
Chinese Taipei	7,308	238.91	48,499.21
Denmark	7,308	231.23	46,940.32
Finland	5,292	225.97	33,218.21
France	7,056	2,393.22	469,071.50
Greece	1,260	417.44	14,610.29
Ireland	6,696	514.41	95,680.51
Italy	6,156	466.48	79,767.93
Japan	4,284	2,596.37	308,968.40
Mexico	576	201.53	3,224.50
Netherlands	3,960	2,802.55	308,280.50
Philippines	5,544	13.62	2,097.02
South Africa	5,220	40.44	5,863.13
South Korea	6,156	104.65	17,895.29
Spain	7,056	431.89	84,649.49
Sweden	6,876	256.73	49,036.20
United Kingdom	7,380	7,762.94	1,591,402.00
United States	5,112	7,787.46	1,105,820.00
Tax havens			
Austria	7,092	300.69	59,236.49
Belgium	7,308	1,103.21	223,952.50
Chile	4,500	49.63	6,203.69
Guernsey	6,624	224.43	41,295.66
Hong Kong SAR	7,092	1,590.14	313,256.80
Isle of Man	7,272	158.03	31,922.42
Jersey	6,912	364.61	70,004.69
Luxembourg	7,200	693.08	138,616.30
Macao SAR	5,616	159.14	24,825.08
Switzerland	7,308	1,942.30	394,287.60

Note: This table shows foreign deposits in the reporting countries considered in our analysis from 2010:Q1 to 2018:Q4. *Avg. foreign deposits by origin country* is the average of foreign deposits at the bilateral level in million US$. *Total foreign deposits* is the deposit volume in million US$ held by foreigners summed over all origin countries in the data. *Data:* BIS Locational Banking Statistics 2019.

