Hide-and-Seek:
Can Tax Treaties reveal Offshore Wealth?

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Abstract

In response to offshore tax evasion, governments in many tax-heaven countries have introduced new tax treaties to facilitate the exchange of financial account information between jurisdictions, including traditional tax havens. This research article aims examining whether these treaties have had a material impact on offshore evasion. Based on panel regression analysis, cross-border deposits in traditional haven jurisdictions, taken as a proxy for offshore evasion in the literature, have declined substantially. However, these offshore assets are being relocated to few non-compliant tax havens and moreover, "non-haven" offshore financial centres, most notably the United States, which has yet to commit to reciprocal and automatic exchange of information and establish a public register of ultimate beneficial ownership.

Keywords: Tax Treaties, Offshore Wealth, Offshore Evasion, Tax Haven

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เกมเล่นซ่อนหา: สนธิสัญญาภาษีสามารถช่วยเปิดเผย ระดับทรัพย์สินที่อยู่ในต่างแดนได้หรือไม่

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บทคัดย่อ

รัฐบาลในหลายประเทศได้นำเสนอสนธิสัญญาภาษีใหม่โดยมีวัตถุประสงค์เพื่อสนับสนุนการแลกเปลี่ยน
ข้อมูลบัญชีการเงินระหว่างประเทศเพื่อช่วยลดการหลีกเลี่ยงภาษีนอกประเทศ งานวิจัยฉบับนี้ทำการ
ศึกษาว่า สนธิสัญญาเหล่านี้ส่งผลกระทบต่อการหลีกเลี่ยงภาษีนอกประเทศหรือไม่ จากการวิเคราะห์
ด้วยวิธี Panel Regression พบว่า มูลค่าเงินฝากข้ามพรมแดนในดินแดนภาษีต่ำซึ่งมักใช้วัดระดับของ
การหลีกเลี่ยงภาษีนอกประเทศได้ลดลงเป็นอย่างมากหลังจากมีการการบังคับใช้สนธิสัญญานี้ อย่างไร
ก็ตาม งานวิจัยฉบับนี้ยังพบว่า นักลงทุนได้เคลื่อนย้ายทรัพย์สินนอกชายฝั่งไปยังดินแดนภาษีต่ำเพียง
บางแห่งที่ยังไม่ได้ร่วมบังคับใช้สนธิสัญญาภาษีดังกล่าว นอกจากนี้ ทรัพย์สินเหล่านี้ยังถูกเคลื่อนย้าย
ไปยังศูนย์กลางการเงินระหว่างประเทศซึ่งไม่นับว่าเป็นดินแดนภาษีต่ำโดยเฉพาะอย่างยิ่งประเทศ
สหรัฐอเมริกา ซึ่งยังไม่ได้บังคับใช้สนธิสัญญาการแลกเปลี่ยนข้อมูลบัญชีการเงินรวมถึงระบบข้อมูลที่
บ่งบอกถึงผู้รับประโยชน์สูงสุดจากทรัพย์สินที่ถูกเคลื่อนย้าย

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1. Introduction (บทนำ)

Eight percent of the world's household financial wealth, or 10 percent of world GDP, is estimated to be held offshore (Zucman, 2013). In principle, there is nothing illegal about offshore accounts, for instance held in London for its superb financial services. However, those accounts could be used to dodge tax authorities whose reach on other jurisdictions is limited. Moreover, if held through sham corporations registered in the likes of Panama, the beneficial owner is effectively hidden. Such secrecy arrangements allow the evasion of not only interest, dividend and capital gains taxes but also property, inheritence and other wealth taxes. Aside from the direct revenue impact on governments, offshore evasion undermines the integrity of the tax system and severely limits options for progressive taxation. The stakes are even higher if accounts are used for money laundering and criminal purposes such as drug trafficking.

Given the potential scale and multi-faceted nature of the problem, governments have introduced various domestic and international measures. This paper focuses on a particular set of measures concerning offshore tax evasion, that is, the exchange of financial account information among tax authorities. Other prominent initiatives including the Financial Action Task Force (FATF), which sets standards and monitors progress on combating money laundering and financing of terrorism. FATF-related investigations would typically involve the prosecutor's office, the financial intelligence unit and others such as the drug enforcement agency and result in criminal charges, in comparison to most tax evasion cases which only result in civil penalties. However, these initatives increasingly seem to overlap, for instance, on the issue of beneficial ownership which are critical in both anti-money laundering and tax evasion cases. There are also prominent initiatives to address corporate profit shifting and transfer pricing, including through new country-by-country reporting requirements.

Over the past decade, a momentum has built up to expand the information base of tax authorities to other jurisdictions, including traditional tax havens. While there is no agreed definition of a tax haven, it is characterized by strict bank secrecy laws, flexible corporate laws, and low or no tax burden. Switzerland is the most prominent, but the list of havens could go up to 60 jurisdictions. Given that bank secrecy does not allow the exchange of information, earlier initiatives such as the 2003 EU Savings Directive requested tax havens to withhold and remit a certain share of interest payment without disclosing the identity of the taxpayer. But in 2009, following FBI investigations triggered by whistleblowing, the US and Swiss governments agreed that the Swiss bank UBS reveal the identities of 4,450 customers to the

IRS. This event demonstrated that bank secrecy of tax havens was no longer impenetrable (Johannesen et al, 2018). In that year, the G20 urged each tax haven to sign at least 12 information exchange treaties under the threat of economic sanctions. Then in 2010, the US Congress enacted the Foreign Account Tax Compliance Act (FATCA), which requires foreign financial institutions to report information on asset holders or be subject to a 30% withholding rate. In 2014, the OECD and the G20 endorsed a new standard for automatic exchange of information, known as the Common Reporting Standard (CRS), modelled after FATCA but which requires all signatories to reciprocate in the exchange of information.

This paper contributes to a nascent but growing literature on the effectiveness of recent tax treaties aimed at curbing offshore evasion. The literature has been somewhat divided. Several studies have found only marginal overall reduction in offshore tax evasion, as evaders simply relocated their activities to jurisdictions beyond the reach of the concerned treaties (Johannesen & Zucman, 2014; Hanlon et al, 2015; Menkhoff & Miethe, 2017; De Simone et al, 2018). Indeed, despite the G20 declaring that the "era of bank secrecy is over", further leaks such as the Panama Papers revealed that offshore evasion was alive and well. Nevertheless, OECD (2018) identified EUR 95 billion in additional tax revenue due to treaty-related enforcement and voluntary compliance schemes. OECD (2019) estimated FATCA- and CRS-based information exchanges to induce a reduction in tax haven bank deposits of 20-25%, over and above the reduction from earlier tax treaties.

