Master's thesis

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An evaluation of the effect of the Common Reporting Standard on cross-border tax evasion

Master's thesis in Economics
Supervisor: Yabin Wang
June 2023

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Abstract

The extent and consequences of cross-border tax evasion are of great concern to policymakers, and considerable measures have been taken during the last two decades to promote international tax transparency. The Common Reporting Standard (CRS), which was developed by the OECD and approved in 2014, is an international standard that provides for the automatic exchange of financial account information between the tax authorities in the participating countries. In this master's thesis, I evaluate the effect of the CRS on the level of cross-border tax evasion. I rely on a panel dataset containing information on cross-border deposits for 881 country pairs over a period running from Q1 2013 until Q4 2021. The empirical strategy is a two-way fixed effects model. As an extension to the baseline analysis, I investigate if the non-participation of the US in the CRS has led tax evaders to relocate deposits towards the US. I provide evidence that the introduction of the CRS provoked a significant decrease in cross-border deposits held in Offshore Financial Centres (OFC) by residents of OECD and EU countries. The effect is statistically significant and has persisted over time but varies considerably between the OFCs in the sample. Moreover, my analysis shows that US-located cross-border deposits have increased compared to cross-border deposits in other non-offshore countries after the introduction of the CRS. Hence, we cannot rule out that the US is emerging as an attractive deposit location for tax evaders, and it is difficult to draw conclusions about the impact of the CRS on the overall level of cross-border tax evasion.

Sammendrag

Omfanget og konsekvensene av skatteunndragelse på tvers av landegrensene vekker stor bekymring blant politiske beslutningstakere, og i løpet av de siste to tiårene har det blitt iverksatt betydelige tiltak for å fremme internasjonal skattetransparens. Common Reporting Standard (CRS), som ble utviklet av OECD og vedtatt i 2014, er en internasjonal standard for automatisk utveksling av finansiell informasjon mellom skattemyndighetene i deltakerlandene. I denne masteroppgaven evaluerer jeg effekten av CRS på omfanget av skatteunndragelse på tvers av landegrensene. Jeg tar utgangspunkt i et paneldatasett med informasjon om bankinnskudd for 881 landpar over en periode fra 1. kvartal 2013 til 4. kvartal 2021. Den empiriske strategien er en modell med toveis faste effekter. Som en utvidelse av basisanalysen undersøker jeg om USAs manglende deltakelse i CRS har ført til at skatteunndragere har flyttet bankinnskudd til USA. Jeg finner bevis for at innføringen av CRS førte til en betydelig nedgang i bankinnskudd som holdes i offshore-finanssentre (OFC) av personer bosatt i OECD- og EU-land. Effekten er statistisk signifikant og har vedvart over tid, men varierer betydelig mellom finanssentrene i datasettet. I tillegg viser analysen min at bankinnskudd i USA har økt sammenlignet med bankinnskudd i andre non-offshore land etter innføringen av CRS. Vi kan dermed ikke utelukke at USA er en fremvoksende attraktiv lokasjon for skatteunndragelser, og det er vanskelig å trekke konklusjoner om effekten av CRS på det samlede omfanget av skatteunndragelse over landegrensene.

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List of Abbreviations

Abbreviation	*Definition*
AEOI	Automatic Exchange of Information
BIS	Bank of International Settlements
BO	Beneficial Ownership
CBI	Citizenship by investment
CRS	Common Reporting Standard
DD	Difference-in-differences
EOI	Exchange of Information
EOIR	Exchange of Information on Request
FATCA	Foreign Account Tax Compliance Act
FSF	Financial Stability Forum
GDP	Gross Domestic Product
IMF	International Monetary Fund
LBS	Locational Banking Statistics
MAC	Convention on Mutual Administrative Assistance in Tax Matters
OECD	Organisation for Economic Co-operation and Development
OFC	Offshore Financial Centre
RBI	Residence by investment
TWFE	Two-way fixed effects
VDP	Voluntary Disclosure Program

Note to the reader

This master's thesis is written without prejudice about the names, geographical borders or status of sovereignty of the countries and jurisdictions that are cited.

In line with the approach taken by the Bank of International Settlements (BIS), the term country is applied and covers territorial entities that are not states as understood by international law and practice but for which data are reported separately (BIS, 2020). This is done without prejudice about the status of the territory.

Offshore Financial Centre (OFC), international financial centre and tax haven are different terms that historically have been applied to cover more or less the same concept. To simplify the language and improve the readability of the master's thesis, OFC is applied to capture all these terms, e.g. when referencing the previous literature.

1. Introduction

1.1. Research question and paper outline

This master's thesis contributes to the existing literature on the effects of international standards for exchange of financial account information between tax authorities in different countries. These standards are designed to reduce the level of cross-border tax evasion through an increased risk of detection for non-compliant taxpayers. The focus of my analysis is the Common Reporting Standard (CRS), which builds on the concept of Automatic Exchange of Information (AEOI) [1]. The CRS was developed by the OECD in response to a G20 request and approved by the OECD Council on 15 July 2014. The main research question of the master's thesis is: To what extent has the CRS been successful in reducing the level of cross-border tax evasion? The most important contribution is the application of a longer sample period with more recent data than what has been applied in the previous literature on this topic. As an extension to the baseline analysis, I proceed to investigate if we can find evidence of asset relocation towards the US after the introduction of the CRS. The US is the only major economy not yet committed to the CRS, something which constitutes a risk to the efficiency of the standard.

The master's thesis is organised as follows: In Chapter 2, the theoretical framework and institutional background are presented and discussed. Chapter 3 highlights relevant previous literature across two topics: the effect of exchange of information (EOI) on the level of cross-border tax evasion and applied classifications of Offshore Financial Centres (OFCs). Chapter 4 contains a thorough introduction to the dataset and descriptive statistics on the outcome variable. Descriptive evidence on the evolution of cross-border deposits is presented in Chapter 5. In Chapter 6, I provide arguments for the choice of empirical strategy and relevant robustness checks. Empirical results from the baseline analysis and attached robustness checks are included in Chapter 7. Chapter 8 contains the sensitivity analysis of the OFC selection, while Chapter 9 includes results from the extension where potential relocation effects towards the US are investigated. In Chapter 10, I provide a further discussion of the results and the related policy implications, limitations to the analysis as well as relevant extensions for future research.

[1] AEOI is systematic and periodical exchange of a predefined set of information.

1.2. The concept of cross-border tax evasion

A wave of financial globalisation emerged during the 1980s when national authorities worldwide started removing capital controls and the movement of international capital was liberalised. The increased capital mobility across borders has resulted in more diverse financing opportunities as well as a more efficient distribution of capital and risk. The related benefits are substantial, but globalisation has also come with costs. Access to international financial markets provides an opportunity to relocate funds to countries where more beneficial tax rules and a high level of secrecy are offered. Cross-border financial positions that are held to hide assets and income from the home authorities, providing the holder of the assets with the opportunity to avoid paying the taxes that are due, constitute illegal tax evasion behaviour. This phenomenon is of great concern to policymakers for several reasons, as laid out in the following paragraphs.

1.3. Motivation

1.3.1. Consequences of cross-border tax evasion

There are many reasons why the topic of cross-border tax evasion is important. First, limiting the occurrence of tax evasion behaviour can boost domestic resource mobilisation and repatriate considerable amounts of lost tax revenues. In addition, funds that are being held offshore are not generating any economic activity in the home country of the asset owner. Estimations made by Zucman (2013) indicate that around 8% of the global financial wealth of households is held in OFCs and that three-quarters of this go unrecorded. Moreover, according to Alstadsæter et al. (2019), the 0.01% richest households evade about 25% of their taxes, while tax evasion detected in stratified random tax audits is less than 5% throughout the distribution. Based on data from massive leaks from offshore financial institutions, they found evidence that the wealth held in OFCs is extremely concentrated, with the top 0.01% of the wealth distribution owning about 50% of it. We can thus conclude that cross-border tax evasion constitutes a prominent risk to the effective taxation of the wealthiest individuals and can amplify the reproduction of economic inequalities over time.

Secondly, tax evasion behaviour affects the fairness of the tax system. In reality, the taxes that are evaded by some individuals are paid by the rest of society. This aspect gained substantial political attention after the global financial crisis in 2008 when public finances

were put under pressure. If people feel that the tax system is unfair, it can quickly lead to reduced confidence in the authorities and more generally a lack of trust in the public institutions. Moreover, researchers have for a long time been concerned with the impact of non-pecuniary factors such as social norms and tax moral in the tax reporting decision (e.g. Myles & Naylor (1995)). Recent work by Etchart-Vincent et al. (2023) presents evidence that taxpayers tend to conform their own income reporting decision in line with what they observe from other peers. Hence, policymakers might be concerned that the level of tax compliance across the population can evolve in a negative spiral and over time constitute a considerable risk to revenue collection.

Finally, we know that cross-border tax evasion can tie in with other illegal activities like money laundering, corruption, bribery and terrorist financing. Reducing the overall level of tax evasion can therefore also reduce the occurrence of crimes of this type.

1.3.2. The importance of examining the effects of the CRS

It has been time and resource consuming to design an international framework that a broad group of countries could accept and commit to implementing. The work put into the technical framework has been extensive and upon commitment to the standard, the implementation and operational processes put large administrative costs on both the tax authorities and the reporting financial institutions in the participating countries. It is therefore important to ensure that the standard has been successful in reducing the overall level of cross-border tax evasion. Secondly, going forward it will be important to know more about what results we can obtain with the international standards that are already in place. By examining the existing system, policymakers can obtain better knowledge and will be able to make better decisions about adjustments in the future approach to tax transparency.

2. Theory and institutional background

In this Chapter, I start by presenting the theoretical framework for tax evasion behaviour which creates the basis for my hypothesis in the empirical analysis. I then proceed to give a short introduction to the key developments in the context of EOI and present the technical framework of the CRS.

2.1. Theoretical framework: Modelling tax evasion behaviour

As pointed out in Chapter 1, available estimates indicate that tax evasion constitutes a non-neglectable part of the total economic activity. This has motivated economists to develop theories that explain tax evasion behaviour and provide valuable insight for policymakers. Allingham & Sandmo (1972) formalise a model of tax compliance that fits the purpose of my analysis well. This model has the objective of analysing the individual taxpayer's decision of whether and to what extent to avoid taxes by deliberate under reporting of income. The key aspect of the tax declaration decision is that it is a decision under uncertainty. If a given taxpayer fails to report the full income, this does not automatically provoke a penalty. Assuming that the taxpayer already chose to declare less than the actual income, the payoff will in turn depend on whether or not he or she is investigated by the tax authorities. If there is no investigation, it is evident that the taxpayer is better off by under reporting the income, while the opposite is true if an investigation is initiated and the tax evasion behaviour is discovered. Overall, the taxpayer makes the choice of tax evasion by weighing the benefits of under reporting the income against the cost of possible detection and penalty.

Allingham & Sandmo (1972) assume that the taxpayer's behaviour conforms to the Von-Neumann-Morgensterns axioms for behaviour under uncertainty[2]. The utility function has income as the only argument and marginal utility is assumed to be positive and strictly decreasing, implying that the taxpayer is risk-averse. Further, it is assumed that the actual income (W) is exogenously given and unknown to the tax authorities. Tax is levied at a constant rate (θ) on the declared income (X). If the taxpayer is subject to an investigation, a penalty tax rate (π), which is higher than the normal tax rate, is levied on the undeclared part of the income (W-X). The decision variable of the taxpayer is hence the declared income X, which will be chosen to maximize:

$$(1)\ E(U) = (1-p)U(W-\theta X) + pU\big(W-\theta X-\pi(W-X)\big)$$

$$U-utility$$

$$p-probability\ of\ detection$$

$$W-actual\ income$$

$$X-declared\ income$$

[2] The four axioms of Von-Neumann-Morgenstern-rationality are completeness, transitivity, continuity and independence.

$\theta - tax\ rate$

$\pi - penalty\ tax\ rate$

For convenience, we follow the notation of Allingham & Sandmo and define:

$$(2)\ Y = W - \theta X,\ \ Z = W - \theta X - \pi(W - X)$$

Where Y is the income of the taxpayer in the case where no detection occurs, and Z is the income in the case where the taxpayer is subject to an investigation by the tax authorities. The first and second-order conditions for an interior maximum are then given by:

$$(3) - \theta(1-p)U'(Y) - (\theta - \pi)pU'(Z) = 0$$
$$(4)\ D = \theta^2(1-p)U''(Y) + (\theta - \pi)^2 pU''(Z)$$

An interior solution requires that 0<X<W. To see what conditions on parameter values are necessary for such an interior maximum, the expected utility is evaluated at X=0 and X=W. Given the assumption that marginal utility is decreasing in X, we have that:

$$(5)\left.\frac{\partial E(U)}{\partial X}\right|_{X=0} = -\theta(1-p)U'(W) - (\theta - \pi)pU'\big(W(1-\pi)\big) > 0$$
$$(6)\left.\frac{\partial E(U)}{\partial X}\right|_{X=W} = -\theta(1-p)U'\big(W(1-\theta)\big) - (\theta - \pi)pU'\big(W(1-\theta)\big) < 0$$

The conditions can be rewritten as:

$$(5')\ p\pi > \theta\left(p + (1-p)\frac{U'(W)}{U'\big(W(1-\theta)\big)}\right)$$
$$(6')\ p\pi < \theta$$

In (5'), the expression in the bracket is positive and less than 1 and thus giving us a set of positive parameter values that will guarantee the interior solution. The condition in (6') indicates that the taxpayer will choose to under declare the income if the expected tax payment on the undeclared part of the income is lower than the regular tax rate.

Two of the parameters in the model are of particular interest to policymakers, namely the penalty rate and the probability of detection. The penalty rate is set directly by the authorities while the probability of detection can be indirectly controlled through the amount of resources that is spent on detecting tax evasion behaviour. International standards for exchange of information (EOI) between tax authorities affect the level of tax evasion through the channel of probability of detection. In particular, the CRS allows the tax authorities to obtain information on potentially undeclared income earned on assets held abroad that would otherwise not be available. This gives the authorities a better chance of success when conducting further tax investigations, and hence increases the probability of detection of the taxpayers who choose to engage in cross-border tax evasion. The cost related to an increase in the probability of detection will in turn depend on the penalty rate, which varies with the tax and legal system of the taxpayer's residence country.

Let us now investigate how a change in the probability of detection affects the undeclared income in the theoretical model of Allingham & Sandmo (1972). Differentiating equation (3) with respect to p we obtain:

$$(7)\frac{\partial X}{\partial p} = \frac{1}{D}\left(-\theta U'(Y) + (\theta - \pi)U'(Z)\right)$$

This derivative is positive; hence, we know that an increase in the probability of detection always will lead to a larger declared income in our theoretical model. This is also intuitively logical. When the probability of detection increases, it becomes more likely that the tax evader is investigated and must pay the penalty rate on the undeclared part of the income. Overall, the expected payoff for the option of under reporting will hence be reduced, all else equal, and the taxpayer will adjust accordingly by increasing the declared part of the income.

The formal model of the taxpayer's choice situation proposed by Allingham & Sandmo (1972) is a significant simplification of the situation that faces taxpayers in the real world, and it has been shown that it produces some implications that conflict with available empirical evidence. In particular, the model has been criticised for giving too little attention to nonpecuniary factors in the taxpayer's decision to evade taxes, such as the effects of an inherent wish to avoid dishonesty and the social interaction among taxpayers (e.g. Myles and Naylor (1995)). However, the simple model of Allingham & Sandmo (1972) fits our purpose

well, as it does a good job of explaining the behavioural response to changes in the probability of detection, which is the channel through which the CRS is targeting tax evasion.