Table A2: Data Description for Country-Level Controls

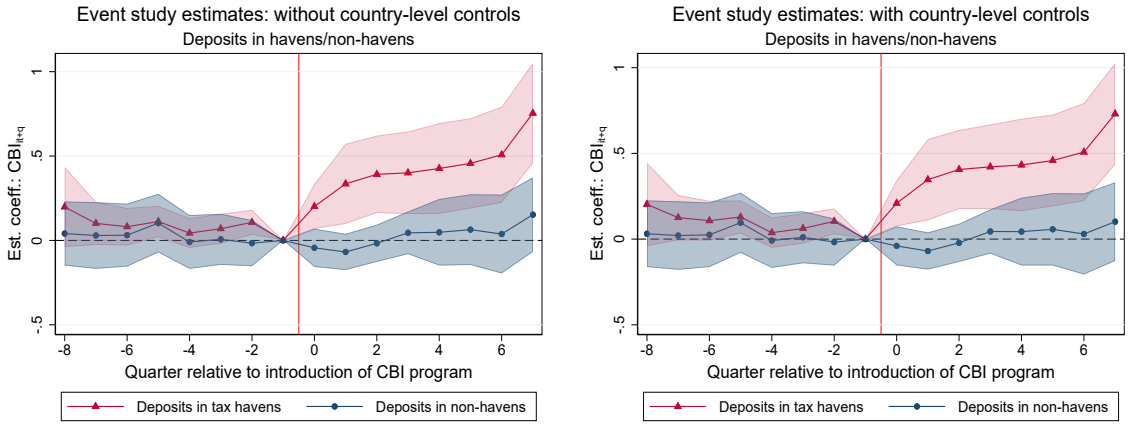
Variables	Description
Quarterly nominal GDP	Quarterly nominal GDP in domestic currency from the IMF; if no quarterly data available we impute from annual data (also from IMF or, if unavailable, from UNSTATS 2019 or National Statistical Offices). To do so, we define continental regions using the UN geoscheme (see the UN Statistics Division methodology description https://unstats.un.org/unsd/methodology/m49/) and calculate average quarterly GDP shares of annual GDP using countries from those continental regions for which quarterly data are available (to reflect seasonal differences). Domestic currencies converted to US$ using IMF data.
Quarterly nominal GDP per capita, domestic currency	Quarterly GDP (see above) divided it by population data (World Bank's World Development Indicators 2019 or National Statistical Offices). For years not covered, we impute annual population data using average population growth rates of the respective country.
Consumer price index (CPI) % change	Quarterly CPI from IMF, completed by information from the National Statistical Offices of Guernsey, Jersey and the Isle of Man as well as by data provided by the CIA World Factbook for 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).
Chinn-Ito financial openness index 2018	Index measuring a county's degree of capital account openness. For detailed information see Chinn and Ito (2006, 2008) and web.pdx.edu/~ito/Chinn-Ito_website.htm.
Armed Conflicts	Binary indicator that equals 1 if state-based, non-state or one-sided armed conflicts resulted in at least 100 deaths within a quarter, 0 otherwise (UCDP/PRIO Armed Conflict Database, UCDP Georeferenced Event Dataset (GED) Global version 20.1).
Taxes on income, profits and capital gains	Total revenue from taxes on income, capital gains and profit taxes on individuals relative to GDP (ICTD/UNU-WIDER Government Revenue Database). For countries lacking information, we impute the revenues by multiplying the total revenue from taxes on income, capital gains and profit taxes with the sample's average share of these revenues from individuals. For countries lacking information in single years, we impute the revenues by inverse distance weighted interpolation using Stata's mipolate idw command, provided by Cox (2015).
Natural disasters	Binary indicator that equals 1 if a natural disaster affected at least 0.1% of the population or caused total damages of at least 0.5% of GDP within a quarter, 0 otherwise (The International Disaster Database; EM-DAT, CRED/UCLouvain, Brussels, Belgium www.emdat.be).
Systemic financial crises	Binary indicator that equals 1 if a systemic banking crisis, a currency crisis, a sovereign debt crisis or a sovereign debt restructuring have taken place within a calendar year, 0 otherwise. For detailed information on the data see Laeven and Valencia (2018).
Oil and gas rents	Rents from oil and gas production to GDP (World Bank: World Development Indicators). For countries lacking information on oil and gas rents we impute a 0.
Financial sector development	Domestic credit relative to GDP (World Bank: World Development Indicators). For countries lacking information in single years, we impute the revenues by inverse distance weighted interpolation with Stata's mipolate idw command by Cox (2015).
Control over corruption	Measure for the perceived extent to which public power is exercised for private gain ranging from -2.5 to 2.5, i.e., highly corrupt to not corrupt (World Governance Indicators).
Political stability	Measure for the perceived likelihood of political instability and politically motivated violence ranging from -2.5 to 2.5, i.e., highly instable to highly stable (World Governance Indicators).
Exchange rate effect	We compute average currency shares of haven deposits for each country using information on currency-specific stocks of deposits from BIS Locational Banking Statistics. We then combine this information with exchange rate information from the IMF International Financial Statistics to construct a variable that expresses the percentage change in haven deposits caused by exchange rate changes.

Table A3: Descriptive Statistics for Control Variables

Variable	Mean	SD
GDP (billion US$)	158	514
GDP per capita (US$)	5,906	28,813
CPI (% change)	4.36	5.79
Taxes on income, profits and capital gains	4.04	3.67
Exchange rate effect	-0.32	1.82
Capital account openness	0.59	1.59
Financial sector development	63.54	47.47
Financial crisis	0.04	0.19
Political stability	0.03	0.90
Control over corruption	0.13	1.01
Oil/gas rents	2.74	7.52
Natural disaster	0.12	0.32
Armed conflicts	0.06	0.24
Obs.	130,068	