Following previous studies, how cross-border capital flows, in particular bank flows, have responded to the recent wave of information exchange among tax authorities. I conduct regression analyses on a large panel data of major international banking centers and their counterparties from the first quarter of 2003 to the fourth quarter of 2018, expecting that only deposits which are associated with tax evasion would see sudden reductions in response to treaties. I find that cross-border deposits in traditional havens have declined substantially with the introduction of new treaties, although the precise magnitude depends on how haven versus non-haven countries are defined. Moreover, given that all traditional tax havens were exchanging information by 2018, I provide regression-based evidence that offshore assets seem to be relocating to "non-haven" offshore financial centers, most notably the United States, which has not committed to reciprocal and automatic exchange of information. This is in line with recent anecdotes which suggest that the US (States such as Delaware, Nevada and South Dakota) is becoming the new Switzerland. To my best knowledge, there is only one

previous study which uses similar regression method and data with a focus on the US (Casi et al, 2018).

The paper is structured as follows. Unlike previous empirical studies on offshore tax evasion, I start with a conceptual framework in Section 2. Section 3 discusses the methodology and data, Section 4 presents the baseline regression results, and Section 5 the regression results on deposit shifting and sham corporations. Section 6 concludes with some policy implications.

2. Conceptual Framework (กรอบแนวคิดงานวิจัย)

This section provides a schematic view and some guidance from theory for the main empirical analyses to follow. I find this is necessary as the empirical literature still faces several limitations and cannot yet paint a robust picture of offshore tax evasion.

2.1. A schematic view of offshore evasion

Say that an Indonesian taxpayer (X) opens an offshore financial account in Singapore (A) and does not declare it to tax authorities back home (Figure 1). Domestic financial institutions would typically report to home tax authorities, who could compare these third-party reports to the self-report of the taxpayer to detect any discrepancies. But this is not the case for offshore accounts, which significantly increase the information asymmetry between taxpayers and tax authorities. Subsequently, the two countries sign a tax treaty to exchange information on financial account, based on which tax authorities could conduct audit and impose a penalty. The tax evader may immediately voluntarily declare the offshore account during a grace period and pay taxes but try to avoid the penalty. He may keep his deposits in Singapore or repatriate them back home; note that in the former case, there would be no sudden reduction in deposits.

Figure 1: Cross-Border Bank Flows involving Tax Havens
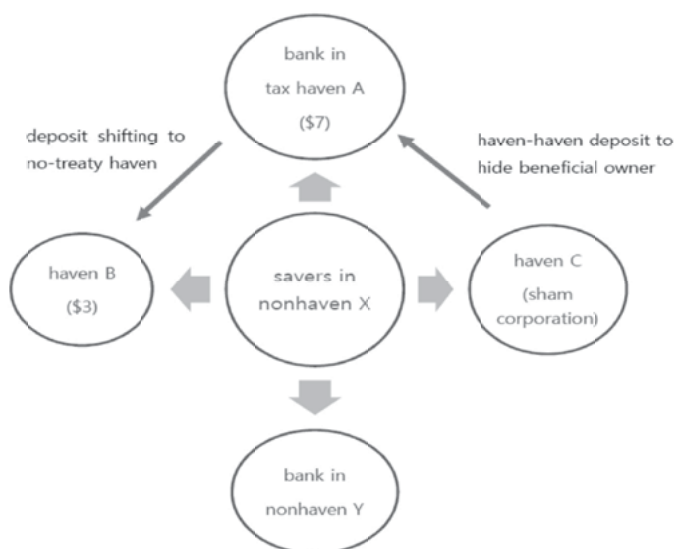
A different option is to keep evading, which would be particularly attractive if offshore accounts were used to evade a wide range of taxes and played a pivotal role in one's wealth accumulation. There are two popular ways to keep evading. First, relocate offshore deposits from Singapore to a different tax haven, say Macau (B), which offers bank secrecy and has not signed a tax treaty with Indonesia (Figure 1). In such case, there would be a sudden reduction in deposits in Singapore but an increase in Macau. Second, keep the money in Singapore but through a sham corporation in another tax haven, say Panama (C), to hide one's identity. Such sham arrangements explain the disproportionately large share of haven-haven flows in international banking statistics (Johannesen & Zucman, 2014). Whether a new treaty between Indonesia and Singapore affects deposits from Panama to Singapore depends on whether Singapore requires its financial institutions to know who the ultimate owner of the assets they manage and agrees to exchange that information with Indonesia. Even in such case, trusts, foundations and similar arrangements held in or via offshore jurisdictions pose great challenge as they manipulate the very concept of ownership.

Regression-based evidence on these flows are presented in Sections 4 and 5. There are other possible types of tax evader response which are beyond the scope of this paper but worth noting. One could shift savings to certain retirement and pension accounts, insurance

contracts, estate accounts and others which are non-reportable under current tax treaties but which offshore centers offer (e.g. Hong Kong's Occupational Retirement Scheme). Citizenship or residence by investment schemes are other possible loopholes, as the evader could disclose to financial institutions his country of residence for tax purposes only, and not his main country of residence. And yet another response is to shift from financial assets to real assets which are not reportable such as jewelry, art, cars and horses and real immovable property.

2.2. Extending the standard tax evasion model

As illustrated above, offshore tax evaders constantly exploit more opaque jurisdictions and arrangements to dodge the tax authorities. Theory provides some guidance in this respect. The standard model on income tax evasion (Allingham & Sandmo, 1972) views evasion as a gamble with an expected payoff based on two different states – not getting caught and enjoying higher disposable income and getting caught and paying the tax plus penalty. The probability of detection in turn depends on the level of information disclosure (Kleven et al, 2011). In the simplest model, income or wealth could be divided into that which is subject to third-party reporting (y_t) and that which is only self-reported (y_s), such that the probability of detection is very high for the former but very low for the latter. Information exchange between tax authorities would turn offshore capital income from y_s to y_t, and thereby increase the probability of detection and lower the expected payoff for evasion.

However, addressing information asymmetry becomes more complicated with multiple jurisdictions as in the case of offshore tax evasion. As long as the treaty network does not cover all jurisdictions, evaders can shift deposits to non-compliant ones. In a simple model with two jurisdictions, home and offshore, the evader's utility function is given as: $max_s \ u = y - \tau(y - s) - ts - c(s,t)$, where y is total wealth, s is wealth shifted to offshore accounts, τ and t are home and offshore tax rates respectively, with $\tau > t$. "Tax rate" here is defined as the expected total payment to the government including penalty, upon different probabilities of detection at home and abroad. Moreover, while shifting wealth offshore increases utility, there is a cost of shifting $c(s,t)$. Generalizing this into $N = 1 \dots n$ jurisdictions, each with a different tax rate $\tau_i \in [0,1]$, the utility function is given as: $max_s \ u = \sum_{i=1}^{n} \left[y_i - \tau_i(y_i + \sum_{i \neq j}^{n} s_{ij}) - \sum_{i \neq j}^{n} c_{ij}(s_{ij}, \tau_j) \right]$, where s_{ij} is the wealth shifted from tax base i to j and the associated shifting cost c_{ij} is a function of s_{ij} and the destination tax rate τ_j.