2.2. Key developments in Tax Transparency and EOI

Under international agreement, jurisdictions can exchange information that is foreseeable relevant for the administration and enforcement of their tax laws. The exchange of information may be upon request, automatic or spontaneous. Exchange of information on Request (EOIR) occurs when a jurisdiction requests from another jurisdiction specific items of information to be used in an ongoing audit or investigation. AEOI occurs when jurisdictions agree to exchange a predefined set of information periodically and systematically. Spontaneous EOI occurs when a jurisdiction, without a prior request from another jurisdiction, sends information that it considers to be useful to this other jurisdiction. Table 1 summarises some of the most important developments within the context of EOI.

Table 1: Summary of key developments in the context of EOI

Exchange framework	***Year***	***Main Challenges***
Exchange of Information on Request	2002	• Requirement of an ongoing tax investigation • Limited information exchange due to the on-request nature
EU Savings Directive	2003	• Limited to EU member states • Significant implementation costs for the tax authorities and financial institutions
US Foreign Account Tax Compliance Act (FATCA)	2010	• The information exchange is not fully symmetrical • Significant implementation costs for the tax authorities and financial institutions
The Common Reporting Standard (CRS)	2014	• Significant implementation costs for the tax authorities and financial institutions • Non-participation of the US

Note: The exchange frameworks of the EU Savings Directive, the FATCA and the CRS provides for AEOI.

Before the financial crisis in 2008, cooperation in tax matters and EOI were largely based on bilateral agreements providing for EOIR. During the financial crisis, as public finances were put under significant pressure, people became more concerned about the large amount of government revenues lost due to tax evasion and tax avoidance. In April 2009 the G20 agreed to a crackdown on tax evasion, declaring that "the era of bank secrecy is over". The Convention on Mutual Administrative Assistance in Tax Matters (MAC), originally

developed by the OECD and the Council of Europe in 1988, was opened for signature to non-OECD and non-Council of Europe countries in 2011 (O'Reilly et al., 2019). One of the key benefits of the MAC is its multilateral approach, where a single legal basis provides for multi-country cooperation in tax matters. Currently, 147 jurisdictions are participants to the MAC, and all participants are required to exchange information on-request with other signatories (OECD, 2023b).

The adoption of the EU Savings Directive[3] in 2003 marked the first step towards a multilateral approach to AEOI. The directive put a requirement on member states to exchange information on interests paid to achieve effective taxation in the member state where the taxpayer is resident for tax purposes. The scope of the Directive was nonetheless limited, as it concerned only member states of the EU. The Foreign Account Tax Compliance Act (FATCA), also providing for AEOI, was passed into US law in 2010. Through FATCA, foreign financial institutions are required to disclose the identities of US citizens with financial accounts, as well as the value of the assets in those accounts, to US authorities. Critics of the FATCA claim that it places an unfair burden on foreign banks and financial institutions, and the information exchange is not fully symmetrical (U.S. Department of the Treasury, 2023).

In 2013, the G20 invited the OECD to design and present a new, single standard that would constitute a truly multilateral approach to AEOI. The CRS was approved by the OECD Council on 15 July 2014. The first jurisdictions committed to the CRS at the side-lines of the Global Forum[4] plenary meeting in Berlin in October 2014. As of October 2022, over 4900 bilateral exchange relationships in accordance with the CRS were activated. 110 jurisdictions were due to undertake the first exchanges by 2022, while 5 more are committed to exchanging information by 2023 (OECD, 2017) (OECD, 2023a)[5].

[5] Council Directive 2003/48/EC.
[4] The Global Forum on Transparency and Exchange of Information for Tax Purposes within the OECD works to promote and ensure the effective implementation of the two international standards for EOI (EOIR and AEOI).
[5] A full list of commitments to the CRS can be found here: https://www.oecd.org/tax/transparency/AEOI-commitments.pdf. *(Accessed on 14.05.2023)*

2.3. Technical framework: The Common Reporting Standard

2.3.1. What is covered by the standard?

The CRS sets out the financial account information to be exchanged, the financial institutions required to report, the different types of accounts and taxpayers covered, as well as due diligence procedures to be followed by financial institutions. In an effort to limit the opportunities to circumvent the standard, the reporting regime requires a broad scope across three dimensions: (1) The scope of financial information reported; (2) The scope of account holders subject to reporting; and (3) The scope of financial institutions required to report. (OECD, 2017, p.12).

Financial accounts that need to be reviewed include depository accounts, custodial accounts, equity and debt interests in certain investment entities, cash value insurance contracts and annuity contracts (OECD, 2017, p. 50–51). In this analysis, I rely on data on depository accounts, but a wide range of other financial assets are also covered by the CRS. Examples of such assets include publicly traded securities held through an investment fund or an equity interest in a trust which engages in financial investment activity. Further, the CRS requires financial institutions to review both individual and entity-held accounts, and to look through certain legal entities or arrangements[6] to identify the true beneficial owner(s) of the account[7] (OECD, 2017, p. 12). Certain financial accounts are seen to have a low risk of being used for tax evasion purposes and are therefore excluded from the need to be reviewed, e.g., term life insurance contracts and retirement and pension accounts.

Once an account is determined to be a reportable account, the financial institution is required to report information in relation to that account that is sufficient to identify the account holder or, if relevant, the beneficial owner, and establish whether there exists a substantial compliance risk for that account holder. The compliance risk relates to whether the account holder has properly declared the relevant financial information to the tax authorities in the jurisdiction where the taxpayer is resident for tax purposes. The required information includes (OECD, 2018, p.99):

[6] Examples of relevant entities can be a shell company or certain trusts and partnerships.
[7] A beneficial owner is a natural person who ultimately owns or controls an interest in a legal entity or arrangement.

- **Identification information**: Information for the automatic exchange partner to be able to identify the account holder concerned.
- **Account information**: Information to identify the account and the financial institution where the account is held.
- **Financial information:** Information on the activity taking place in the account and the account balance.

Financial institutions report information on relevant accounts and account holders to the tax authorities in the jurisdictions where the financial institution is located. Thereafter, this information is exchanged by the tax authorities with the jurisdiction(s) of residence of the relevant taxpayer (OECD, 2018, p.8). Exchanges take place on an annual basis, and relate to information collected in the preceding year, e.g., exchanges undertaken in 2018 relate to financial account information gathered during 2017.

2.3.2. Strengths and weaknesses of the standard

One of the biggest strengths of the CRS is its extensive country coverage and multilateral nature. An international standard for EOI will only be able to substantially reduce or eliminate cross-border tax evasion if there exist no or few potential relocation opportunities. Even though all major OFCs are participating in the CRS, it is necessary to underline that the non-participation of the US poses a significant risk to the efficiency of the standard in combatting tax evasion. Further, the CRS, which provides for AEOI, is different from the standard for EOIR in one crucial way. The standard for EOIR grants a tax authority the right to request a particular piece of information to progress a tax investigation. The CRS, on the other hand, provides for yearly, automatic exchange of a predefined set of financial account information on reportable accounts held by non-residents. This implies that there exists no requirement of an ongoing investigation for the defined information to be exchanged.

Even if the CRS provides for extensive coverage of reportable institutions, reportable accounts and asset types, it is relevant to point out certain weaknesses that have been exploited by tax evaders to circumvent the standard. The CRS provides countries with the opportunity to add financial institutions to a list of non-reporting institutions, in line with the requirements set out in Section VIII, subparagraph B(1) (OECD, 2017, p. 45). Such financial institutions should present a low risk of being used for tax evasion purposes. Despite this,

certain jurisdictions have exploited this opportunity, e.g. Hong Kong authorities who initially included Occupational Retirement Schemes (ORSE) and Mandatory Provident Funds (MPF), which are pension funds, in this list. These have later become reporting institutions (Chiocchetti, 2020) (The Economist, 2017).

Secondly, the possibility to obtain tax residence status in several OFCs through residence and citizenship by investment (CBI/RBI) schemes provides a way for tax evaders to escape the reporting obligations. This circumvention strategy is commonly referred to as the *redefinition channel*, which exploits the fact that reportable accounts only include accounts held by non-residents of the reporting jurisdiction. If a taxpayer avoids indicating the dual citizenship to the bank, the bank will not know that the taxpayer is in fact a non-resident, and hence it will not perform the required due diligence procedures. In 2018, the OECD published the results of an analysis of over 100 CBI/RBI schemes offered by CRS-committed jurisdictions, identifying the schemes that constitute a potential risk to the integrity of the CRS (OECD, 2018b)[8].

It is also relevant to highlight that even if the coverage of financial asset classes is extensive, not all asset types that are being used for tax evasion purposes are covered by the CRS. Examples of such asset classes are crypto assets and non-financial assets like real estate and art. Finally, from an economic point of view, it is important to consider the significant costs CRS participation poses on the tax authorities and the financial institutions in the participating countries. Such implementation costs can only be defended if we are confident that they are exceeded by the benefits of the standard. This question of the overall profitability of the international standard is highly relevant but will receive no further attention in this master's thesis.

3. Previous literature

Tax evasion behaviour has been a topic of interest for researchers for many decades. Areas such as tax evasion and inequality, e.g. Alstadsæter et al. (2019), and behavioural responses to policy changes, e.g. Slemrod & Yitzhaki (2000), have received particular attention.

[8] The schemes identified were operated by Antigua and Barbuda, (the) Bahamas, Bahrain, Barbados, Colombia, Cyprus, Dominica, Grenada, Malaysia, Malta, Mauritius, Monaco, Montserrat, Panama, Qatar, Saint Kitts and Nevis, Saint Lucia, Seychelles, Turks and Caicos Islands, United Arab Emirates and Vanuatu.

Further, many have also investigated the financial flows to and from OFCs, the factors driving these flows and how much of this wealth is held there for purposes of concealing the ownership. As the literature related to tax evasion, and more particularly to OFCs, is extensive, I focus only on the areas that are of specific interest for my analysis.

First, I present the results from some of the most influential research examining the effect of international standards for EOI on cross-border deposits held in OFCs. This will provide a useful point of reference for my analysis. Secondly, I acknowledge the importance the selection of OFCs constitutes for my analysis. There exists no clear consensus in the literature and the political arena for a comprehensive list of OFCs. Therefore, I proceed to present the most influential classifications of OFCs and explain how these differ from each other.

3.1. Literature examining the effect of international standards for EOI

Table 2 summarises the main results reported in the literature on EOI, which varies considerably both in terms of size and significance. The presented results are from analyses that are based on the BIS Locational Banking Statistics. Chiocchetti (2020) and Ahrens & Bothner (2019) also investigate the effect of EOI using data on portfolio investments published by the International Monetary Fund (IMF), but these results will not be discussed further as this asset class is not the focus of this analysis.

The research approach differs mainly across three dimensions: the time period considered, the applied selection of OFCs and the structure of the sample. Johannesen & Zucman (2014) and O'Reilly et al. (2019) are relying on a sample including only reporting banks in OFCs. By comparison, the majority of the literature includes a control group consisting of deposits in non-offshore countries by residents of other non-offshore countries. This is the case for Casi et al. (2020), Beer et al. (2019) and Ahrens & Bothner (2019). Menkhoff & Miethe (2019) and Chiocchetti (2020) are exploiting all 4 subsets of the BIS LBS data, including deposits in OFCs and non-offshore countries from savers in both OFCs and non-offshore countries respectively.

Table 2: Summary of main results reported in the literature on EOI

Study	***Sample length***	***Offshore locations in sample***	***Reported effect of EOIR***	***Reported effect of the CRS***
Ahrens and Bothner (2019)	2009 – 2017	Austria, Belgium, Chile, Guernsey, Isle of Man, Jersey, Luxembourg, Macao, Switzerland	n.a.	-41%
Beer et al. (2019)	1995 – 2018	Austria, Bahamas, Bahrain, Belgium, Bermuda, Chile, Curacao, Cyprus, Guernsey, Hong Kong, Isle of Man, Jersey, Luxembourg, Macao, Panama, Singapore, Switzerland	No significant effect	-35%
Casi et al. (2020)	2014 – 2017	Guernsey, Hong Kong, Isle of Man, Jersey, Luxembourg, Switzerland	n.a.	-11.5%
Chiocchetti (2020)	2009 – 2019	Austria, Belgium, Chile, Guernsey, Ireland, Isle of Man, Jersey, Luxembourg, Switzerland	n.a.	No significant effect
Johannesen & Zucman (2014)	2003 – 2011	Austria, Belgium, Cayman Islands, Chile, Cyprus, Guernsey, Isle of Man, Jersey, Luxembourg, Macao, Malaysia, Panama, Switzerland	- 11%	n.a.
Menkhoff & Miethe (2019)	2003 – 2017	Austria, Bahamas, Bahrain, Belgium, Bermuda, Cayman Islands, Chile, Guernsey, Hong Kong, Ireland, Isle of Man, Jersey, Luxembourg, Malaysia, Panama, Singapore, Switzerland	-27.5%	-43%
O'Reilly et al. (2019)	2000 – 2019	Bahrain, Bahamas, Bermuda, Netherlands Antilles / Curacao, Cayman Islands, Cyprus, Guernsey, Hong Kong, Isle of Man, Jersey, Luxembourg, Macao, Malaysia, Panama, Singapore, Switzerland	No significant effect	-22%

Note: The reported effects indicate the average decrease in cross-border deposits held in OFCs by residents in non-offshore countries upon introduction of EOIR or the CRS. The specification of the CRS variable varies between the articles.

Johannesen & Zucman (2014) were among the first to examine the effectiveness of EOIR treaties and find that these have a statistically significant, but quite modest impact on cross-border bank deposits in OFCs, with an average decline of 11% upon treaty implementation. More importantly, results indicate that treaties signed by OFCs did not trigger any significant repatriation effects, but rather a relocation of deposits to other non-compliant offshore locations. More recent articles by O'Reilly et al. (2019), Menkhoff & Miethe (2019) and Beer et al. (2019), investigate the effects of agreements for both EOIR and AEOI. Only Menkhoff & Miethe find a statistically significant effect of EOIR, reporting an average decrease of 27.5% in OFC deposits by residents in non-offshore locations. Despite this result, the authors

also provide evidence that the effect of EOIR has weakened over time, indicating that tax evaders found new ways to circumvent the EOIR standard.

O'Reilly et al. (2019), Menkhoff & Miethe (2019) and Beer et al. (2019) are all reporting a significant negative effect of the CRS on cross-border deposits in OFCs. Multiple more recent contributions to the literature on the effects of EOI are focusing solely on the effects of AEOI, such as the articles published by Casi et al. (2020), Ahrens & Bothner (2019) and a thesis by Chiocchetti (2020). These articles rely on a more limited sample period to avoid the period during which countries entered into agreements providing for EOIR. Casi et al. report a highly statistically significant decrease of 11.5% in cross-border deposits in OFCs post CRS introduction, whereas Ahrens & Bothner report a considerably more sizeable decrease of 41%. In contrast to much of the literature on EOI, Chiocchetti are including a wide range of control variables in her fixed effects structure. She is unable to report a significant effect of the CRS on cross-border deposits in OFCs.