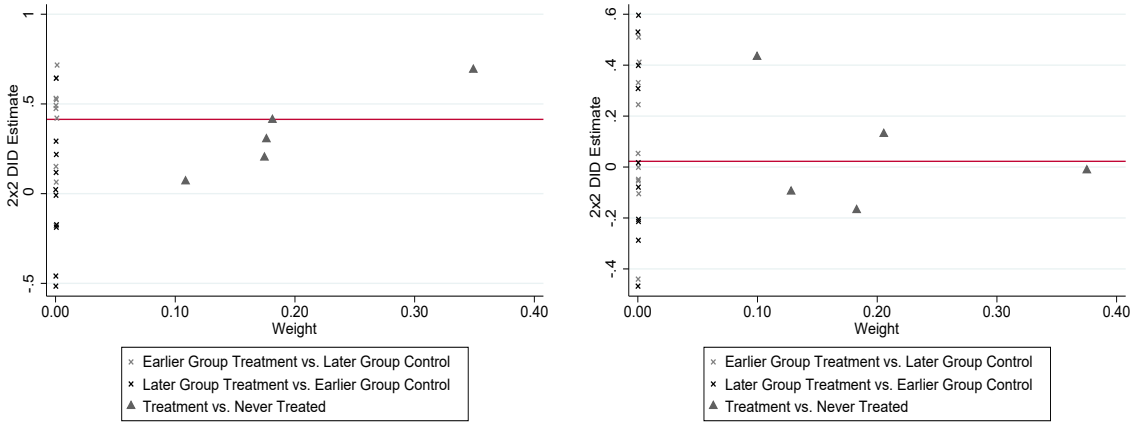
Note: This table shows sample mean and standard deviation (SD) for the control variables. Data from 2010:Q1 to 2018:Q4. *Sources:* See Table A2.

Figure A1: Event study: Citizenship-by-Investment Programs (All Programs)



Note: Event study estimates for deposits from CBI countries held in banks of non-haven and haven countries. Control group: Countries which do not have a CBI program in sample period. Left graph shows results without covariates, right panel with covariates. 90% confidence interval based on standard errors clustered by country pair. *Data:* BIS Locational Banking Statistics 2019.

Figure A2: Bacon Decomposition



Note: Figures show the bacon decomposition (Goodman-Bacon, 2018), decomposing the difference-in-differences estimation results for deposits in tax havens (left panel) and non havens (right panel) regarding variation in treatment timing, estimated using Goodman-Bacon et al. (2019). Note that while we have six treated countries, there are only five treatment timing groups, as Malta and Grenada introduced their CBI programs in the same quarter. *Data:* BIS Locational Banking Statistics 2019.

Table A4: Bacon Decomposition

	Tax havens		Non-havens	
DID comparison	weight	average DID estimate	weight	average DID estimate
Earlier group treatment vs. later group control	0.006	0.446	0.005	0.154
Later group treatment vs. earlier group control	0.004	0.030	0.004	0.034
Treatment vs. never treated	0.989	0.416	0.991	0.022
DID estimate	0.414		0.022	

Note: Table shows results of the Bacon decomposition for decomposing difference-in-differences estimation results with variation in treatment timing (Goodman-Bacon, 2018), estimated using Goodman-Bacon et al. (2019). *Data:* BIS Locational Banking Statistics 2019.

Table A5: Robustness: Relevance of Individual Tax Havens

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Country j dropped	None	Austria	Belgium	Chile	Guernsey	Hong Kong SAR	Isle of Man	Jersey	Luxembourg	Macao SAR	Switzerland
CBIP	0.417***	0.402***	0.428***	0.366***	0.349***	0.457***	0.463***	0.467***	0.444***	0.346***	0.452***
	(0.131)	(0.142)	(0.141)	(0.134)	(0.115)	(0.143)	(0.145)	(0.144)	(0.144)	(0.130)	(0.144)
Add. controls	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Country-pair FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Time FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Obs.	48,816	43,668	43,596	45,252	43,920	43,632	43,632	43,812	43,632	44,604	43,596
R^2	0.037	0.042	0.038	0.030	0.039	0.042	0.034	0.036	0.040	0.036	0.037

Note: Table shows results of OLS panel regressions. Each specification drops one reporting tax haven. Dependent variable is the *ln* of foreign deposits held by individuals from jurisdiction i in BIS reporting jurisdiction j at the end of year–quarter t. We consider the deposits held by residents (non-banks) of up to 220 countries i in 10 haven jurisdictions j (see the country list in Table A1). Sample period from 2010:Q1 to 2018:Q4. $CBIP = 1$ if there is a (reformed) CBI program in jurisdiction i in year–quarter t. Additional controls as described in Table A2. Standard errors (clustered by country pair) in parentheses, *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. *Data:* BIS Locational Banking Statistics 2019.