Therefore, while a "big bang" multilateral agreement should be preferred to the current sequential approach (Elsayyad & Konrad, 2011), tax treaties may still reduce offshore evasion in the absence of a complete network if they drive up the cost of shifting – the fee paid for sophisticated accounting, legal and financial services catering to tax evader demands. Recall that additional tax evasion is optimal only if the marginal benefit is greater than or equal to the marginal cost. As a growing number of jurisdictions exchange information, the probability of detection increases in those jurisdictions, and fewer options are left for relocating wealth. Such restrictions on the supply could generally drive up the fee for evasion services.

3. Definition and Data (คำจำกัดความและข้อมูล)

This section explains the key variables, and their data sources, to be used in the regression analyses in Section 4, notably tax treaties and cross-border banking flows, as well as the treatment group, tax havens, in contrast to other jurisdictions.

3.1.Tax Havens and Offshore Centers

There is no precise definition of a tax haven. OECD (2000) identifies the following features of tax havens: no or low taxes, lack of effective exchange of information, lack of transparency, and no requirement of substantial activity. However, other studies also point out that tax havens tend to score high on governance indicators and have relatively sophisticated communication infrastructure (Dharmapala, 2008). Table 1 compares the tax haven lists provided in the literature – Hines and Rice (1994), OECD (2000), Johannesen and Zucman (2014) and Gravelle (2015) – which together identify about 60 jurisdictions. A different and yet overlapping concept is "offshore financial centre (OFCs)." According to the IMF (2000), OFCs are jurisdictions that have: relatively large number of financial institutions engaged primarily in business with non-residents; financial systems with external assets and liabilities out of proportion to domestic financial intermediation; and centers which provide low or zero taxation; light financial regulation; banking secrecy and anonymity.

Table 1: List of Tax Havens

	Hines and Rice (1994)	OECD (2000)	Johannesen and Zucman (2014)	Gravelle (2015)
Andorra	1	1	1	1
Anquilla	1	1	1	1
Antigua and Barbuda	1	1	1	1
Aruba		1	1	1
Austria			1	
Bahamas	1	1	1	1
Bahrain	1	1	1	1
Barbados	1	1	1	1
Belgium			1	
Belize	1	1	1	1
Bermuda	1	1	1	1
British Virgin Islands	1	1	1	1
Cayman Islands	1	1	1	1
Chile			1	
Cook Islands	1	1	1	1
Costa Rica			1	1
Curacao*	1	1	1	1
Cyprus	1	1	1	1
Dominica	1	1	1	1
Gibraltar	1	1	1	1
Grenada	1	1	1	1
Guernsey**	1	1	1	1
Hong Kong	1	1	1	1
Ireland	1			1
Isle of Man	1	1	1	1
Jersey**	1	1	1	1
Jordan	1			1
Lebanon	1			1
Liberia	1	1	1	1
Liechtensetin	1	1	1	1
Luxembourg	1	1	1	1
Macao	1		1	1
Malaysia			1	
Maldives	1	1		1
Malta	1	1	1	1
Marshall Islands	1	1	1	1
Mauritius		1		
Monaco	1	1	1	1
Montserrat	1	1	1	1
Nauru		1	1	1
Netherlands			1	
Niue		1	1	1
Panama	1	1	1	1
Saint Kitts and Nevis	1	1	1	1
Saint Lucia	1	1	1	1
Saint Vincent and Grenadines	1	1	1	1
Samoa		1	1	1
San Mariano		1	1	1
Seychelles		1	1	1
Singapore	1	1	1	1
Sint Maarten (Dutch part)*	1	1	1	1
Switzerland	1	1	1	1
Tonga		1		1
Trinidad and Tobago			1	
Turks and Caicos Islands	1	1	1	1
Uruguay			1	
US Virgin Islands		1	1	1
Vanuatu	1	1	1	1

3.2. Tax Treaties

Tax treaties have a long history, dating back at least a century. The primary purpose of these treaties has been to facilitate cross-border trade and investment and avoid double taxation. Most double tax conventions (DTCs) do contain provisions for the exchange of information, but this has not been their main feature. In more recent decades, countries have also signed tax information exchange agreements (TIEAs), which is more explicitly aimed at curbing offshore tax evasion. Under DTCs and TIEAs, however, information was exchanged only upon request. Home tax authority had to have a well-documented suspicion that a resident was evading taxes through offshore accounts. Due to such restrictions, it is reported, for instance, that during the 2006-2010 period the US placed only 894 requests under its more than 80 tax treaties with foreign jurisdictions, which is very few as a single Swiss bank admitted to have more than 19,000 US clients with undeclared bank accounts (Johannesen & Zucman, 2014). However, under the new FATCA and CRS-based agreements, information gets exchanged automatically. Therefore, they are potentially more effective in curbing offshore evasion.

My main data sources are the Exchange of Tax Information Portal and the Automatic Exchange Portal, which are publicly available and represent the best effort of the OECD to gather information on tax treaties. Dropped from the sample are treaties which failed to meet OECD standards based on a peer-review evaluation on whether the treaty signed was properly drafted and enforced. Most of the signed TIEAs are treaties between tax haven and non-haven pairs, whereas DTCs are more common between non-havens. My dataset covers treaties signed from as early as the 1950s and until 2018. There are several thousand treaty pairs, but Figure 2 shows only for BIS reporting countries. Whereas DTC and TIEAs are shown by their date of signature so that they come into effect later, CRS is shown by their date of commencement of automatic exchanges as there is no precise date of signature. In 2014, 44 "early adopters" committed to automatic exchanges under the CRS Multilateral Competent Authority Agreement and subsequently more countries followed, but actual exchanges begun in 2017. To increase the sample size for the recently launched CRS, I include CRS with planned date of commencement through the first quarter of 2020.

Figure 2: New Treaty Pairs by Type
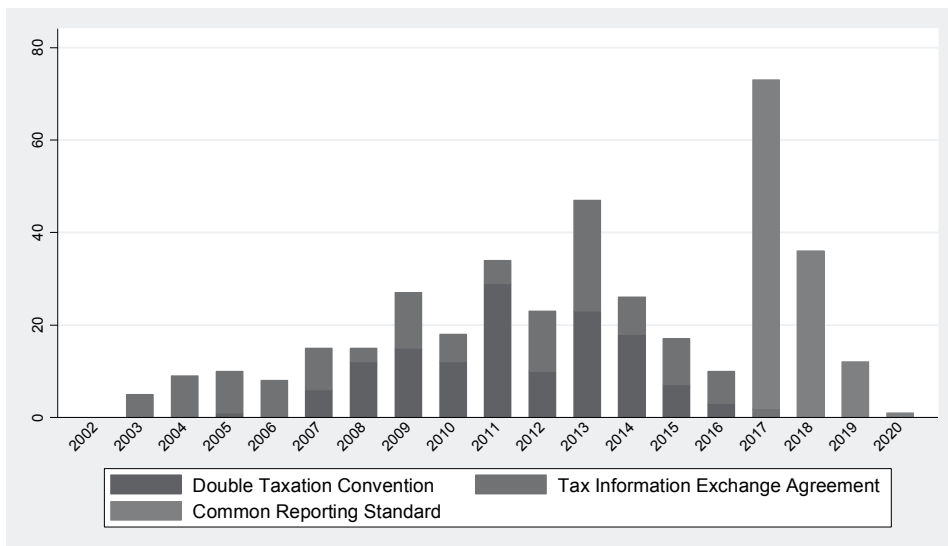
Source: Author, based on Exchange of Tax Information Portal and Automatic Exchange Portal.