Finally, both Casi et al. (2020) and Ahrens & Bothner (2019) are investigating potential relocation effects towards the US. These analyses are motivated by the fact that the US is the only major economy not yet committed to the CRS. Ahrens & Bothner conclude that the deposits of non-offshore savers in the US did not increase relative to the deposits held in other non-offshore locations. Casi et al., on the other hand, provide evidence that, after CRS introduction, the outstanding volume of cross-border deposits held in the US increased on average by 10% more compared to those in other non-offshore locations.

3.2. Offshore Financial Centres

Offshore Financial Centres, International Financial Centres and tax haves are phrases that might differ slightly in their connotation, but that have been used almost interchangeably in the previous literature (Hines, 2010). In general, OFCs host a relatively large number of financial institutions engaged primarily in business with non-residents, and the financial systems have large external assets and liabilities compared to the size of the domestic economy. Hence, the word "offshore" is not a reference to the geographical location, but rather the prevalence of non-resident financial activity. Common features of OFCs also include low or zero taxation, light financial regulation and a high level of secrecy (IMF, 2000). This in turn encourages investments from foreign residents and foreign-owned legal

entities. Many attempts have been made to identify and list offshore financial centres, most of which will not be discussed further here. Table 3 summarises the lists set out by the OECD, the Financial Stability Forum (FSF) and the IMF. These constitute some of the most influential classifications in the international political landscape.

As part of the project on harmful tax competition, the OECD Committee of Fiscal Affairs published a report defining a set of factors to be used to identify tax havens and harmful tax practices (OECD, 1998). Based on these factors, the OECD developed and published a list of 41 tax havens including mostly small jurisdictions and a list of 47 harmful regimes in 21 OECD countries (OECD, 2000, p.12-14)[9]. The same year, the FSF presented a list of 42 OFCs based on several regulatory characteristics of the jurisdictions, largely similar to the criteria applied by the OECD (FSF, 2000). However, this list included some OECD members and multiple Asian financial centres that were not considered in the OECD tax haven list. The IMF initiated an OFC program in June 2000, where it addressed concerns about potential risks posed to other financial systems by activities undertaken in offshore centres (IMF, 2003). In this program, the IMF relied on the list produced by the FSF and four additional jurisdictions.

In more recent years, several researchers have made an effort to develop statistical methods to classify OFCs from non-OFCs. In an IMF working paper (Zoromé, 2007), a new methodology distinguishes OFCs based on their macroeconomic features as opposed to relying on more subjective presumptions about activities or regulatory frameworks. Zoromé identified 80% of the OFCs included in the IMF list (2000), in addition to three new OFC countries (Latvia, Uruguay, UK). Further, Pogliani & Wooldridge (2022) make an effort to improve previous methodologies by focusing on intermediation activity inherent to OFCs. They identify a core set of 12 OFC over the period 1995-2020, but the set of countries varies with time and different measures of activity. Such contributions that are based on a quantitative methodology constitute a valuable addition to the more traditional OFC lists that are based mostly on the regulatory characteristics of the countries. It is also worth mentioning that definitions proposed by international organisations might be vulnerable to political

[9] These lists have evolved over time as jurisdictions have made commitments to tax transparency and EOI. The original lists are included in Table 3.

influence. Despite this, , I will rely on the original IMF selection (2000), as this list is closely related to the majority of selections that have been applied in the previous literature.

Table 3: Lists of tax havens, harmful tax regimes and OFCs

Tax Havens (OECD, 2000)	**Harmful tax regimes (OECD, 2000)**	**OFCs (FSF, 2000)**	**OFCs (IMF, 2000)**
Andorra	Australia	Andorra	Andorra
Anguilla	Belgium	Anguilla	Anguilla
Antigua & Barbuda	Canada	Antigua & Barbuda	Antigua & Barbuda
Aruba	Finland	Aruba	Aruba
Bahamas (The)	France	Bahamas (The)	Bahamas (The)
Bahrain	Germany	Bahrain	Bahrain
Barbados	Greece	Barbados	Barbados
Bermuda	Hungary	Bermuda	Bermuda
Belize	Iceland	Belize	Belize
British Virgin Islands	Ireland	British Virgin Islands	British Virgin Islands
Cayman Islands	Italy	Cayman Islands	Cayman Islands
Cooks Islands	Korea	Cooks Islands	Cooks Islands
Cyprus	Luxembourg	Costa Rica	Costa Rica
Dominica	Netherlands	Cyprus	Cyprus
Gibraltar	Norway	Gibraltar	Dominica
Grenada	Portugal	Guernsey	Gibraltar
Guernsey	Spain	Hong Kong	Grenada
Isle of Man	Sweden	Ireland	Guernsey
Jersey	Switzerland	Isle of Man	Hong Kong
Liberia	Turkey	Jersey	Ireland
Liechtenstein	United States	Lebanon	Isle of Man
Maldives		Liechtenstein	Jersey
Malta		Luxembourg	Lebanon
Marshall Islands		Macao	Liechtenstein
Mauritius		Malaysia	Luxembourg
Monaco		Malta	Macao
Montserrat		Marshall Islands	Malaysia
Nauru		Mauritius	Malta
Netherlands Antilles		Monaco	Marshall Islands
Niue		Nauru	Mauritius
Panama		Netherlands Antilles	Monaco
Samoa		Niue	Montserrat
San Marino		Panama	Nauru
Seychelles		Samoa	Netherlands Antilles
St. Lucia		Seychelles	Niue
St. Kitts & Nevis		Singapore	Palau
St. Vincent and the Grenadines		St. Lucia	Panama
Tonga		St. Kitts & Nevis	Samoa
Turks & Caicos Islands		St. Vincent and the Grenadines	Seychelles
US Virgin Islands		Switzerland	Singapore
Vanuatu		Turks & Caicos Islands	St. Lucia
		Vanuatu	St. Kitts & Nevis
			St. Vincent and the Grenadines
			Switzerland
			Turks & Caicos Islands
			Vanuatu

Note: Bermuda, Cayman Islands, Cyprus, Malta, Mauritius and San Marino were found to meet the tax haven criteria but were not included in the list in the 2000 Progress Report because they had made commitments to improve tax transparency and EOI before its publication. Sources: (OECD, 2000, p.12-14, 17) (Zoromé, 2007, p. 23)

4. Data

This chapter provides details on the data and variables applied in the analysis. First, I present details on the CRS variable and provide arguments for its alternative specifications. I then proceed to define the OFC variable and the outcome variable and give details on the BIS LBS data that have been applied. Finally, I give a short introduction to the other variables in the dataset, before relevant descriptive statistics are presented.

Table 4: List of variables in the dataset

Variable name	***Type***	***Definition***
CRS_LawDepL	Dummy	Switches on when the CRS is implemented into domestic law in the reporting country.
CRS_EffDepL	Dummy	Switches on when the CRS came into effect in the reporting country.
CRS_firstwave	Dummy	Switches on for all country pairs when the CRS came into effect for the first wave of adopters.
CRS_commitment	Dummy	Switches on for all country pairs when the first countries announced their commitment to implement the CRS.
log_deposits	Continuous	Log transformation: ln(deposits). The amount of outstanding cross-border deposits from the non-bank sector.
OFC	Dummy	=1 for all country pairs with an OFC as the reporting country.
CRS_LawDepL_OFC	Dummy	Interaction variable: CRS_LawDepL * OFC
CRS_firstwave_OFC	Dummy	Interaction variable: CRS_firstwave * OFC
CRS_EffDepL_OFC	Dummy	Interaction variable: CRS_EffDepL * OFC
CRS_commitment_OFC	Dummy	Interaction variable: CRS_commitment * OFC
US	Dummy	=1 for all country pairs with the United States as the reporting country.
CRS_firstwave_US	Dummy	Interaction variable: CRS_firstwave * US
FATCA	Dummy	Switches on when a FATCA agreement entered into force between the countries in a given country pair.
SVD	Dummy	Switches on in the period when a temporary voluntary disclosure program is active in the counterparty country in a given country pair.
FATCA_OFC	Dummy	Interaction variable: FATCA * OFC
SVD_OFC	Dummy	Interaction variable: SVD * OFC
log_GDP_repcountry	Continuous	Log transformation: ln(GDP_repcountry). The yearly current USD GDP of the reporting country.
log_GDP_counterparty	Continuous	Log transformation: ln(GDP_counterparty). The yearly current USD GDP of the counterparty country.

4.1. The Common Reporting Standard

The treatment variable is an interaction variable between the dummy for OFCs and the dummy for the post-CRS period. The CRS variable is a dummy variable that switches on at

the time of the introduction of the CRS. Due to the reciprocal nature of the standard, in practice, exchanges under the CRS start when both parties in the country pair have implemented the appropriate legislation[10] (OECD, 2017). However, one might expect the tax evader to react when the CRS is introduced in the OFC if there exists an expectation that it will be implemented in the resident country of the tax evader at a later moment. I choose to consider only reporting country introduction dates, as I expect this choice to have a limited impact on the validity of the results and it simplifies the coding of the CRS variable. Further, the choice of CRS specification depends on the assumptions we make about the behavioural response of the tax evaders. One might be concerned that there exist considerable anticipation effects[11] already from the moment when countries first announced their commitment to implement the CRS[12]. However, results from the previous literature differ in their conclusion about such anticipation effects. It is intuitively logical that individuals who engage in aggressive tax evasion behaviour through OFCs will be less risk-averse than the average taxpayer. Naturally, such individuals will also respond to changes in the probability of detection, but one might expect them to wait until the moment when the increased risk becomes a reality.

I am following the approach taken by Casi et al. (2020) and run the baseline regressions applying 3 alternative specifications of the CRS variable, laid out in Chapters 4.1.1., 4.1.2. and 4.1.3. This allows us to investigate whether the size and significance of the estimation results will vary with the applied specification. It is nonetheless relevant to underline that it remains a weakness to the analysis that we possess no absolute evidence on the reaction patterns of the tax evaders. A comprehensive list of the applied CRS introduction dates is included in Appendix A.2.

4.1.1. Country specific dates for CRS implementation into domestic law

In this specification, the CRS variable switches on when the CRS is implemented into domestic law in the reporting country. For example, the CRS variable switches on in the second quarter of 2016 for all country pairs with Hong Kong as the reporting country, because the CRS was implemented in June 2016 in Hong Kong. When relying on the country

[10] As set out in Paragraph 3 in Section 3 of the Competent Authority Agreement.
[11] In this context, anticipation effects refer solely to the relocation of cross-border deposits prior to CRS implementation.
[12] On October 29 2014, at the side-lines of the Global Forum plenary meeting, the majority of Global Forum members committed to implement the CRS. This included all reporting countries in our dataset (OECD, 2014).

specific dates for CRS implementation, we will be able to capture any potential relocation effects that occur between implementation and the effective date. However, the implementation date for the countries in our dataset is usually quite close to the effective date.

4.1.2. Country specific CRS effective dates

In the second specification, the CRS variable switches on in the moment when the CRS came into effect in the reporting country. The underlying assumption is that the tax evader will wait to relocate the offshore assets until the moment when financial institutions start collecting financial account information. For example, for all country pairs with Switzerland as the reporting country, the CRS variable switches on in the last quarter of 2016. Swiss financial institutions started collecting information from 2017 onwards, so that the tax evader would have to remove assets and close the relevant account(s) before 31 December 2016 to fully avoid detection (OECD, 2023a) (OECD, 2017, p.25).

4.1.3. CRS effective date for the first wave adopters

Casi et al. (2020) argue that there might exist other concurring events affecting the level of tax evasion that are systematically related to the implementation of the CRS at the individual country level. Therefore, an alternative specification with a post-period dummy that is constant across all observations is applied, switching on at the CRS effective date for the large first wave of adopters. The first exchanges for this group were undertaken in 2017, based on information collected during 2016. Implicitly, when applying this specification, we assume that there will be no anticipation effects for the first wave adopters prior to the moment when the CRS came into effect. However, any potential anticipation effects for the second wave of adopters would be captured, and it can therefore constitute a good compromise.

4.2. Offshore Financial Centres

The treatment group includes all country pairs in our dataset with a reporting country that is defined as an OFC according to the IMF list[13]. A dummy variable is equal to one for all such country pairs. The interaction between the OFC variable and the CRS variable constitutes our

[13] A full list of the OFC selection applied in the analysis is included in Table 3 on p.16.

treatment variable, switching on after CRS introduction for the treatment group. As laid out in Chapter 3, there exists no clear consensus on a selection of offshore locations. Misclassification of countries into offshore and non-offshore groups might lead to bias in estimation results and it is therefore important to give considerable attention to this issue. In Chapter 8, I proceed to discuss issues related to the OFC selection and perform a sensitivity analysis of the results from the baseline analysis.

4.3. Cross-border deposits

The outcome variable is the outstanding amount of cross-border deposits made by individuals and entities in the non-bank sector. The variable measures stocks as opposed to flows and does hence not say anything about the movements that occur during a given period. By restricting the scope to the cross-border deposits from the non-bank sector, we omit interbank deposits made between banks which we do not expect to be used for tax evasion purposes. The data is reported on a quarterly basis and in millions of USD.

4.3.1 Data source

Data on cross-border deposits is gathered from the BIS LBS. The BIS compiles and publishes statistics on the international business of banks. The LBS captures outstanding financial assets and liabilities of internationally active banks located in a set of reporting countries against a wide range of counterparty countries. The reporting countries are those with authorities that participate in the collection of international banking statistics, while the counterparty countries are where the holders of the international assets or liabilities are located (BIS, 2019). I rely on the publicly available dataset and exploit the data in two different ways: In Chapter 5, where descriptive evidence on the evolution of cross-border deposits is presented, I rely on aggregate data which contains information on the total outstanding amount of cross-border deposits in each reporting country. The reporting countries in our dataset also report bilateral data containing information on the outstanding amounts against a number of specific counterparty countries, which is the data applied in the regression analysis.

4.3.2. Data coverage

There are 8 countries included in the IMF OFC selection that report bilateral data on the non-bank sector's cross-border deposits to the BIS: Guernsey, Hong Kong SAR, Ireland, Isle of

Man, Jersey, Luxembourg, Macao SAR and Switzerland. Even though this OFC coverage is limited compared to the full list of OFCs, estimations by Fichtner & Hennig (2013) show that 6 of these are among the 30 largest global destinations for foreign financial assets[14]. This indicates that the combined size of the financial sectors in the included OFCs is significant from a global perspective. In addition to these 8 OFCs, the bilateral dataset contains information on 21 reporting countries defined as non-offshore. On the counterparty side, I have selected all countries that are OECD and/or EU members and not included in our OFC selection. Evidence provided by Zucman (2013) suggests that offshore assets belong mainly to residents of rich countries and in particular to Europeans. Secondly, OECD and EU counties are generally facing similar fiscal rules and regulations, which in turn provide similar incentives and ensure a high level of cross-country comparability. Finally, we can also rule out that changes in cross-border deposits are driven by political instability or war, which is generally not present in these countries.