Table A6: Robustness: Relevance of Individual CBI Countries

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Country i dropped	None	Dominica	Cyprus	Grenada	Malta	St. Lucia	Vanuatu	Cyprus and Malta	Cyprus, Dominica and Vanuatu
CBIP	0.417***	0.436***	0.419***	0.482***	0.256**	0.456***	0.461***	0.211*	0.524**
	(0.132)	(0.152)	(0.155)	(0.150)	(0.105)	(0.152)	(0.140)	(0.122)	(0.213)
Add. controls	✓	✓	✓	✓	✓	✓	✓	✓	✓
Country-pair FE	✓	✓	✓	✓	✓	✓	✓	✓	✓
Time FE	✓	✓	✓	✓	✓	✓	✓	✓	✓
Obs.	48,816	48,492	48,456	48,492	48,492	48,456	48,528	48,132	47,844
R^2	0.0366	0.0368	0.0367	0.0371	0.0367	0.0369	0.0369	0.0369	0.0373

Note: Table shows results of OLS panel regressions. Each specification drops one CBI country; in col. (8) we drop the European CBI countries Cyprus and Malta; in col. (9) we drop Cyprus, Dominica and Vanuatu, as they reformed a pre-existing CBI program and did not introduce a new program. Dependent variable is the ln of foreign deposits held by individuals from jurisdiction i in BIS reporting jurisdiction j at the end of year–quarter t. We consider the deposits held by residents (non-banks) of up to 220 countries i in 10 haven jurisdictions j (see the country list in Table A1). Sample period from 2010:Q1 to 2018:Q4. $CBIP = 1$ if there is a (reformed) CBI program in jurisdiction i in year–quarter t. Additional controls as described in Table A2. Standard errors (clustered by country pair) in parentheses, *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.
Data: BIS Locational Banking Statistics 2019.

Table A7: Panel Regressions: High-risk RBI Programs

Sample	Full	Control variables available			
Deposits in		Havens			Non-havens
	(1)	(2)	(3)	(4)	(5)
RBIP	0.082	0.055	0.026	0.018	-0.271**
	(0.176)	(0.176)	(0.172)	(0.159)	(0.131)
Add. controls	–	–	✓	✓	✓
Country-pair FE	✓	✓	✓	✓	✓
Time FE	✓	✓	✓	–	✓
Time×country$j$ FE	–	–	–	✓	–
Obs.	61,272	46,116	46,116	46,116	77,040
R^2	0.043	0.037	0.041	0.111	0.007

Note: Table shows results of OLS panel regressions. Dependent variable is the ln of foreign deposits held by individuals from jurisdiction i in BIS reporting jurisdiction j at the end of year–quarter t. We consider the deposits held by residents (non-banks) of up to 220 countries i in 10 haven and 20 non-haven jurisdictions j (see the country list in Table A1). Sample period from 2010:Q1 to 2018:Q4. $RBIP = 1$ if there is a (reformed) RBI program in jurisdiction i in year–quarter t. Treated countries are Bahrain (2018:Q2), Barbados (2012:Q1), Colombia (2017:Q4), Panama (2012:Q2), Seychelles (2013:Q4), and the United Arab Emirates (2016:Q1). Additional controls as described in Table A2. Column (1) uses the full BIS country-by-country sample; cols (2)–(5) the sample for which data on control variables is available. Standard errors (clustered by country pair) in parentheses, *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. *Data:* BIS Locational Banking Statistics 2019.