3.3. Cross-Border Bank Flows

Given that hidden wealth is hard to observe directly, I consider the outstanding deposits in foreign-owned bank accounts in traditional tax havens or offshore centers, as published by the Bank for International Settlements (BIS), as a proxy for hidden financial wealth. The BIS locational banking statistics (LBS) are widely used in international economics and to calculate balance of payments. Total LBS reporting countries increased from 32 in 2002 to 47 in 2016. BIS started publishing the matrix of creditor banking systems and borrower countries in September 2016 and has since expanded it. BIS Statistics Table A6.2. shows the bilateral cross-border positions of banks located in up to 29 LBS-reporting countries against counterparties in more than 200 countries with breakdowns by instrument (all instrument, loans and deposits) and sector (all sector, non-bank sector).

Figure 3 shows that while deposits in non-haven have recovered after the global financial crisis, the same cannot be said for deposits in tax havens where the deposits declined further, especially if one excludes Hong Kong and Macao. There is variation across tax havens. Declines were most evident in Guernsey, the Isle of Man, Jersey and Switzerland.

Figure 3: Offshore Deposits in Tax Haven versus Non-Haven Jurisdictions (Millions of US$, 2003q1 to 2018q4)
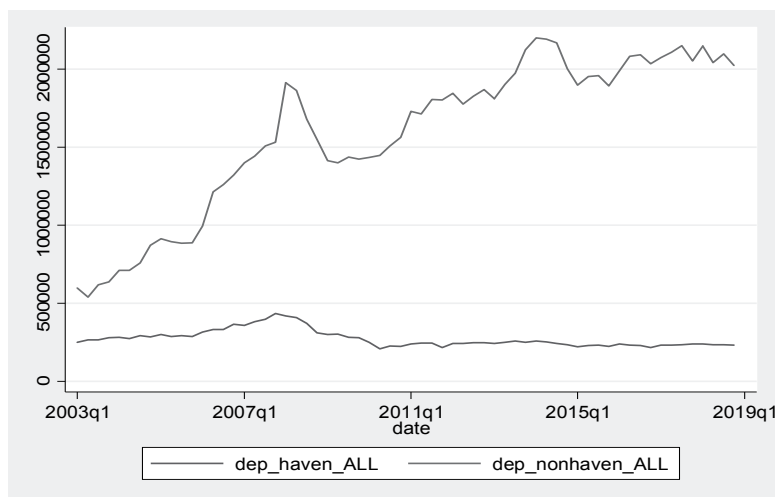
The BIS data has a number of limitations. First, it does not tell what fraction of the deposit in tax havens belong to households evading taxes. The BIS provides a sectoral decomposition between deposits owned by banks and by "non-banks", which includes multinational firms that hoard cash offshore as well as households trying to evade tax. Zucman (2013) estimates that tax evaders own about half of the non-bank deposits in tax havens. In addition, disaggregated data between households and corporates, while available for a smaller number of countries, provides supporting evidence that the main impact of information exchange has been on individuals (OECD, 2019). Second, the BIS data is based on immediate rather than beneficial ownership. About 25 percent of all deposits in tax havens are registered as belonging to other havens, reflecting the widespread use of sham corporations. Third, the BIS data does not provide information on the equity and bond portfolios that are entrusted to tax haven banks. The Swiss National Bank reports that about 25 percent of the funds held by foreigners in Switzerland take the form of bank deposits, while 75 percent are equities and bonds (Zucman, 2013). Fourth, although unlikely, it is possible that individuals do pay tax on their deposits held in tax havens, but there is no way to know this from the BIS data.

4. Estimations and Results (การประมาณการและผลการศึกษา)

This section provides regression-based evidence on the direct impact of tax treaties on traditional tax havens, while Section 5 addresses specific issues of deposit shifting and the use of sham corporations. I these two sections, I consider various models which share the following notations: $Deposits_{ijq}$ denotes the deposits held by residents of country i with banks of country j at the end of quarter q, $Signed_{ijq}$ is a dummy equal to 1 if a treaty allowing for information exchange between i and j exists in quarter q, γ_{ij} denotes country-pair fixed effects (time invariant characteristics such as distance, border, common language or common legal systems) and θ_q time fixed effects (which control for all common time trends affecting the deposits in tax havens, such as financial crises, changes in financial market activity or the regulatory environment). In most models, I also control for log of GDP. Based on the Huasman Test, I use the fixed effects estimator with robust standard errors clustered at the country-pair level for all regressions.

4.1. Treaty Impact on Deposits in Haven vs. Non-Haven Banks

I first compare changes in cross-border deposits held in traditional tax havens with those held in non-haven countries:

$$[1]\ log(Deposits_{ijq}) = \alpha + \beta_1 Signed_{ijq} + \beta_2 Signed_{ijq} * Haven_j + \gamma_{ij} + \theta_q + \epsilon_{ijq}$$

Should treaties have any effect at all, β_1 should be statistically different from zero. Moreover, a negative coefficient on the treaty variables for the haven locations, β_2, relative to non-haven locations, would be consistent with deposits in havens declining after tax evasion becomes more costly.

Table 2 shows that for TIEAs and to a lesser extent DTCs, the deposits of the "treaty" pairs are about 60 percent smaller after treaty signature than before, relative to the deposits of the "no treaty" pairs. This is based on transforming the estimated coefficient for percentage results, 100*$(\exp(\beta) - 1)$. In column 3, using interaction terms, I then separate the treaty pairs into those signed by non-haven savers with haven banks versus non-haven banks. It shows that most of the reduction happen in the "haven bank – non-haven saver" pairs. All the negative coefficients are statistically significant. In columns 4 to 6, a similar trend is shown for CRS-based exchanges, although the haven interaction term is not statistically significant.