I include in the sample all country pairs with enough data available and end up with an unbalanced panel containing information on 881 country pairs. Others, such as Casi et al. (2020), rely on a balanced panel instead, to ensure that the same country pairs are present throughout the sample period. This can help rule out the possibility that the estimated effect is driven by country pair-year-specific macroeconomic shocks affecting the country pairs at different moments in time. However, balancing my dataset results in a loss of 29% of the observations and 294 of the country pairs in the unbalanced sample. In addition, we lose all country pairs with either Hong Kong SAR or Macao SAR as the reporting country, which is a considerable limitation as these constitute 25% of the original OFC coverage. I have therefore chosen to rely on an unbalanced panel but exclude country pairs with very limited data coverage[15]. To limit the focus of the analysis to the CRS, I choose a sample period running from the first quarter of 2013 until the last quarter of 2021. Setting the sample start to Q1 2013, we omit the implementation of EOI agreements for EOIR purposes only, which would be time-consuming to control for. Further, more recent data is included in an effort to investigate the persistence of the results reported in the previous literature.

[14] These include (in descending order): Luxembourg, Ireland, Switzerland, Hong Kong SAR, Jersey and Guernsey.
[15] I have excluded all country pairs for which there is less than 4 observations available on each side of the treatment. For a comprehensive list of the excluded country pairs, see Appendix A.5.

4.3.3 Strengths and weaknesses of the data

The main advantage of the BIS LBS data is the extensive coverage over time and across countries. Being able to decompose between the bank and non-bank sector deposits increases the precision of the analysis, even though we are unable to identify the exact portion of non-bank cross-border deposits that are held offshore for tax evasion purposes. Using deposit data, we are only considering one type of wealth held by households in OFCs and are unable to investigate the effects on other asset types also covered by the CRS. The Swiss National Bank has previously reported that about 75% of funds held by foreigners in Switzerland are equities and bonds, while only 25% are held as deposits (Zucman, 2013). However, as the CRS affects all asset classes similarly, it is reasonable to assume that the response in bank deposits constitutes a good proxy for the response in the overall stock of offshore wealth. Finally, the arguably most significant drawback of the data is that it provides information on immediate rather than ultimate ownership. This might lead to a misattribution of wealth in certain instances and can confound estimation results.

In theory, we would prefer to compare the behavioural changes in depositing activity between reporting countries that belong to the same group (OFCs) before and after treatment, as this will increase the probability that the common trend assumption is fulfilled. However, when relying solely on the publicly available data from BIS LBS, there are few reporting- and counterparty countries available that are not participating in the CRS. Among the reporting countries in the applied sample, only Chinese Taipei and the US are not committed to the CRS. Further, the expectation is that there exists no tax evasion of the type non-offshore to non-offshore locations, due to the lack of incentives that exists to evade taxes between such countries. Under this assumption, deposits of the type non-offshore in non-offshore constitute a valid control group.

4.4. Other variables

4.4.1. FATCA

The US has entered into bilateral agreements with many countries that provide for the automatic exchange of financial account information. The information on such bilateral agreements is collected through the web page of the US Treasury Department (U.S. Department of the Treasury, 2023). This information is coded in a dummy variable switching

on for the affected country pair at the moment when the FATCA agreement entered into force[16].

4.4.2. Voluntary Disclosure Programs

Information on relevant temporary VDPs in force during the sample period is taken from Chiocchetti (2020). A dummy variable SVD switches on when a program enters into effect for a given country pair and stays switched on until the program is terminated.

4.4.3. GDP Data

Most of the GDP data is collected from the World Bank Databank (World Bank, 2023). The data contains information on the current USD GDP, i.e. a measure of the GDP in a given country using current prices, converted in the year the data was reported. Certain countries in the dataset did not have available GDP data from the World Bank for the full sample period. These include the Channel Islands (Guernsey and Jersey), the Isle of Man and Chinese Taipei. I found GDP data published locally by the authorities of Guernsey and Jersey (States of Jersey, n.d.) (States of Guernsey, n.d.). These GDP numbers were converted from GBP to USD using the World Bank official exchange rate. The Isle of Man had missing data for 2020 and 2021. I assumed a growth rate equal to the average for all high-income countries and calculated 2020 and 2021 GDP estimates based on this assumption. GDP data on Chinese Taipei was collected from the IMF (2023).

[16] A full list of the country specific implementation dates for the FATCA is included in Appendix A.3.

4.5. Descriptive statistics

In Table 5, descriptive statistics on the outcome variable in the regression analysis are presented. The first three lines give the mean value across all observations, as well as for OFCs and non-offshore reporting countries separately. In addition, I provide the mean across all observations for each reporting country.

Table 5: Descriptive statistics on cross-border deposits (bilateral data)

Group	***N***	***Mean***	***Standard Deviation***	***Min. value***	***Max. value***
All observations	29 920	3569.584	28 438.08	0.001	829 596
Offshore Financial Centres	9885	1446.027	4182.468	0.001	42 390.71
Non-offshore locations	20 035	4617.319	34 580.41	0.001	829 596
Australia	1296	837.9757	3108.116	0.278	31 534.93
Austria	1283	1005.298	3584.796	1.703	32 203.69
Belgium	1296	1597.979	5468.777	3.582	48 122
Brazil	431	283.7773	1316.828	1	8971
Canada	936	4945.378	23 064.52	0.803	202 531.3
Chile	916	59.87633	399.1559	0.001	7233
Chinese Taipei	1299	231.2292	766.9519	0.003	10 811.08
Denmark	1161	738.3504	1909.898	3.199	15 901.2
Finland	1043	689.0781	2540.91	0.062	24 340.55
France	1296	13 349.35	41 702.52	4	313 592
Greece	429	30.3463	74.85419	0.011	388
Guernsey	1208	404.6561	1573.258	0.001	12398
Hong Kong SAR	1073	1331.459	2882.239	2.317	27 778.06
Ireland	1332	1470.438	4305.327	0.027	36 862.66
Isle of Man	1330	420.5163	1807.014	0.475	13 689
Italy	946	755.2212	2433.588	1.436	21 161
Jersey	1325	798.3298	3509.732	1	25929
Korea	1145	149.598	402.7801	0.002	3049.666
Luxembourg	1332	2552.101	5685.92	0.875	42 390.71
Macao SAR	953	115.584	434.4799	0.001	4515.793
Mexico	191	198.3577	566.8726	0.002	4379.143
Netherlands	460	6364.19	11 654.91	5.618	61 019.92
South Africa	948	94.16034	309.4474	1	2448
Spain	1152	1495.725	3483.181	1.016	25 168.35
Sweden	1215	665.0021	1535.132	0.638	16 021.99
Switzerland	1332	3972.406	6565.859	17.814	40 606.84
United Kingdom	1296	28 708.4	107 782.4	12	829 596
United States	1296	15 731.13	60 583.2	5	483 504

Note: Observed values in millions of USD. Observations indicate the outstanding amount of cross-border deposits in a bilateral relationship (country pair) in a given quarter.

5. Descriptive evidence

In this chapter, I present descriptive evidence on the evolution of cross-border deposits based on an aggregate dataset covering the period from Q1 2006 until Q4 2021. The data contain information on the total amount of outstanding cross-border deposits held by counterparties in the non-bank sector. Descriptive statistics can be found in Appendix A.6. The reporting countries are the same as in the bilateral dataset. Even though this country coverage is limited, the expectation is that the data will give a good approximation of the overall evolution in international financial flows.

5.1. Evolution of cross-border deposits in Offshore Financial Centres

Figure 1 illustrates the evolution of cross-border deposits during the sample period for OFCs and non-offshore countries respectively, indicating the aggregate outstanding amount for each group at each moment in time. The red vertical line marks the effective date of the CRS for the first wave adopters. This provides a valuable point of reference as it is the first moment when the CRS came into effect and a large number of the countries in the dataset were part of this first wave of adopters[17].

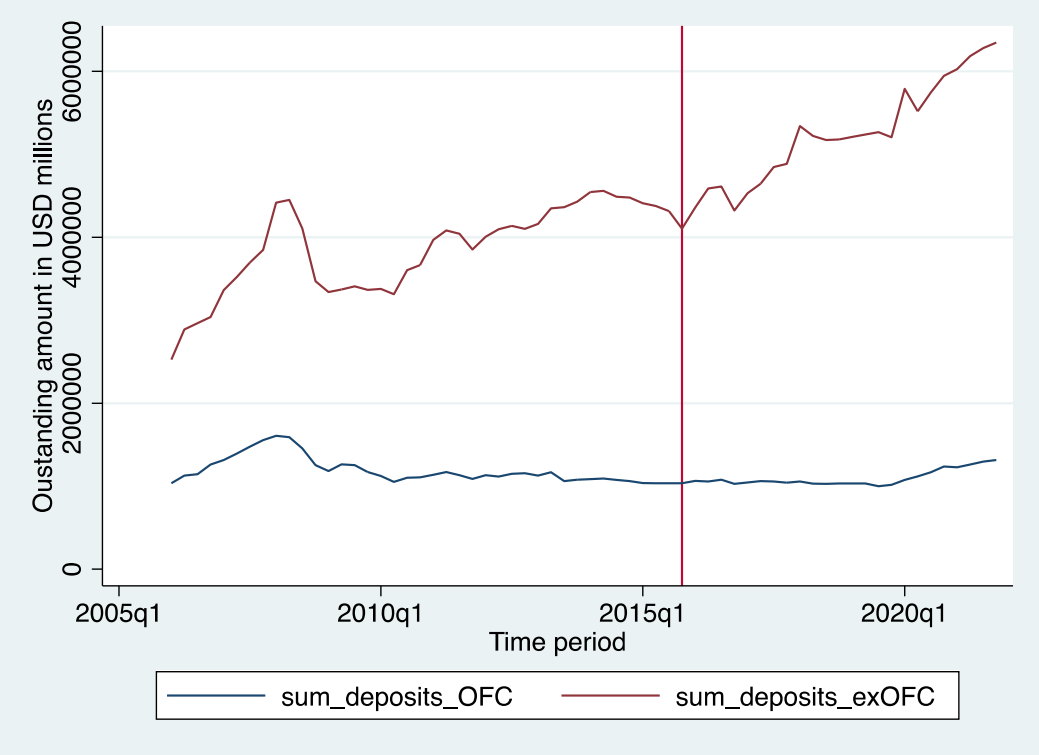
Both groups experienced a peak in the amount of outstanding cross-border deposits by non-bank counterparties before the financial crisis in 2008, and a significant drop in the cross-border deposits followed this. Notice, however, that the total across the non-offshore countries in our dataset has since surpassed the pre-crisis level by a considerable amount. This is not the case for the OFCs, for which the pre-crisis level has not been reached again. As laid out in Chapter 2.2., important developments in the context of tax transparency and EOI took place in the years following the financial crisis, something which can explain these diverging trends.

Further, we observe a difference in trends for the two groups after the CRS came into effect. There exists a clear positive trend in the cross-border deposits in non-offshore countries, whereas the outstanding amount of cross-border deposits in OFCs has been much more stable over time. Nonetheless, it is important to remember that the difference in size and

[17] 18 of the 28 reporting countries in the dataset were part of the first wave of CRS adopters.

characteristics between the two group makes it challenging to compare them based on graphical evidence. In addition, the lines represent overall group numbers and may therefore hide differences in the trends within each group. In an effort to make a more meaningful comparison between the two groups, I present the evolution in % deviations from group averages in Figure 2[18]. Also in this graph, we observe a divergence in trends in the years after the CRS came into effect. Despite the clear limitations of the presented graphical evidence, we can conclude that it is in favour of the main hypothesis, namely that the CRS had a negative effect on the cross-border deposits held in OFCs when compared to those held in non-offshore countries.

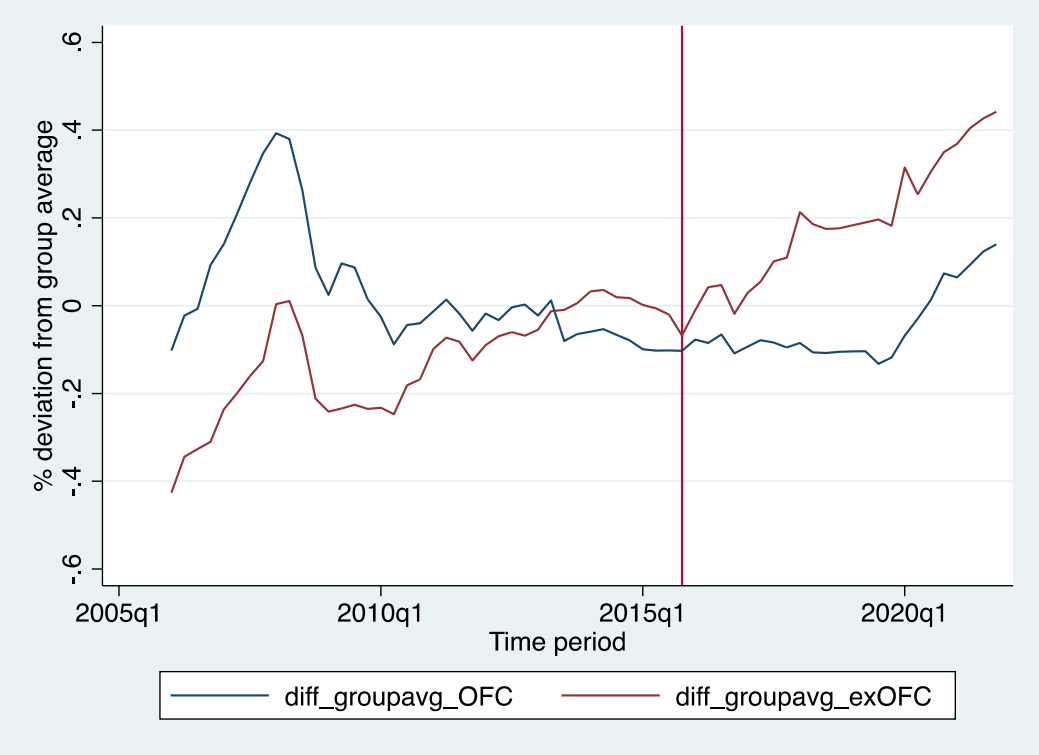
Figure 1: Evolution of cross-border deposits held in OFCs and non-offshore countries



Note: The graphs show the evolution in cross-border deposits held by counterparties in the non-bank sector, in OFCs and non-offshore countries respectively. The sample period is running from Q1 2006 until Q4 2021.

[18] The group averages are the averages across the full sample period (i.e. 2006 until 2021) for OFCs and non-offshore countries respectively.