Table 2: Treaty Impact on Bilateral Bank Deposits

|	(1)	(2)	(3)	(4)	(5)	(6)
DTC	-	-0.4156***	-0.5110***	-	-	-
	-	(0.0039)	(0.0064)	-	-	-
DTC*Haven	-	-	0.2534	-	-	-
	-	-	(0.3766)	-	-	-
TIEA	-0.9394***	-0.9461***	-0.1377	-	-0.9221***	-0.1409
	(0.0001)	(0.0001)	(0.1884)	-	(0.0001)	(0.1727)
TIEA*Haven	-	-	-0.8248***	-	-	-0.7831***
	-	-	(0.0000)	-	-	(0.0000)
CRS	-	-	-	-1.0210***	-0.9508***	-0.8629***
	-	-	-	(0.0001)	(0.0001)	(0.0004)
CRS*Haven	-	-	-	-	-	-0.7074
	-	-	-	-	-	(0.1407)
log(GDP)	0.8473***	0.8833***	0.8871***	0.7547***	0.8661***	0.8693***
	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Constant	-17.4473***	-18.3355***	-18.4252***	-15.0455***	-17.9395***	-18.0247***
	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Observations	37,212	37,212	37,212	37,212	37,212	37,212
R-squared	0.0393	0.0412	0.0417	0.0249	0.0442	0.0448
Number of Panel ID	860	860	860	860	860	860
Country pair FE	YES	YES	YES	YES	YES	YES
Time FE	YES	YES	YES	YES	YES	YES

Robust p-values in parantheses (***p<0.01, **p<0.05, *p<0.1)

Note: DTC = double taxation convention; TIEA = tax information exchange agreement; CRS = Common Reporting Standard based exchanges.

4.2.Treaty Impact on Developed vs. Developing Country Savers

I then examine how different saver countries responded to the introduction of tax treaties. Figure 4 shows that developed countries, including Europe and the United States, still own most of the offshore wealth, at about $4.6 trillion at the end of 2018 whereas developing countries held about $1.1 trillion, of which Africa and Middle East (AME) accounted for $366 billion, Asia and Pacific (AP) for $506 billion, Europe (EE) for $83 billion, and Latin America and Caribbean (LAC) for $173 billion.

Figure 4: Offshore Deposits by Savers (Millions of US$, 2003q1 to 2018q4; left axis unless otherwise indicated)
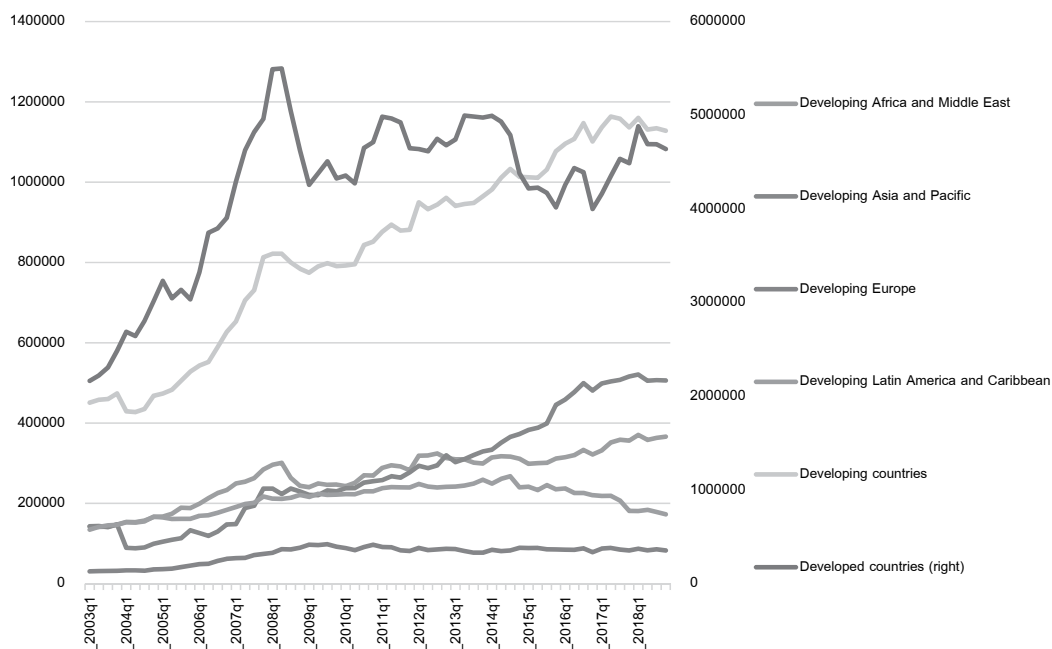
Note: Data are provided for non-bank counterparties only. Data are aggregated across currencies, type of currency and reporting institution.

Source: Author's calculation based on BIS LBS.

Given that the initial conditions are different, I suspect that the impact of new treaties also vary. Taking developed countries as the benchmark, I add regional dummies for developing countries in the following model:

$$[2] \quad log(Deposits_{ijq}) = \alpha + \beta_1 Signed_{ijq} + \beta_2 Signed_{ijq} * AME_i + \beta_3 Signed_{ijq} * AP_i + \beta_4 Signed_{ijq} * EE_i + \beta_5 Signed_{ijq} * LAC_i + \gamma_{ij} + \theta_q + \epsilon_{ijq}$$

In Table 3 shows the estimation result. As before, treaty signature has a negative impact on offshore deposits. However, all the interaction terms with developing regions have a negative coefficient, relative to developed countries. This is especially the case when the deposits are held in tax haven jurisdictions, as shown in columns 3 and 6 for TIEA and CRS respectively. Albeit from a low base, the use of offshore accounts is increasing rapidly in developing regions,

especially Asia and Pacific. This may reflect increasing wealth at the top. Also, primary tax havens or offshore centers in Asia – Hong Kong, China and Singapore – were until recently under less pressure to disclose customer information, compared to Switzerland for instance. On the other hand, GDP is not statistically significant for deposits held in havens, compared to those in non-havens which are likely to be associated with real cross-border activities.

Table 3: Treaty Impact on Bilateral Bank Deposits of Different Savers (Counterparty Saver: Developing Regions with benchmark with Developed Countries)

	(1)	(2)	(3)	(4)	(5)	(6)
Type of Treaty	TIEA			CRS		
Reporting Bank	All	Non-haven	Haven	All	Non-haven	Haven
Treaty	-0.7967***	-0.1385	-0.7745***	-0.7988***	-0.7001***	-1.6392***
	(0.0001)	(0.1301)	(0.0001)	(0.0003)	(0.0029)	(0.0001)
Treaty*AME	0.5407***	0.4402***	0.4253**	1.0723***	0.8765*	2.1719***
	(0.0066)	(0.0000)	(0.0319)	(0.0061)	(0.0662)	(0.0010)
Treaty *AP	0.5691***	-	0.7524***	0.4976	0.3178	1.7036***
	(0.0017)	-	(0.0001)	(0.1344)	(0.4051)	(0.0002)
Treaty *EE	0.4327*	-	0.4690*	1.2783***	1.2462**	1.7897***
	(0.0875)	-	(0.0639)	(0.0065)	(0.0262)	(0.0001)
Treaty *LAC	0.2985	-1.0662*	1.0207***	0.5350**	0.3898	1.6402***
	(0.4038)	(0.0861)	(0.0001)	(0.0356)	(0.1590)	(0.0003)
log(GDP)	0.2558***	0.2905***	-0.0018	0.2556***	0.2890***	0.0137
	(0.0001)	(0.0001)	(0.9733)	(0.0001)	(0.0001)	(0.8050)
Constant	-3.3733***	-4.2098***	2.8691**	-3.3761***	-4.1809***	2.4870*
	(0.0001)	(0.0001)	(0.0352)	(0.0001)	(0.0001)	(0.0691)
Observations	159,499	133,062	26,437	159,499	133,062	26,437
R-squared	0.0114	0.0109	0.0283	0.0121	0.0115	0.0253
Number of Panel ID	4,432	3,560	872	4,432	3,560	872
Country pair FE	YES	YES	YES	YES	YES	YES
Time FE	YES	YES	YES	YES	YES	YES

Robust p-values in parantheses (***p<0.01, **p<0.05, *p<0.1)

Note: Developing countries in Africa and Middle East (AME), Asia and Pacific (AP), Europe (EE), Latin America and Caribbean (LAC). DTC is controlled for in columns 1 to 3 and TIEA for columns 4 to 6.

4.3.Treaty Impact Over Time

To examine the timing of the response to treaty signature, I now consider lagged and antici-pation effects. For TIEAs, I include a dummy equal to 1 in the quarter q of the legal event establishing information exchange, three dummies equal to 1 in q + 1, q + 2 and q + 3 re-spectively, and a dummy equal to 1 in all quarters after q + 3 ("long run"). For CRS-based automatic exchanges, I focus on anticipation effects because it is based on the entry into force date, rather than the signature or commitment date. I include three dummies equal to 1 in q - 1, q - 2 and q - 3 respectively, and a dummy equal to 1 for fourth to eighth quarters before the commencement of automatic exchange.

$$[3 \quad log(Deposits_{ijq}) = \alpha + \beta_1 Signed_{ijq} + \beta_2 lagged\ effect + \beta_3 anticipation\ effect + \gamma_{ij} + \theta_q + \epsilon_{ijq}$$

Table 4 shows as TIEAs do not enter into force immediately after they are signed, the effect becomes stronger over time towards the entry into force. For CRS-based automatic exchanges, lagged effects are stronger for developed country savers (column 2) whereas anticipation effects are stronger for all non-havens including developing countries (column 5). Generally lagged effects would be strong if the exchanged information is effectively used for tax audits. Anticipation effects would be strong if the government introduces enticing measures such as time-bound tax amnesties or voluntary disclosure schemes in the lead up to the exchange of information, which was the case for several developing countries such as Argentina, India and Indonesia.

Table 4: Treaty Impact on Bilateral Bank Deposits over Time

	(1)	(2)	(3)	(4)	(5)
Counterparty SAVER	Non-Haven	Developed Countries		All Non-Havens	
(-4 to -8 quarters)	-	-	-0.8172**	-	-1.5361***
	-	-	(0.0276)	-	(0.0000)
(-3 quarter)	-	-	-0.9146**	-	-1.5739***
	-	-	(0.0211)	-	(0.0000)
(-2 quarter)	-	-	-0.8874**	-	-1.1502***
	-	-	(0.0301)	-	(0.0000)
(-1 quarter)	-	-	-0.9154**	-	-1.8369***
	-	-	(0.0231)	-	(0.0000)
(Contemporary)	-0.3534***	-1.3158***	-1.1435***	-1.0465***	-1.1102***
	(0.0004)	(0.0001)	(0.0000)	(0.0000)	(0.0000)
(+1 quarter)	-0.4171***	-1.3311***	-	-0.8205***	-
	(0.0002)	(0.0001)	-	(0.0024)	-
(+2 quarter)	-0.5107***	-1.3899***	-	-0.8390***	-
	(0.0002)	(0.0001)	-	(0.0017)	-
(+2 quarter)	-0.5523***	-1.4487***	-	-0.9894***	-
	(0.0000)	(0.0003)	-	(0.0005)	-
(long run)	-0.7934***	-1.5294***	-	-0.8306***	-
	(0.0000)	(0.0004)	-	(0.0009)	-
log(GDP)	-0.3320	-0.3092	-0.0738	0.7200***	0.8726***
	(0.1182)	(0.1286)	(0.6441)	(0.0000)	(0.0000)
Constant	13.5277**	12.9176**	6.7701	-14.0969***	-18.0791***
	(0.0170)	(0.0173)	(0.1117)	(0.0000)	(0.0000)
Observations	6,110	6,110	5,962	35,601	34,954
R-squared	0.1214	0.1273	0.1302	0.0320	0.0544
Number of Panel ID	164	164	164	860	855
Country pair FE	YES	YES	YES	YES	YES
Time FE	YES	YES	YES	YES	YES

Robust p-values in parantheses (***p<0.01, **p<0.05, *p<0.1)

Note: DTC is controlled for in column 1 and TIEA for columns 2 to 5.

4.3. Treaty Formation

Before turning the specific issues of deposit shifting and the use of sham corporations, I conduct a simple identification test. Following Johannesen and Zucman (2014), I examine the possibility that tax havens systematically signed treaties with countries that were placing less and less deposits in their banks relative to the global trend. This would introduce a spurious relationship between treaty signature and deposit growth. I run probit models of the form:

[4] $$Treaty_{ijq} = \alpha + \beta Growth_{ijq} + \delta X_{ijq} + \gamma Distance_{ij} + \tau_i + \theta_q + \epsilon_{ijq}$$

, where $Treaty_{ijq}$ is a dummy equal to 1 if i and j sign an information exchange treaty in quarter q, $Growth_{ijq}$ captures the growth rate of the deposits held by savers of country i in haven j before quarter q, X_{ijq} includes other bilateral factors, τ_i denotes saver-country fixed effects and θ_q time fixed effects. I consider the percentage growth over the four quarters before q and as an alternative measure, the percentage growth from eight quarters to four quarters before q. Table 5 shows that the level of deposits, distance and GDP (all in logs) are generally significant determinants of the probability to sign a treaty. Controlling for those factors, past growth rates of deposits remain insignificant. This result is consistent with Bilicka and Fuest (2014) who find that tax havens do not systematically undermine tax information exchange by signing TIEAs with irrelevant countries.

Table 5: Probit Model on why Havens Sign Treaties (Reporting Bank: Haven/ Counterparty Saver: Non-Haven)

	(1)	(2)	(3)	(4)	(5)	(6)
Type of Treaty		TIEA			CRS	
Deposit growth, -4q to 0q	-0.0016	-0.0017	-0.0031	0.0008	0.0006	0.0008
	(0.1257)	(0.2073)	(0.5510)	(0.2299)	(0.1726)	(0.9449)
- Deposit growth, 8q to -4q	0.0000	0.0004	0.0040	-0.0004	-0.0005	-0.0291
	(0.9968)	(0.7912)	(0.4296)	(0.4435)	(0.5280)	(0.3550)
log(deposit)	-	-0.0001	-0.0016	-	0.0002	-0.0086
	-	(0.6315)	(0.3180)	-	(0.4194)	(0.1536)
log(distance)	-	-0.0008	-0.0101***	-	-0.0001	-0.0546**
	-	(0.1091)	(0.0081)	-	(0.9100)	(0.0224)
log(GDP)	-	0.0022***	0.0110	-	0.0015***	2.3389***
	-	(0.0000)	(0.5030)	-	(0.0025)	(0.0050)
Observations	12,437	11,687	3,581	5,593	5,167	228
Time FE	YES	YES	YES	YES	YES	YES
Country FE	NO	NO	YES	NO	NO	YES

Robust p-values in parantheses (***p<0.01, **p<0.05, *p<0.1)

5. Deposit Shifting and Sham Corporations (การเลื่อนการฝากและบริษัทแชม)

While the previous section suggest that tax treaties have been generally effective in curbing offshore evasion, further assessment is required specifically on the issues of deposit shifting and the use of sham corporations.