Figure 2: Deviation from group averages for OFCs and non-offshore countries

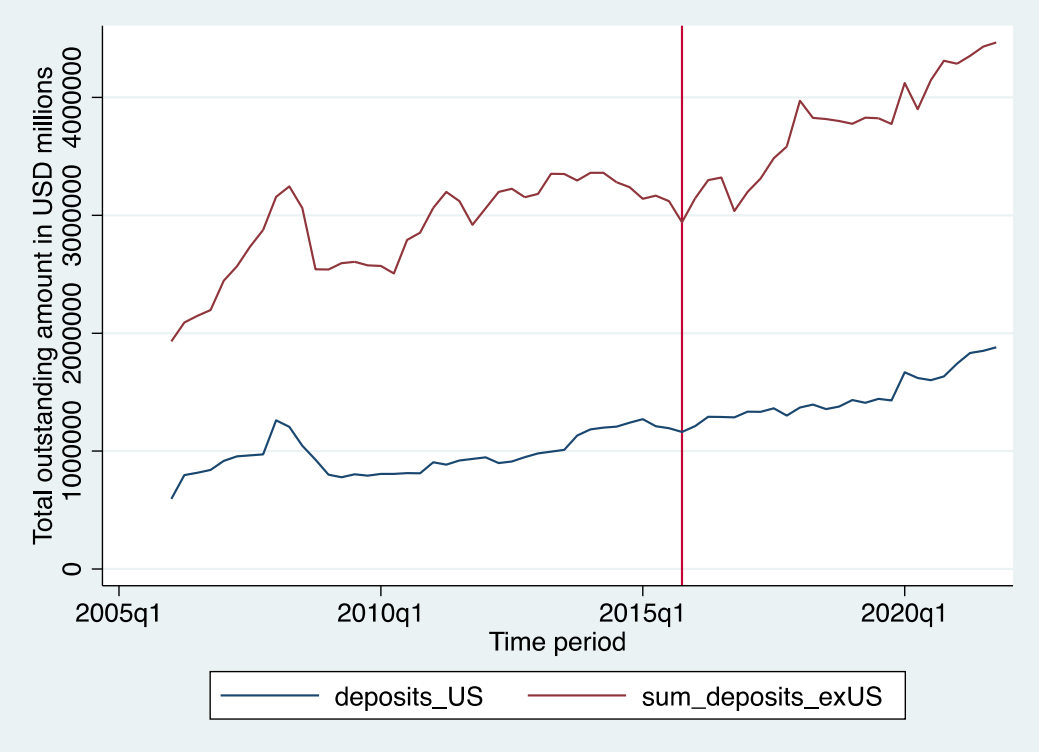


Note: The graphs show the % deviation from the group average outstanding amount of cross-border deposits held by counterparties in the non-bank sector, in OFCs and non-offshore countries respectively. The sample period is running from Q1 2006 until Q4 2021.

5.2. Evolution of cross-border deposits in the US

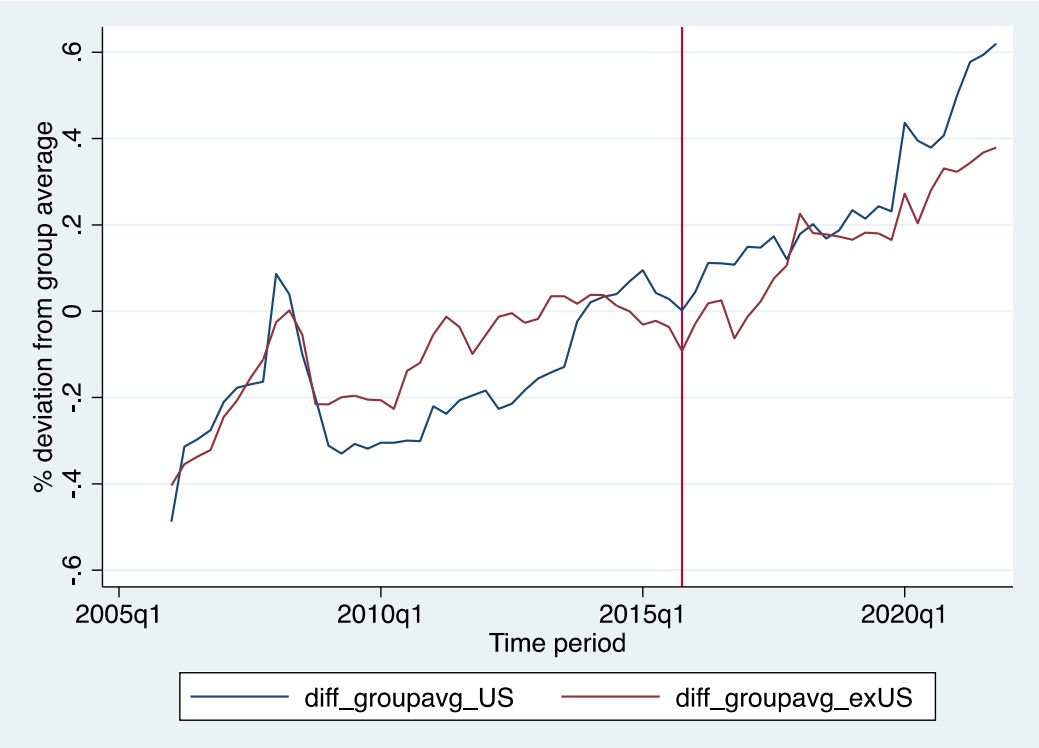
Figures 3 and 4 are comparing the evolution in US-located cross-border deposits to cross-border deposits held in other non-offshore countries (ex. US). Whereas the graphical illustration in Figure 3 shows that the cross-border deposits in the US have increased after the CRS came into effect, this is also true for the other non-offshore locations in our sample. The deviations from group averages illustrated in Figure 4 give some indications that the positive post-trend has been stronger in the US, in particular towards the end of the sample period. However, we are unable to draw any conclusions, and in Chapter 9 we turn to a regression-based approach to evaluate this hypothesis.

Figure 3: Evolution of cross-border deposits held in the US



Note: The graphs show the evolution in cross-border deposits held by counterparties in the non-bank sector, in the US and other non-offshore countries respectively. The sample period is running from Q1 2006 until Q4 2021.

Figure 4: Deviation from group averages for the US and other non-offshore countries



Note: The graphs show the % deviation from the group average outstanding amount of cross-border deposits held by counterparties in the non-bank sector, in the US and other non-offshore countries respectively. The sample period is running from Q1 2006 until Q4 2021.

6. Empirical strategy

The baseline regression model is estimated in an attempt to identify the causal effects of the introduction of the CRS on cross-border deposits in OFCs. Our main hypothesis, which builds on the theoretical framework presented in Chapter 2, is that the introduction of the CRS led to a reduction in the level of tax evasion for those affected by the policy change. Assuming that authorities appropriately use the received information, the information exchange framework considerably increases their ability to detect taxpayers who under declare their income. This reduces the expected payoff for the taxpayer, who will adjust the behaviour accordingly by increasing the declared part of the income. We cannot rule out the possibility that compliance increases without any considerable repatriation of funds. However, it is reasonable to assume that funds held in an OFC solely for tax evasion purposes will be relocated away from the OFC when the opportunity to evade taxes is considerably reduced or eliminated[19]. This in turn translates into a reduction in cross-border deposits, which is applied as a proxy to investigate behavioural changes from tax evaders.

In Chapter 6.1., I present the baseline regression model and provide arguments for the applied empirical strategy. I then proceed to discuss the underlying assumptions that should be fulfilled in Chapter 6.2. In Chapter 6.3, I present a replication attempt based on Casi et al. (2020). In Chapter 6.4., I present and provide arguments for a selection of robustness checks.

6.1. Baseline regression model

In the baseline regression model, I apply a two-way fixed effects structure, where I include both country pair (unit) fixed effects and quarter-year (time) fixed effects. The regression equation can be written as:

$$\log(deposits)_{ijq} = \alpha_{ij} + \beta_1 OFCxCRS_{ijq} + \gamma_q + u_{ijq} \quad (1)$$
$$i - reporting\ country\ (deposit\ location)$$
$$j - counterparty\ country\ (resident\ location)$$
$$q - time\ period\ (quarter), q = 2013q1, \dots, 2021q4$$
$$\alpha_{ij} - unit - specific\ intercept\ term$$
$$\gamma_q - quarter - year - \ specific\ dummies$$

[19] In accordance with the concept of home bias in investments.

The OFC variable indicates whether the deposit location of a country pair is an OFC, and the CRS variable switches on in the post-treatment period. The parameter in front of the interaction between these two variables (β_1) is to be interpreted as the treatment effect of the CRS on cross-border deposits held in OFCs by residents of non-offshore countries. The baseline specification is estimated with the 3 alternative approaches to the CRS variable, in line with those applied in the analysis of Casi et al. (2020) [20]. Further, the outcome variable gives the outstanding amount of cross-border deposits in reporting country *i*, against non-bank counterparties in country *j* in a given quarter *q* [21]. I apply a logarithmic transformation of the outcome variable because of the strong right skewness in the distribution of this variable.

The outcome variable is expected to be impacted by a wide range of variables that are unrelated to tax evasion. First, including country pair fixed effects allow us to flexibly control for factors that are constant over time but vary between the country pairs in our data. The level of cross-border deposits in a given country pair depends to a large extent on factors specific to the bilateral relationship, such as geographical proximity, cultural similarities and how large trade between the parties is. Further, we also know that the level of cross-border deposits is sensitive to macroeconomic shocks, such as the financial crisis in 2008[22], and other changes in the macroeconomic environment that affect all countries. The expectation is that such time-variant factors are present during the sample period, e.g. the Covid-19 pandemic outbreak in March 2020, and I therefore decide to include year-quarter dummies in the regression to limit this risk. All specifications are estimated using cluster-robust standard errors, clustered at the country pair level, to account for potential heteroskedasticity.

The applied empirical strategy is closely related to previous work examining the effects of EOI, where a difference-in-differences (DD) approach combined with a fixed effects (FE) structure commonly has been applied. This choice of strategy is motivated by the challenges mentioned in the paragraph above. However, researchers have been divided in the choice of the fixed effects structure. Johannesen & Zucman (2014) and O'Reilly et al. (2019) are, in line with the approach I am taking, applying country pair and quarter-year fixed effects. Others have decided to apply a more comprehensive fixed effects structure. E.g., Casi et al.

[20] Details on these alternative CRS specifications are provided in Chapter 4.1.
[21] A comprehensive list with definitions of the variables can be found in Chapter 4, on p.17.
[22] Descriptive evidence in favor of this argument is presented in Chapter 5.

(2020) include residence country-quarter-year fixed effects, while Beer et al. (2019) include two separate sets of time fixed effects for offshore and non-offshore banks respectively. I have chosen to stick to the basic two-way fixed effects structure as I believe that it does a good job of controlling for the factors that are not explicitly included in the model. Further, following the approach of Casi et al. (2020) would require estimating a large number of additional parameters, and I have therefore decided to apply a less restrictive specification.

6.2. Estimating policy effects in the panel data setting

DD is among the most common research approaches applied for natural experiments, i.e. when some exogenous event changes the environment in which individuals, households or firms operate (Verbeek, 2017, p.390). Such an exogenous event can be a change in government policy or, in this case, the introduction of an international standard. The simplest version of the DD approach is a "canonical" DD model with only two time periods where a subset of the units receive treatment in period 2. When expanding this approach to our setting, with multiple time periods and a variation in treatment timing between the units, a common approach is to apply a TWFE regression specification, where both unit fixed effects and time fixed effects are included in an ordinary least squares (OLS) estimation (Wooldridge, 2021).

The setting with variation in treatment timing is more complicated than the situation where treatment timing is constant across all units. In our dataset, we have so-called staggered interventions. This implies that the units receive treatment at different times, but once a unit enters into the treatment group they stay in this group until the end of the sample period. Once a jurisdiction has become a participant to the CRS, they continue to be so until the end of the sample period. In such a situation, Woolridge (2021) argues that the TWFE estimator will be unbiased if a set of assumptions are fulfilled:

- **Assumption NA: No anticipation, Staggered**:
  $For\ treatment\ cohorts\ r = q, q+1, \dots T,$
  $E(y_t(r) - y_t(\infty)|d) = 0, t < r.$

This assumption rules out any anticipatory effects. This means that the potential outcomes are the same prior to exposure, regardless of when a unit is first exposed to the treatment. This

has implications for the applied control groups, indicating that in a given period t, units that receive treatment in period q>t still function as valid control units. As described in Chapter 4 it can be difficult to decide exactly how to define the policy variable for the CRS and there is no clear consensus on this in the previous literature. It remains a weakness of this analysis that we don't possess precise information about the moment when tax evaders will start to shift assets away from the offshore location, which in turn can have implications for the fulfilment of the "no anticipation" assumption.

- **Assumption CTS: Common Trend, Staggered:**
  $E(y_t(\infty) - y_1(\infty) | \, d_q, \dots, d_T) = E(y_t(\infty) - y_1(\infty)) = \theta_t, t = 2, \dots, T$
  $where \; d_q, \dots, d_T \; represent \; dummies \; for \; the \; cohorts \; treated \; in \; t = q, \dots, T$

Generally, when applying the DD approach, we implicitly assume that the common trend assumption holds, i.e. that in the absence of treatment, the difference between the treatment and control group should be constant over time. This is an assumption that researchers often struggle to fulfil. In our case, the assumption would imply that trends in cross-border deposits in offshore and non-offshore locations, respectively, are similar prior to the introduction of the CRS. In Chapter 6.4., a dynamic regression approach is presented, which can help us evaluate the CTS assumption more thoroughly.

6.3. Replication attempt: Casi et al. (2020)

The regression analysis in this master's thesis is closely related to the work reported by Casi et al. (2020), in particular in terms of the applied CRS specifications. The main differences in research design are related to a different OFC selection, an extended sample period and the fixed effects structure. Casi et al. (2020) are including residence country-quarter-year fixed effects and cluster the standard errors at the deposit country level. By comparison, I have chosen to apply quarter-year fixed effects and cluster standard errors at the country pair level.

It can increase the validity of my results if I can replicate the results found by Casi et al. (2020). Further, it is useful to compare the results of the replication attempt to the results from my baseline model when restricted to the sample period of Casi et al. (Q4 2014 – Q3 2017). This way, we also gain more insight into how much of the differences can be assigned to the extended sample period and how much should be assigned to the difference in

research design. In the replication attempt, I apply the exact sample selection of Casi et al. and the same definition of offshore jurisdictions[23].

6.4. Robustness checks

6.4.1. Including additional controls

Even though the use of control variables in the previous literature has been limited, one might be concerned that the applied TWFE structure is unable to control for variables that can affect the level of tax evasion or otherwise affect the outcome variable. In an initial robustness check, I proceed to include a selection of control variables that have been used previously in the literature:

- FATCA agreements
- Temporary voluntary disclosure programs
- GDP in the reporting country and the counterparty country

In an attempt to control for other EOI agreements that might confound the estimated effect of the CRS, we include a variable indicating if there exists a FATCA agreement between the US and a relevant counterparty. Other EOI agreements, e.g. bilateral agreements providing for EOIR or the EU Savings Directive, entered into force before the sample period starts. Thus, such control variables contain no variation over time in our sample and would therefore be omitted in the fixed effects regressions.

Further, it is a concern that effects that in reality are attached to special voluntary disclosure programs implemented during the sample period might influence our estimates of the effect of the CRS. I include a variable SVD for such temporary voluntary disclosure programs based on a list provided by Chiocchetti (2020)[24].

Finally, we wish to control for overall economic changes at the country level, i.e. changes over time that are affecting a specific country pair in the data. The log GDP of countries in a bilateral relationship is commonly used in gravity models to explain financial links and cross-border investments (Delatte et al., 2022). In addition, controlling for GDP levels allows us to

[23] Guernsey, Hong Kong SAR, Isle of Man, Jersey, Luxembourg, Switzerland.
[24] This list is included in Appendix A.4.

capture at least a part of the effect that would be captured by including residence country-quarter-year dummies. Including these control variables can help justify the inclusion of quarter-year dummies that don't control for specific changes occurring only in the reporting country or the counterparty country.