5.1. Deposit Shifting

Several previous studies find that information exchange agreements do not reduce tax evasion overall but rather induce a relocation of wealth from collaborative tax havens to non-collaborative ones (Johannesen & Zucman, 2014; Hanlon et al. 2015). However, there has been a dramatic increase in treaty network in recent years, especially with the commencement of automatic exchanges. For instance, more than 100 jurisdictions have committed to the CRS, including most of the traditional tax havens. Therefore, it is not clear whether updated data will yield similar results showing deposit shifting amongst tax havens.

Augmenting the basic model used in Section 4, I introduce a treaty coverage (TC) variable, expressed by the number of treaties signed by the non-haven country with tax havens other than j. An additional treaty signed is expected to increase the deposits held in a haven which has not signed a treaty, resulting in a positive coefficient for the interaction term TC and "no treaty" pair (shown as 1-Signed). Following Johannesen and Zucman (2014), I construct a second measure of treaty coverage which weighs treaties according to their importance. For each country i and haven j, I compute the share of i's deposits in tax havens which were placed in j during 2003, the first year of the sample, when no major treaties were yet signed.

$$[5] \quad log\big(Deposits_{ijq}\big) = \alpha + \beta_1 Signed_{ijq} + \beta_2 Treaty\ coverage_{iq} + TC_{iq} * Signed_j + \beta_4 TC_{iq} * (1 - Signed)_j + \gamma_{ij} + \theta_q + \epsilon_{ijq}$$

Table 6. Treaty Impact on Bilateral Bank Deposits, Account for Deposit Shifting (Reporting Bank: Haven/ Counterparty Saver: Non-Haven.

	(1)	(2)	(3)	(4)
Measure of TREATY COVERAGE	Number of treaties		Weighted share	
Signed	-0.5178***	-0.3384	-0.5338	-0.4137
	(0.0000)	(0.1687)	(0.2086)	(0.3113)
Treaty coverage	-0.0553**	-	-0.7023**	-
	(0.0101)	-	(0.0208)	-
Treaty coverage*Signed	-	-0.1639	-	-2.9109***
	-	(0.2069)	-	(0.0000)
Treaty coverage*(1-Signed)	-	-0.0503**	-	-0.4606
	-	(0.0201)	-	(0.1241)
log(GDP)	0.0882**	0.0877**	0.1060**	0.1067**
	(0.0254)	(0.0262)	(0.0380)	(0.0369)
Constant	1.2378	1.2492	1.4291	1.4143
	(0.1977)	(0.1936)	(0.2469)	(0.2520)
Observations	59,296	59,296	31,445	31,445
R-squared	0.0140	0.0143	0.0078	0.0090
Number of Panel ID	1,435	1,435	515	515
Country pair FE	YES	YES	YES	YES
Time FE	YES	YES	YES	YES

Robust p-values in parantheses (***p<0.01, **p<0.05, *p<0.1)

Note: DTC is controlled for in columns 1 to 4.

Table 6 shows the estimation results. Unlike Johannesen and Zucman (2014), I do not find that an additional treaty signed by the non-haven country increase the deposits held in a haven which has not signed a treaty. Nevertheless, compared to a haven which has signed a treaty, they experience only marginal reductions in deposit, as shown in columns 2 and 4.

Given the somewhat inconclusive evidence, I consider a model in which certain non-haven jurisdictions are also considered as potential destinations for deposit shifting, along with traditional tax havens. These are the US, the UK, and selected European countries including Germany, France, Italy and Spain. In particular, the US is the only major economy which has not committed to reciprocal and automatic exchange of information on financial accounts. While the FATCA intergovernmental agreements require non-US financial institutions to report the identities and assets of US taxpayers to the IRS, this is not reciprocated to other jurisdictions. This is reason to suspect that tax evaders may find US an attractive place to park hidden wealth. For instance, Bloomberg editorial board (28 December 2017) notes: "Financial institutions catering to the global elite, such as Rothschild & Co. and Trident Trust Co., have moved accounts from offshore havens to Nevada, Wyoming and South Dakota. New York lawyers are actively marketing the country as a place to park assets."

The below model includes an interaction term that indicates the change in cross-border deposits non-residents hold in the US after CRS implementation. But given that the US does not have an implementation date, I create a dummy "PostCRS" which equals 1 starting from 2016 when the first wave of CRS adopters started collecting information for exchange in 2017.

[6] $$log(Deposits_{ijq}) = \alpha + \beta_1 Signed_{ijq} * Haven + \beta_2 PostCRS_{ijq} * US_j + Signed_{ijq} * UK_j + \beta_4 Signed_{ijq} * Europe_j + \gamma_{ij} + \theta_q + \epsilon_{ijq}$$

Table 7 shows that deposits in the US significantly increased since 2016, even as there was no change in the UK and reductions in Europe as well as in traditional tax havens. This is consistent with the findings of Casi et al (2018), who find that after the CRS implementation, deposits held in the US are on average 9% higher compared to other non-haven countries and that this effect is both immediate and persistent.

Table 7. Treaty Impact on Bilateral Bank Deposits in Certain Non-Haven Jurisdictions (Reporting Bank: US, UK, and Haven/ Counterparty Saver: Non-Haven)

	(1)	(2)	(3)	(4)
CRS*Haven	-	-0.4121**	-0.4133**	-0.4165**
	-	(0.0260)	(0.0255)	(0.0243)
PostCRS*US	0.3087***	0.3094***	-	-
	(0.0000)	(0.0000)	-	-
CRS*UK	0.0278	-	0.0280	-
	(0.6758)	-	(0.6740)	-
CRS*Europe	-0.0571*	-	-	-0.0588**
	(0.0559)	-	-	(0.0493)
log(GDP)	0.2422***	0.2384***	0.2417***	0.2502***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Constant	-3.0572***	-2.9670***	-3.0467***	-3.2507***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Observations	159,499	159,499	159,499	159,499
R-squared	0.0081	0.0081	0.0073	0.0075
Number of Panel ID	4,432	4,432	4,432	4,432
Country pair FE	YES	YES	YES	YES
Time FE	YES	YES	YES	YES

Robust p-values in parantheses (***p<0.01, **p<0.05, *p<0.1)

Note: "Europe" consists of selected countries including Germany, France, Italy and Spain.