6.4.2. Event study: A dynamic TWFE specification

One of the main purposes of this master's thesis is to investigate whether the effect of the CRS on cross-border deposits in OFCs has persisted over time, or if tax evaders seem to find new ways to circumvent the standard. It is therefore interesting to investigate the dynamics of the treatment effect, something which can be done by applying an event study approach similar to that of Casi et al. (2020). The more recent data provides us with the flexibility to include more lags and investigate more long-term effects of the CRS, as opposed to Casi et al. who are focusing solely on short-term effects. Secondly, as mentioned in Chapter 6.2., the unbiasedness of the estimated coefficients in a DD model relies on the common trend assumption to be fulfilled. The event study can help us evaluate whether the cross-border deposits in offshore and non-offshore locations evolved following parallel trends prior to the introduction of the CRS.

We start by formulating a dynamic TWFE specification including lags and leads of the treatment:

$$\log(deposits)_{ijq} = \alpha_{ij} + \gamma_q + \sum_{r \neq 0} 1\big(R_{ij,q} = r\big)\beta_r + u_{iq} \ (2)$$

Testing for the existence of a pre-trend in this setting is equivalent to testing the null hypothesis that all pre-treatment coefficients are insignificant:

$$H0\colon \hat{\beta}_r = 0 \ \forall \ r < 0 \ (3)$$

It is important to remember that even if we can reject the null hypothesis of no pre-trend, this cannot fully justify a conclusion that the common trend assumption is fulfilled. However, such a result is usually interpreted as a sign in favour of the validity of the DD specification (Roth et al., 2022).

6.4.3. Testing for anticipation effects

In Chapter 4.1. I provide arguments for the choice of CRS specifications applied in the analysis. However, one might still be concerned that there exist anticipation effects prior to the moments when the CRS was implemented into domestic law and came into effect. This would, in turn, imply that the "no anticipation" assumption is violated and that the reported results are not able to capture the full effect of the standard. In an attempt to rule out this possibility, I run a TWFE regression similar to the one in my baseline model applying a CRS variable that turns on at the moment of CRS commitment of the reporting countries in the dataset, i.e. 29 October 2014.

7. Empirical results

In this chapter, the results from the baseline regression analysis and attached robustness checks are presented. In Chapter 7.1., I present and interpret the results from the baseline model. I proceed to present the findings from the replication attempt of Casi et al. (2020) in Chapter 7.2., before the results from the included robustness check are presented in Chapters 7.3.-7.5.

To obtain the precise estimated percentage impact of the CRS, we must apply the following transformation to the estimated coefficients: $100 * (exp(\beta) - 1)$. The result tables report the estimated coefficients, while the estimated percentage impact is indicated in the text.

7.1. Baseline regression

In Chapter 6, I argue that a specification including both country pair and time fixed effects can fit our purpose well, and a model based on equation (1) is therefore estimated. The estimation results are presented in Table 6. When applying the country specific implementation dates for the CRS (see column 1), the estimated coefficient indicates an average decrease in the cross-border deposits held in OFCs of 34.8%[25] upon CRS implementation. In the second specification, applying the country specific effective dates for the CRS (see column 2), the reported average decrease is 34.6%. With the non-staggered treatment timing, set to the effective date of the first wave of adopters of the CRS (see

[25] Exp(-0.428)-1=-0.348

column 3), the results indicate an average decrease of 31.6%. The estimated coefficients in all three specifications are significant at the 1% significance level.

The results from all three specifications are providing evidence of a considerable effect of the CRS on cross-border deposits in OFCs. The estimated effects are quite close in terms of size, with specification (3) reporting the smallest effect and specification (1) the largest effect. The difference between the estimated effects from specifications (1) and (2) is small, which is in line with the expectation as we know that these specifications are quite similar. It is also intuitively logical that specification (3) is unable to identify as much of the behavioural change as when applying country specific dates in (1) and (2). The reported results in (3) do nonetheless show that the effect of the CRS is robust despite the concern that the country specific dates could be correlated with other events affecting the level of tax evasion.

Table 6: Results from the baseline regression model

CRS specification:	*Country specific implementation dates*	*Country specific effective dates*	*First wave adopters effective date*
	(1) log_deposits	(2) log_deposits	(3) log_deposits
CRS_LawDepL_OFC	-0.428***		
	(0.0738)		
CRS_EffDepL_OFC		-0.424***	
		(0.0723)	
CRS_firstwave_OFC			-0.380***
			(0.0687)
Observations	29920	29920	29920
Number of country pairs	881	881	881
R^2	0.037	0.037	0.032
Adjusted R^2	0.036	0.036	0.031

Notes: Cluster robust standard errors in parentheses, clustered at the country pair level. All regressions include country pair and quarter-year fixed effects. Sample period running from Q1 2013 until Q4 2021.
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

7.2. Replication attempt: Casi et al. (2020)

After trying to replicate as closely as possible the sample and the empirical strategy of Casi et al. (2020), I obtain results that are highly similar to those reported in their article. See regression results in Table 7. Applying CRS specification (1), Casi et al. report an average decrease in cross-border deposits held in OFCs of 11.5% upon implementation of the CRS

into domestic law. By comparison, I report an average decrease of 11.6% from my replication attempt. When applying country specific effective dates for the CRS (column 2), Casi et al. report an average decrease of 11.1% against an average decrease of 11.4% in my replication attempt. Finally, with the third CRS specification, Casi et al. report an average decrease of 12.1% after the CRS effective date for the first wave adopters. By comparison, I report an average decrease of 12.5%. Besides the highly similar estimated coefficients, I obtain higher p-values for specifications (1) and (2) when compared to Casi et al. who report coefficients that are significant at the 5% level[26]. In specification (3), however, we obtain the same p-value of 0.047.

The small differences observed in the replication attempt are likely related to a difference in the applied sample. Casi et al. apply a balanced sample of 10 968 observations, which is a slightly higher number of observations than what I obtained when trying to replicate the same balanced sample (10 848 observations). I have been unable to identify the exact reasons for this sample difference.

Table 7: Results from the replication attempt (Casi et al.(2020))

CRS specification:	*Country specific implementation dates*	*Country specific effective dates*	*First wave adopters effective date*
	(1) log_deposits	(2) log_deposits	(3) log_deposits
CRS_LawDepL_OFC	-0.123* (0.0639)		
CRS_EffDepL_OFC		-0.121* (0.0657)	
CRS_firstwave_OFC			-0.134** (0.0642)
Observations	10848	10848	10848
Number of country pairs	904	904	904
R^2	0.063	0.063	0.064
Adjusted R^2	0.024	0.024	0.024

Notes: Cluster robust standard errors in parentheses, clustered at the reporting country level. All regressions include country pair and residence country-quarter-year fixed effects.
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

[26] My p-values are 0.064 in specification (1) and 0.076 in specification (2).

To identify which differences in my baseline results are stemming from the extension of the sample period and which differences can be attributed to a difference in research design, I proceed to estimate my baseline models on the more restricted sample period of Casi et al., running from the last quarter of 2014 until the third quarter of 2017. I do expect the results to differ because of the difference in OFC selection and research design, as discussed in Chapter 6.3. I report larger estimated coefficients in Table 8 when compared to Casi et al. (2020), and all three coefficients are significant at the 1% level. In column 1, I report an average decrease in cross-border deposits in OFCs upon CRS implementation of 17.7%, while the reported average decrease is 17.8% when applying CRS effective dates in column 2. These effects are, as in my baseline model, highly similar both in terms of size and significance. In line with the results from Casi et al. (2020), the estimated effect based on the CRS effective date for the first wave adopters is slightly higher than for the country specific specifications, with an average decrease in cross-border deposits in OFCs of 18.9%. Overall, we can conclude that the inclusion of more recent data has led to a substantial increase in the identified effect of the CRS on cross-border deposits in OFCs. Nonetheless, the results provided in this section also indicate that my research design produces higher estimated effects when compared to the work of Casi et al. (2020).

Table 8: Results from the baseline model w/limited sample period

CRS specification:	*Country specific implementation dates*	*Country specific effective dates*	*First wave adopters effective date*
	(1) log_deposits	(2) log_deposits	(3) log_deposits
CRS_LawDepL_OFC	-0.195***		
	(0.0456)		
CRS_EffDepL_OFC		-0.196***	
		(0.0462)	
CRS_firstwave_OFC			-0.209***
			(0.0522)
Observations	10430	10430	10430
Number of country pairs	881	881	881
R^2	0.010	0.010	0.011
Adjusted R^2	0.009	0.009	0.010

Notes: Cluster robust standard errors in parentheses, clustered at the country pair level. All regressions include country pair and quarter-year fixed effects. Sample period running from Q4 2014 until Q3 2017.
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

7.3. Robustness check: Control variables

As explained in Chapter 6, we might fear that there are other factors affecting the level of tax evasion that the applied fixed effects structure fails to control for, thus leading to an omitted variable bias. I control for a selection of such factors, and Table 9 compares the results from the baseline TWFE model in column 1 to the extended models in columns 2 – 5.

In column 2, I start by controlling for potential "spillover effects" of the CRS affecting country pairs that don't have an OFC as the reporting country. The inclusion of the non-interacted CRS variable leads to an increase in the reported effect of the CRS on cross-border deposits in OFCs, indicating an average decrease of 36.8%. This effect remains essentially unaltered in columns 3 – 4. In line with the expectations, the estimated coefficients for the GDP variables in column 5 are significant both in statistical and economic terms, indicating that changes in the GDP of the countries in a given country pair affect the amount of cross-border deposits between these countries. Further, including these controls alters the reported effect on cross-border deposits in OFCs slightly, with a reported average decrease of 38.2% in column 5. The reported coefficients for the FATCA are highly statistically significant, and the results indicate a strong average decrease in cross-border deposits in OFCs upon FATCA implementation of 59.6% % in column 5. The estimated coefficients for the special VDPs variable are neither significant nor large in economic terms.

The results from this robustness check provide evidence that the original two-way fixed effects structure is doing a good job of identifying the effect of the CRS on the level of tax evasion and this effect remains highly statistically significant. However, the estimated coefficient for the variable of interest is slightly altered and I report a higher estimated effect of the CRS on cross-border deposits in OFCs in the robustness check compared to the baseline model, with an average decrease of 38.2%. Most of the included control variables are relevant in explaining the outcome variable, i.e. the amount of cross-border deposits.

Table 9: Results from robustness check w/control variables

CRS specification:	*Country specific implementation dates*				
	(1) log_deposits	(2) log_deposits	(3) log_deposits	(4) log_deposits	(5) log_deposits
CRS_LawDepL_OFC	-0.428***	-0.458***	-0.458***	-0.453***	-0.481***
	(0.0738)	(0.0773)	(0.0774)	(0.0778)	(0.0783)
CRS_LawDepL		0.0895*	0.122**	0.121**	0.137**
		(0.0510)	(0.0538)	(0.0538)	(0.0535)
FATCA_OFC			-0.880***	-0.873***	-0.906***
			(0.264)	(0.264)	(0.278)
FATCA			0.276***	0.276***	0.232***
			(0.0752)	(0.0754)	(0.0769)
SVD_OFC				0.0826	0.0695
				(0.128)	(0.129)
SVD				0.0416	0.0391
				(0.0500)	(0.0500)
log_GDP_repcountry					0.365***
					(0.0781)
log_GDP_counterparty					0.435**
					(0.207)
Observations	29920	29920	29920	29920	29920
R^2	0.037	0.038	0.040	0.040	0.049
Adjusted R^2	0.036	0.036	0.039	0.039	0.047

Notes: Cluster robust standard errors in parentheses, clustered at the country pair level. All regressions include country pair and quarter-year fixed effects. Sample period running from Q1 2013 until Q4 2021.
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

7.4. Robustness check: Event study

The event studies are based on the dynamic TWFE DD approach presented in Chapter 6.4.2. The results are presented in Table 10 and provide us with information on the dynamics of our treatment variable. Column 1 shows the results when applying the country specific implementation dates and column 2 show the results when applying the effective date for the first wave adopters[27].

[27] Specification (2) has been excluded because of the high degree of similarity between specifications (1) and (2), i.e. country specific implementation and effective dates.

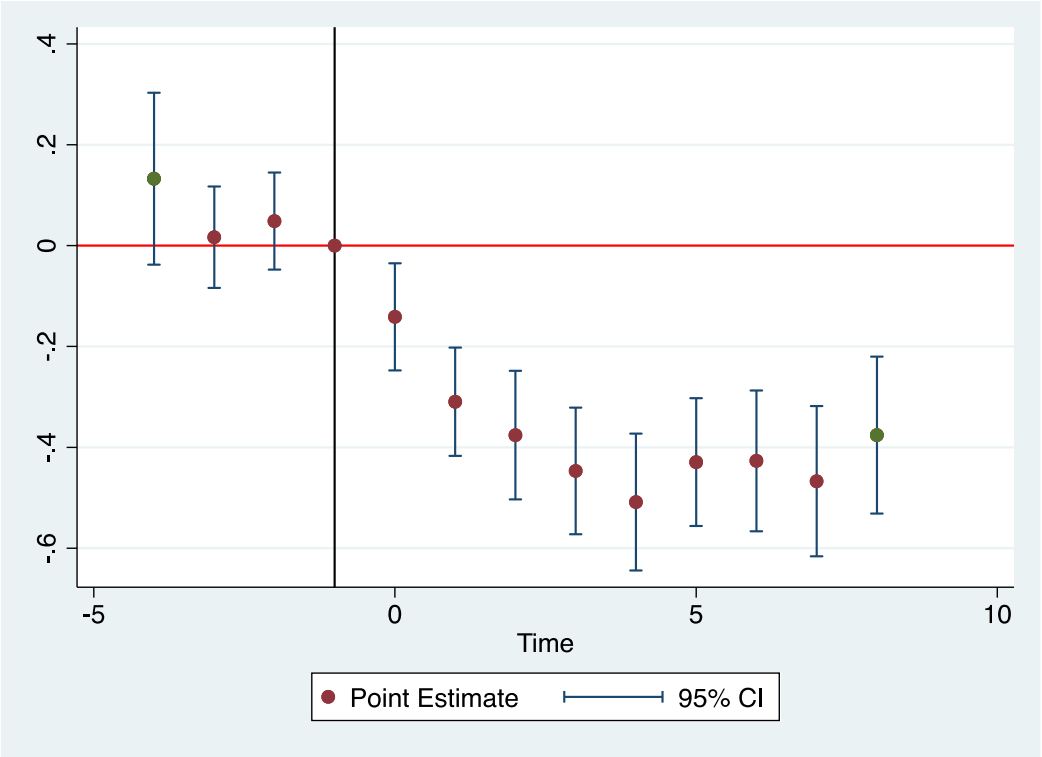
Table 10: Results from the dynamic TWFE model

CRS specification:	*Country specific implementation dates*	*First wave adopters effective date*
	(1) log_deposits	(2) log_deposits
lead4	0.133 (0.0869)	-0.0239 (0.0611)
lead3	0.0166 (0.0513)	-0.0294 (0.0549)
lead2	0.0486 (0.0491)	-0.0176 (0.0446)
lag1	-0.310*** (0.0547)	-0.201*** (0.0401)
lag2	-0.376*** (0.0650)	-0.227*** (0.0531)
lag3	-0.447*** (0.0639)	-0.210*** (0.0567)
lag4	-0.508*** (0.0691)	-0.345*** (0.0630)
lag5	-0.429*** (0.0646)	-0.292*** (0.0633)
lag6	-0.427*** (0.0711)	-0.258*** (0.0660)
lag7	-0.467*** (0.0759)	-0.349*** (0.0714)
lag8	-0.376*** (0.0792)	-0.476*** (0.0847)
Observations	29920	29920
Number of country pairs	881	881
Controls included	YES	YES
R^2	0.050	0.046
Adjusted R^2	0.049	0.044

Notes: Cluster robust standard errors in parentheses, clustered at the country pair level. All regressions include country pair and quarter-year fixed effects. Leads and lags are based on treatment variables CRS_Law_DepL_OFC (1), CRS_firstwave_OFC (2). The first lead is omitted and serves as the benchmark period. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

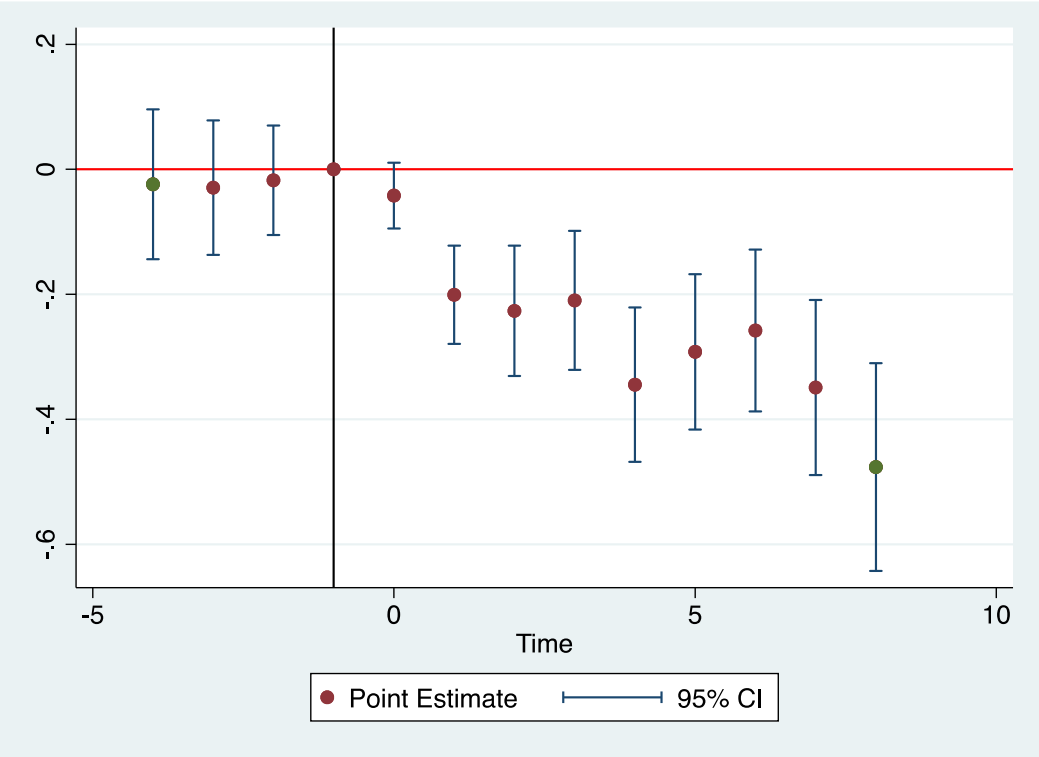
The estimated coefficient in front of a given lag gives the accumulated treatment effect between the quarter in question and the quarter when the CRS was first introduced. E.g., in column 1, the reported average decrease in cross-border deposits in OFCs is 31.3% two quarters (lag2) after the implementation date of the CRS. The highly significant estimated coefficients in all 8 included lags are in line with our expectations based on the results from the baseline model. Overall, the event study confirms evidence of an economically significant effect of the CRS and indicates that the effect has been persistent over time. When tested jointly, the included leads are statistically insignificant in both specifications. Hence, there are no signs of a pre-treatment trend, something which increases the credibility of the estimated results and the applied DD approach in the baseline model. The results from the event studies are illustrated graphically in Graphs 5 and 6.

Figure 5: Event study - staggered treatment



The chart plots estimated coefficients (y-axis values) together with their 95% confidence intervals for different time periods before and after the CRS implementation(t=0). The time period t=-1 serves as the benchmark and is omitted from the regression. The CRS specification relies on country specific implementation dates into domestic law.

Figure 6: Event study - non-staggered treatment



The chart plots estimated coefficients (y-axis values) together with their 95% confidence intervals for different time periods before and after the CRS came into effect (t=0). The time period t=-1 serves as the benchmark and is omitted from the regression. The CRS specification relies on the CRS effective date for the first wave adopters.

7.5. Robustness check: Anticipation effects

To rule out the possibility that tax evaders started shifting assets away from OFCs already when countries announced their commitment to implement the CRS, I test the use of an alternative CRS specification based on the moment of commitment, i.e. 29 October 2014. The results from this test are shown in Table 11, and the regressions are based on the same research design as the baseline models. In column 1, the reported average decrease in cross-border deposits upon CRS commitment is 26.5%. an effect that is significant at the 1% level. However, when controlling also for the moment of implementation of the CRS into domestic law in column 2, the coefficient for CRS commitment changes sign and loses its significance. We see that the CRS specification relying on country specific implementation dates identifies a larger effect on cross-border deposits in OFCs, with a reported average decrease of 36.6%. This indicates that most of the behavioural response of tax evaders happened after the CRS came into effect, and hence that the selected CRS specifications are doing a good job of identifying the effects of the standard. In column 3 in Table 11, I proceed to include control variables, and the results from this regression reconfirm the conclusion above.

Table 11: Results from the test of anticipation effects

	(1) log_deposits	(2) log_deposits	(3) log_deposits
CRS_commitment_OFC	-0.308***	0.0556	0.147**
	(0.0706)	(0.0658)	(0.0674)
CRS_LawDepL_OFC		-0.455***	-0.556***
		(0.0803)	(0.0857)
Observations	29920	29920	29920
Controls included	NO	NO	YES
R^2	0.026	0.037	0.050
adj. R^2	0.024	0.036	0.048

Notes: Cluster robust standard errors in parentheses, clustered at the country pair level. All regressions include country pair and quarter-year fixed effects. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

8. Sensitivity analysis: Selection of Offshore Financial Centres

In this Chapter, I will investigate the sensitivity of my results by altering the selection of OFCs. As discussed in Chapter 4.2., I chose to start with a definition of OFCs based on a list published by the IMF in 2000. In the previous literature, many different offshore selections have been applied and there exists no consensus on this topic (see Table 2), and it is therefore relevant to investigate the sensitivity of the baseline results.

Mistakenly defining some countries as offshore might lead to a downward bias in the results because the low or negligible effect of the CRS on cross-border deposits in these locations will pull down the estimated average effect of the CRS on all OFCs in the sample. Biased regression results are naturally of great concern to researchers and should be avoided. In this case, however, the risk of applying a too narrow definition of OFCs is arguably higher. This can lead to either a downward or an upward bias in the estimation results. An upward bias might occur if there are relocation effects between different offshore locations after the introduction of the CRS. If funds are relocated from an OFC to another country that was *mistakenly* classified as non-offshore, these flows will mistakenly be captured as repatriation effects whereas they in reality are a result of relocation behaviour. One might argue that the European countries that were already exchanging information automatically under the EU Savings Directive should not be considered offshore when estimating the effects of the CRS. Even though this is a reasonable argument, there exist several counterparty countries in our dataset that are not EU members and did not exchange information automatically prior to the

introduction of the CRS. In addition, it is intuitively logical that the extended scope of the CRS could provoke a further reduction in cross-border deposits held for tax evasion purposes in these European countries.

The results from the sensitivity analysis are presented in Table 12. Notice that the analysis is performed using the CRS specification with country specific implementation dates. I test the sensitivity of the previously reported results by excluding offshore locations that were covered by some form of AEOI prior to the CRS, i.e. Ireland, Luxembourg and Switzerland, in columns 2 – 4. In an additional test in column 5, I rely on the OFC selection applied by Johannesen & Zucman (2014), which is even wider than the IMF OFC list, including also Austria, Belgium and Chile as OFCs. We can conclude that changing the OFC selection does indeed alter the estimated effect of the CRS. As I proceed to exclude Ireland, Luxembourg and Switzerland from the OFC selection the estimated effect of the CRS increases considerably, and in column 4, I report an average decrease in cross-border deposits held in OFCs of 50.1%. Further, when relying on the OFC selection of Johannesen & Zucman, the reported average decrease shrinks to 28.8%. The effect persists to be highly statistically significant across all the estimations.

The findings in this chapter indicate that the average effect of the CRS varies significantly across different OFCs. The estimations reported in columns 2 – 4 in Table 12 show that the excluded offshore locations (Ireland, Luxembourg, Switzerland) have experienced a considerably lower effect of the CRS compared to the five other OFCs in our sample. It is important to underline that this does not necessarily mean that the initial classification of Ireland, Luxembourg and Switzerland as offshore was wrong. The reason for this can be that these OFCs were already covered by a form of AEOI before CRS introduction. Further, in line with the expectations, relying on the broader OFC selection in column 5 reduces the average effect of the CRS. Overall, I find evidence that the significant effect of the CRS reported in the baseline model is robust to different selections of OFCs, whereas the size of the effect is highly sensitive to the changes in OFC classification.

Table 12: Results from the sensitivity analysis (OFC selection)

OFC selection:	*IMF*	*Ex. IR*	*Ex. IR & LU*	*EX. IR, LU & SW*	*JZ*
	(1)	(2)	(3)	(4)	(5)
	log_deposits	log_deposits	log_deposits	log_deposits	log_deposits
CRS_LawDepL_OFC	-0.428***				
	(0.0738)				
CRS_LawDepL_OFC_S1		-0.523***			
		(0.0810)			
CRS_LawDepL_OFC_S2			-0.625***		
			(0.0861)		
CRS_LawDepL_OFC_S3				-0.695***	
				(0.102)	
CRS_LawDepL_OFC_JZ					-0.340***
					(0.0698)
Observations	29920	29920	29920	29920	27450
Number of country pairs	881	881	881	881	881
Controls included	YES	YES	YES	YES	YES
R^2	0.037	0.051	0.056	0.058	0.044
Adjusted R^2	0.036	0.049	0.055	0.056	0.042

Notes: Cluster robust standard errors in parentheses, clustered at the country pair level. All regressions include country pair and quarter-year fixed effects. Sample period running from Q1 2013 until Q4 2021. CRS_LawDepL_OFC_S1, CRS_LawDepL_OFC_S2, CRS_LawDepL_OFC_S3 are the treatment variables when we exclude Ireland, Luxembourg and Switzerland one by one from the OFC selection. CRS_LawDepL_OFC_JZ is the treatment variable when we rely on the OFC selection of Johannesen & Zucman (2014). * p < 0.1, ** p < 0.05, *** p < 0.01

9. Extension: US Relocation Effects

The US is the only major economy that is not committed to implementing the CRS. Even though a large number of countries have entered into bilateral FATCA agreements with the US that provide for the automatic exchange of financial account information, the nature of these agreements is not fully symmetrical, as the US is receiving information of better quality than what it sends to its FATCA partners. Many tax experts have expressed their concern about the non-participation of the US and are arguing that the US is emerging as an attractive

relocation destination for tax evasion purposes. An international standard providing for EOI is only efficient when it has a fully global coverage because this makes it impossible to circumvent the risk of detection. The lack of commitment from the US, which holds a crucial role in international financial markets, therefore constitutes a serious risk to the efficiency of the CRS. Casi et al. (2020) are providing preliminary evidence in a test for relocation effects towards the US after CRS introduction. In this chapter, I try to reassess this relocation effect by relying on an extended sample period. As we expect relocation effects to happen with some lags, the extension of the data from Q3 2017 until Q4 2021 is arguably a very valuable contribution to the literature.

9.1. Testing for relocation effects towards the US

I am building on the research design from the baseline model and previous work by Casi et al. (2020). By including an interaction between the post CRS period and a dummy variable for the US, I compare the changes in cross-border deposits held in the US to cross-border deposits held in other non-offshore locations, while also controlling for the effect of the CRS on deposits in OFCs. The non-staggered CRS specification is applied in this analysis as we naturally do not have country specific implementation and effective dates for the US. The regression equation is given by:

$$\log(deposits)_{ijq} = \alpha_{ij} + \beta_1 USxCRS_{ijq} + \beta_2 OFCxCRS_{ijq} + \gamma_q + u_{ijq} \quad (4)$$

$i - reporting\ country\ (deposit\ location)$
$j - counterparty\ country\ (resident\ location)$
$q - time\ period\ (quarter), q = 2013q1, \dots, 2021q4$
$\alpha_{ij} - unit - specific\ intercept\ term$
$\gamma_q - quarter - year - \ specific\ dummies$

Regression results can be found in Table 13. In column 1, equation (4) is estimated with no additional control variables included. In this case, the reported relocation effect towards the US is statistically significant at the 1% level. The effect is also economically significant, indicating that there has been an average increase in US-located cross-border deposits of 24.6% after the CRS came into effect when compared to cross-border deposits held in other non-offshore countries. I proceed to rerun the regression with additional controls on FATCA, special VDPs and GDP in the reporting and counterparty countries. Results from this regression are included in column 2 in Table 13. A table with the full regression results is included in Appendix A.7. The estimated effect on US-located cross-border deposits is reduced considerably in size and has a p-value of 0.042. The size of the reported effect

persists to be economically significant, with an average increase of 19.7% in US-located deposits post-CRS introduction. The estimated coefficients for the GDP control variables are significant, indicating that some of the increase in US-located deposits initially attributed to the CRS should be attributed to differences in GDP.

Table 13: Results from the extension (US relocation effects)

	(1) log_deposits	(2) log_deposits
CRS_firstwave_US	0.220***	0.180**
	(0.0604)	(0.0886)
CRS_firstwave_OFC	-0.364***	-0.392***
	(0.0696)	(0.0698)
Observations	29920	29920
Number of country pairs	881	881
Controls included	NO	YES
R^2	0.033	0.041
Adjusted R^2	0.032	0.040

Notes: Cluster robust standard errors in parentheses, clustered at the country pair level. All regressions include country pair and quarter-year fixed effects. Sample period running from Q1 2013 until Q4 2021. Non-staggered CRS specification. * p < 0.1, ** p < 0.05, *** p < 0.01

In theory, one could expect that cross-border deposits in the US and other non-offshore locations would follow a similar trend prior to the moment when the CRS came into effect, as these countries originally belong to the same group (i.e. non-offshore countries). However, it is nonetheless relevant to investigate the validity of the common trend assumption. In line with the approach taken in the baseline analysis, I have specified a dynamic TWFE model where the interaction between the dummy variables for the CRS and the US from equation (4) has been replaced by 16 separate indicators marking the 8 quarters before and after the CRS came into effect. Results from this regression can be found in Appendix A.8. We see clear signs of a negative pre-trend for US-located cross-border deposits, something which constitutes a risk to the validity of the estimation results presented in Table 13. However, when the 7 first leads are tested jointly, these are not significant. This indicates that the common trend assumption is fulfilled for the 7 quarters prior to the moment when the CRS came into effect. It is nonetheless important to underline that the potential violation of the common trend assumption constitutes a weakness of the analysis.