5.2.Sham Corporations

Some tax havens such as British Virgin Islands and Panama are well known for hosting sham corporations, thanks to flexible corporate laws that make it simple to create new companies without much activities. How did deposits held through sham corporations respond to the recent wave of tax treaties? To answer this, I regress haven-haven deposits on the number of treaties (or their weighted share) concluded by banking havens with non-haven countries. The idea is that with anti-money laundering regulations and other international pressures, banks are increasingly required to know who the ultimate owner of the assets they manage – in which case, haven-haven flows would also be affected.

[7] $log(Deposits_{ijq}) = \alpha + \beta_1 Signed_{ijq} + \beta_2 Treaty\ coverage_{jq} + \beta_3 TC_{jq} * Haven_i + \beta_4 TC_{jq} * Nonhaven_i + \gamma_{ij} + \theta_q + \epsilon_{ijq}$

Table 8 shows the expected negative signs for treaty coverage of the banking haven with non-havens, in columns 2 and 4. In particular, the reduction is deposit is significant based on the weighted treaty coverage. In comparison, haven-haven treaties do not have a significant impact on haven-haven deposits, in line with the findings of Johannesen and Zucman (2014).

Table 8. Treaty Impact on Bilateral Bank Deposits, accounting for Sham Corporations (Reporting Bank: Haven/ Counterparty Saver: Haven)

	(1)	(2)	(3)	(4)
Treaty coverage, banking haven with non-havens	0.0003	-0.0089**	-0.2817	-0.5821**
	(0.9446)	(0.0199)	(0.2944)	(0.0144)
Treaty coverage, banking haven with other havens	-	0.1967*	-	1.5956
	-	(0.0591)	-	(0.1398)
Constant	4.7440***	4.7941***	5.3280***	4.8016***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Observations	3,257	3,257	6,807	3,257
R-squared	0.0000	0.0301	0.0019	0.0281
Number of Panel ID	87	87	146	87
Country pair FE	YES	YES	YES	YES
Time FE	YES	YES	YES	YES

Robust p-values in parantheses (***p<0.01, **p<0.05, *p<0.1)

Similar to the case of deposit shifting, however, there is a possibility that certain non-haven jurisdictions are increasingly hosting the sham corporations. Again, there is reason to suspect that tax evaders would find the US an attractive place to create sham corporations as part of their offshore evasion network. The US Congress has to date opposed a public register of ultimate beneficial ownership (UBO) for companies, LLCs and trusts. In comparison, countries such as the UK launched its first public UBO registry in 2016 for about three million UK companies and LLCs and took further measures in 2018 to expand the registry coverage.

I consider three models based on the "PostCRS" dummy which equals 1 starting from 2016 when the first wave of CRS adopters started collecting information for exchange in 2017. I create a similar dummy which equals 1 starting from 2017 when the second wave of CRS adopters also started collecting information. Equation [8] simply tests haven-haven flows as in Table 8 but based on a non-country specific dummy, and I expect a negative coefficient as found earlier. Equation [9] tests whether sham corporations in tax havens increased their deposits in the US after the CRS implementation, in which case the coefficient would be positive. Lastly, equation [10] tests the possibility that US is becoming the choice location for creating sham corporations. For instance, a non-US taxpayer could set up an investment entity in the US, through which he could hold deposits in a Swiss bank.

[8] $$log\left(Deposits_{haven,haven,q}\right) = \alpha + \beta_1 PostCRS_q + \gamma_{haven,haven} + \theta_q + \epsilon_{haven,haven,q}$$

[9] $$log\left(Deposits_{haven,US,q}\right) = \alpha + \beta_1 PostCRS_q + \gamma_{haven,US} + \theta_q + \epsilon_{haven,US,q}$$

[10] $$log\left(Deposits_{US,nonhaven,q}\right) = \alpha + \beta_1 PostCRS_q + \gamma_{US,nonhaven} + \theta_q + \epsilon_{US,nonhaven}$$

Table 9 shows the expected signs, although only estimated coefficents for the haven-to-US deposits are statistically significant, in line with what is found in Table 7 under deposit shifting. While the coefficient on nonhaven-to-US deposits are not statistically significant, the two PostCRS dummies in columnes 5 and 6 suggest that the deposits are increasing at at faster pace over time.

Table 9. Evolving Landscape in the Wake of CRS Implementation

	(1)	(2)	(3)	(4)	(5)	(6)
Reporting Bank	Haven		US		Non-haven	
Counterparty Saver	Haven		Haven		US	
PostCRS (2016)	-0.0890	-	0.3059**	-	0.0276	-
	(0.3882)	-	(0.0336)	-	(0.8573)	-
PostCRS (2017)	-	-0.0998	-	0.3293**	-	0.1352
	-	(0.3334)	-	(0.0165)	-	(0.3378)
log(GDP)	0.0015	-0.0056	0.7057***	0.7399***	-0.2901	-0.4158
	(0.9948)	(0.9810)	(0.0001)	(0.0000)	(0.5844)	(0.4548)
Constant	4.2996	4.4613	-9.5226***	-10.3149***	17.6108	21.4197
	(0.4383)	(0.4252)	(0.0060)	(0.0031)	(0.2823)	(0.2137)
Observations	2,089	2,089	550	550	767	767
R-squared	0.0026	0.0026	0.3496	0.3426	0.0040	0.0078
Number of Panel ID	64	64	13	13	15	15
Country pair FE	YES	YES	YES	YES	YES	YES
Time FE	YES	YES	YES	YES	YES	YES

Robust p-values in parantheses (***p<0.01, **p<0.05, *p<0.1)

6. Conclusion (บทสรุป)

International tax cooperation is critical if countries want to maintain the integrity of their tax base. Without exchange of information between jurisdictions, personal income taxes particularly on capital income would be difficult to enforce effectively. Given the limitations of information exchange upon request, countries have begun to shift towards automatic exchanges, which are believed to have a much stronger impact on offshore tax evasion.

This paper is an early attempt to provide a more systematic assessment on this issue. As automatic exchanges are still fairly recent, more time would be needed to assess their effectiveness on curbing offshore evasion. Depending on how well the received data could be analysed and applied in tax audits, especially for high net wealth individuals, the lagged effects could be potentially very strong. The overall findings suggest that automatic exchanges, when combined with other measures on beneficial ownership, could help to enhance tax transparency. My paper also finds that deposit shifting remains a challenge, and further treaty network

expansion to all jurisdictions would be desirable, including to jurisdictions which are not typically considered tax havens but nevertheless score high in terms of financial secrecy. Perhaps a broader finding is that offshore tax evasion keeps evolving in response to new policy measures. Sophisticated accounting, legal and financial services for the wealthy will continue to find ways to exploit loopholes in the tax law if not facilitate outright evasion. Therefore, tax authorities should remain vigilant of new and emerging risks to tax compliance, while at the same time implementing new measures in a clear and efficient manner.

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