9.2. Robustness check: Sample split

To investigate further the robustness of the finding that cross-border deposits in the US have increased after the CRS entered into effect, I conduct a sample-split analysis similar to what was done by Casi et al. (2020) in their article. In this case, the DD regression design becomes a time-trend test of deposits located in the US before and after the CRS effective date of the first wave adopters. The results from this time-trend test are presented in column 1 in Table 14. The estimated increase in US-located cross-border deposits after the CRS came into effect is considerably larger than the one reported in Table 13, with an average increase of 45.4%. As shown in Column 2 of Table 14, there has also been a considerable increase of 17.7% in cross-border deposits held in other non-offshore countries. The difference between the two estimates from columns 1 and 2 in Table 14 is close to our initial estimated effect from Table 13. In column 3 in Table 14, I rerun the DD regression specified in equation (4) but remove all OFCs from the baseline sample.

Table 14: Results from robustness check on split samples (US relocation effects)

Sample	*US deposits*	*Non-offshore deposits (ex. US)*	*Non-offshore + US deposits*
	(1) log_deposits	(2) log_deposits	(3) log_deposits
CRS_firstwave	0.374***	0.163***	
	(0.0520)	(0.0316)	
CRS_firstwave_US			0.221***
			(0.0606)
Observations	1296	18739	20035
Number of country pairs	36	557	593
Country pair FE	YES	YES	YES
Quarter-year FE	NO	NO	YES
R^2	0.180	0.010	0.050
Adjusted R^2	0.179	0.010	0.048

Notes: The table reports time-trend estimates for the split sample. In column 1 only US-located cross-border deposits are included. Only cross-border deposits held in other non-offshore countries (ex. US) are included in column 2. Column 3 reports DD estimates but excludes all OFCs from the baseline sample. Cluster robust standard errors in parentheses, clustered at the country pair level. Sample period running from Q1 2013 until Q4 2021. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

10. Discussion

10.1. Policy implications and limitations of the analysis

To what extent has the CRS been successful in reducing the level of cross-border tax evasion? This is the main research question and requires further discussion. We can conclude that the reported results on cross-border deposits in OFCs are both statistically and economically highly significant. Through the applied empirical strategy, I make an effort to isolate the changes in cross-border deposits that can be contributed to the introduction of the CRS. The CRS should in theory only affect the deposits that are held offshore for tax evasion purposes. However, as mentioned in Chapter 4, it is not straightforward to draw conclusions about the impact of the CRS on the level of cross-border tax evasion from our estimated reactions in cross-border deposits.

The BIS LBS data allows us to extract from interbank deposits through the decomposition between the bank and non-bank sectors. Nonetheless, a part of the non-bank deposits will belong to multinational corporations that place cash abroad but are not affected by the EOI framework. Two challenges arise: We do not know the exact portion of non-bank deposits that belong to households, and we do not know the exact portion of household deposits that are held in OFCs for tax evasion purposes. Naturally, this fraction can also differ between OFCs. The Bank of England reported that in 2007 about 70-75% of deposits in the Channel Islands (Guernsey and Jersey) and the Isle of Man belonged to households (Johannesen & Zucman, 2014), while Zucman (2013) estimated that about 50% of OFC deposits likely belong to households. With a baseline assumption that tax evaders own 50% of the deposits in OFCs, the estimated average decrease in such deposits upon implementation of the CRS is -37.1%/50% = -74.2%[28]. The estimated impact on tax evasion is therefore considerable from an economic point of view. Even with the lower-bound estimates, implicitly assuming that 100% of non-bank deposits are held for tax evasion purposes, we observe an economically significant decrease in the level of tax evasion of 37.1%.

The findings of this analysis indicate that the CRS has been successful in reducing the occurrence of cross-border tax evasion through OFCs further than what was achieved with

[28] The estimated decrease in the overall level of cross-border deposits in OFCs is 37.1%. If we assume that 50% of the total cross-border deposits are held for tax evasion purposes, the estimation results indicate that this part of deposits were reduced by 74.2%.

the standard for EOIR and other forms of AEOI. The extensive information exchange that happens under the CRS has been essential for its success. Moreover, the CRS and EOIR are two international standards that complement each other, and one can argue that the introduction of the CRS has led to better achievements also in the context of EOIR. Many countries rely on the information received under the CRS to initiate tax investigations and request further information about the relevant taxpayers (OECD, 2022). This indicates that, post-CRS introduction, the overall success of the two international standards for EOI has improved.

The estimated effect of the CRS on cross-border deposits in OFCs is good news for policymakers, but it is nonetheless relevant to point out certain limitations of the analysis. I have not analysed whether the decrease in offshore-located cross-border deposits translated into similar repatriation effects and an increase in government revenues. As we know that the number of non-compliant OFCs today is very limited, it is reasonable to assume that the CRS triggered a considerable repatriation of funds. However, in the extension in Chapter 9, I present evidence that the US might be emerging as a new attractive deposit location in the post-CRS era. Even though this analysis contains certain weaknesses, we cannot rule out that part of the reduction in cross-border deposits in OFCs is a consequence of relocation towards the US, rather than an increase in compliance. Policymakers should make sure that appropriate attention is given to this emerging risk going forward.

Further, my analysis is based on deposit data, and I am not investigating the effect on other assets that are also covered by the CRS, e.g. portfolio investments. We cannot conclude that the effect of the CRS across all affected asset classes has been similar to the estimated effect on cross-border deposits. Despite this, it is reasonable to assume that changes in deposits constitute a sound proxy for the effects on the overall stock of wealth. Chiocchetti (2020) and Ahrens & Bothner (2019) have investigated the effects of the CRS on foreign portfolio investments based on IMF data, and present evidence that the CRS has significantly affected the level of tax evasion related to this asset class. In general, a lack of data availability has made it challenging for researchers to investigate the response in asset classes other than deposits, which is also why the BIS LBS deposit data is commonly applied in the previous literature.

Research by e.g. Johannesen & Zucman (2014) and Casi et al. (2020) make an effort to investigate the use of shell companies by relying on offshore-in-offshore deposits. I have not made similar efforts and can hence not rule out the possibility that tax evaders decreased their direct outbound deposits but increased the use of more complex entity structures where ownership is more obscure. It is important to underline that through the CRS, financial institutions are required to obtain information on the final beneficial owners of the deposits. The expectation is thus that there should be a significant effect of the CRS also on deposits held by shell companies or other complex entity structures.

A huge drawback of the BIS LBS data is that it reports immediate rather than beneficial ownership (BO). It is possible that there exists a considerable problem with misattribution of wealth in the data because deposits held through a shell company located in e.g. Jersey will be attributed to Jersey, even if the natural person who is the beneficial owner is located in e.g. France. A global, comprehensive BO register would significantly improve our ability to correctly attribute wealth to different countries. This in turn will give researchers a more precise way to evaluate the effects of international standards for EOI. Naturally, policymakers are concerned with this issue, and work on the implementation of comprehensive BO registers is already in progress[29].

Overall, due to the limitations in my analysis, it is impossible to draw conclusion about the exact impact of the CRS on the overall level of cross-border tax evasion. The findings in the extension underlines the importance for policymakers to continuously evaluate new and emerging risks and adjust the standards accordingly. Examples of other emerging risks include the redefinition channel and asset classes such as crypto, art and real estate which policymakers fear will be increasingly attractive for tax evasion purposes in the future. Tax evaders will always have strong incentives to find new ways of circumvention, and policymakers will have to adjust quickly to ensure the efficiency of international standards for EOI.

[29] The Global Forum of the OECD provides support for countries to build effective BO frameworks. For more information, see: https://www.oecd.org/tax/transparency/documents/effective-beneficial-ownership-frameworks-toolkit_en.pdf. *Accessed on 30.05.2023.*

10.2. Relevant extensions

Multiple topics emerge as highly relevant for researchers going forward. First, it is crucial to investigate further possible circumvention strategies where relevant data is available. If the US continues to be a non-participant of the CRS, researchers should proceed to investigate the evolution of such relocation effects over time. Further, little research has investigated the real economic impact related to the standards for EOI. It is also relevant to investigate the impact on public finances, and how this impact varies across regions and countries. Finally, a topic that has received little attention in the literature so far is an overall analysis of the costs related to the implementation of the CRS. Going forward, as countries gain more years of experience with the implementation, it is relevant for policymakers to obtain a more detailed insight into the related costs and benefits of the CRS.

11. Conclusions

This master's thesis investigates the impact of the CRS and to what extent it has been successful in reducing the level of cross-border tax evasion. I apply a two-way fixed effects structure and report a highly statistically and economically significant average decrease of 34.8% in cross-border deposits held in OFCs when compared to cross-border deposits held in non-offshore countries by counterparties from the non-bank sector in OECD and EU countries. This effect has also been persistent over time. After controlling for several additional variables, the estimated effect increases further to an average decrease of 38.2%. Although we cannot directly translate this result into an estimated effect on the level of cross-border tax evasion, it is reasonable to assume that the CRS has been successful in reducing cross-border tax evasion through OFCs.

In an additional sensitivity analysis, I find evidence that the effect of the CRS has varied considerably across the OFCs in the sample. One potential reason for this is that certain OFCs were already committed to AEOI with EU member states and did therefore experience a lower impact of the CRS on cross-border deposits. Despite this, the statistical significance of the results is robust to changes in the OFC selection, indicating that the CRS has provoked an additional effect on top of the international standards that were already in place. As an extension to the baseline analysis, I investigate a potential relocation of deposits towards the US. Despite certain weaknesses of this analysis, results indicate that cross-border deposits

held in the US has increased after the introduction of the CRS when compared to deposits held in other non-offshore countries. Such potential relocation effects constitute a risk to the efficiency of the standard, and it is important that both policymakers and researchers investigate this issue further in the future.

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Appendix

A.1. Countries in bilateral dataset

Reporting countries	*Counterparty countries*
Australia	*Australia*
Austria	*Austria*
Belgium	*Belgium*
Brazil	*Bulgaria*
Canada	*Canada*
Chile	*Chile*
Chinese Taipei	*Colombia*
Denmark	*Croatia*
Finland	*Czech Republic*
France	*Denmark*
Greece	*Estonia*
Guernsey	*Finland*
Hong Kong SAR	*France*
Ireland	*Germany*
Isle of Man	*Greece*
Italy	*Hungary*
Jersey	*Iceland*
Korea	*Israel*
Luxembourg	*Italy*
Macao SAR	*Japan*
Mexico	*Korea*
Netherlands	*Latvia*
South Africa	*Lithuania*
Spain	*Mexico*
Sweden	*Netherlands*
Switzerland	*New Zealand*
United Kingdom	*Norway*
United States	*Poland*
	Portugal
	Romania
	Slovakia
	Slovenia
	Spain
	Sweden
	Turkey
	United Kingdom
	United States
= 28 reporting countries	*= 37 counterparty countries*

A.2. Country specific implementation and effective dates for the CRS

Reporting country	*Year of first exchanges*	*Implementation into domestic law*	*Effective date*
Australia	2018	18.03.2016	01.07.2017
Austria	2018	14.08.2015	01.10.2016
Belgium	2017	16.12.2015	01.01.2016
Brazil	2018	29.12.2016	01.01.2017
Canada	2018	15.12.2016	01.07.2017
Chile	2018	21.07.2017	01.07.2017
Chinese Taipei	n/a	n/a	n/a
Denmark	2017	30.12.2015	01.01.2016
Finland	2017	08.04.2016	01.01.2016
France	2017	28.12.2015	01.01.2016
Greece	2017	14.04.2016	01.01.2016
Guernsey	2017	01.12.2015	01.01.2016
Hong Kong SAR	2018	29.06.2016	01.01.2017
Ireland	2017	31.12.2015	01.01.2016
Isle of Man	2017	23.10.2015	01.01.2016
Italy	2017	28.12.2015	01.01.2016
Jersey	2017	01.12.2015	01.01.2016
Korea	2017	15.12.2016	01.01.2016
Luxembourg	2017	24.04.2015	01.01.2016
Macao SAR	2018	31.05.2017	01.07.2017
Mexico	2017	12.01.2016	01.01.2016
Netherlands	2017	28.12.2015	01.01.2016
South Africa	2017	02.03.2016	01.01.2016
Spain	2017	17.11.2015	01.01.2016
Sweden	2017	10.12.2015	01.01.2016
Switzerland	2018	18.12.2016	01.01.2017
United Kingdom	2017	15.04.2015	01.01.2016
United States	n/a	n/a	n/a

A.3. FATCA agreements

See below a list of the FATCA agreements that exists between the US and other countries in the dataset, as well as the respective dates these agreements entered into force.

Country	*Date (in force)*
Australia	30.06.2014
Austria	09.12.2014
Belgium	23.12.2016
Bulgaria	30.06.2015
Brazil	26.06.2015
Canada	27.06.2014
Colombia	27.08.2015
Croatia	27.12.2016
Czech Republic	18.12.2014
Denmark	30.09.2015
Estonia	09.07.2014
Finland	20.02.2015
France	14.10.2014
Germany	11.12.2013
Greece	13.12.2017
Guernsey	26.08.2015
Hong Kong SAR	06.07.2016
Hungary	16.07.2014
Iceland	22.09.2015
Ireland	02.04.2014
Isle of Man	26.08.2015
Israel	29.08.2016
Italy	17.08.2015
Japan	11.06.2013
Jersey	28.10.2015
Korea	08.09.2016
Latvia	15.12.2014
Lithuania	07.10.2014
Luxembourg	29.07.2015
Macao SAR	30.07.2021
Mexico	10.04.2014
Netherlands	09.04.2015
New Zealand	03.07.2014
Norway	27.01.2014
Poland	01.07.2015
Portugal	10.08.2016
Romania	03.11.2015
Slovakia	09.11.2015
Slovenia	01.07.2014
South Africa	28.10.2014
Spain	09.12.2013
Sweden	01.03.2015
Switzerland	02.06.2014
Turkey	14.06.2021
United Kingdom	11.08.2014

Note: Chinese Taipei (Taiwan) and Chile have signed FATCA agreements, but these have not entered into force yet. All other countries in the dataset are exchanging information under the FATCA.

A.4. Special voluntary disclosure programs

See below a list of temporary VDPs in place for counterparty countries in dataset. This list is taken from Chiocchetti (2020, p.56), and includes information on relevant programs up until the end of 2019.

Country	***Duration of special VDP***
Australia	2010 Q2 & 2014 Q2 – 2014 Q4
Austria	2013 Q1 – 2013 Q4
Brazil	2016 Q2 – 2016 Q3 & 2017 Q2 – 2017 Q4
Chile	2015 Q1 – 2015 Q4
Denmark	2012 Q2 – 2013 Q2
Israel	2015 Q2 – 2016 Q4 & 2017 Q4
Italy	2015 Q1 – 2015 Q3
Mexico	2017 Q1 – 2017 Q3
Netherlands	2013 Q4 – 2014 Q2
South Africa	2016 Q4 – 2017 Q3
Spain	2012 Q2 – 2015 Q1
Turkey	2016 Q3 – 2017 Q2
United Kingdom	2013 Q1
United States	2014 Q3

A.5. Removed country pairs

See below a list of country pairs that have been removed due to extensive lack of data, i.e. less than 4 observations available on each side of the moment of treatment.

Reporting country	***Counterparty country***
Canada	*Iceland*
Canada	*Latvia*
Canada	*Sweden*
Chile	*Bulgaria*
Chile	*Estonia*
Chile	*Latvia*
Chile	*Lithuania*
Chile	*Poland*
Chile	*Portugal*
Chile	*Romania*
Chile	*Slovakia*
Chile	*Slovenia*
Denmark	*Hungary*
Finland	*Croatia*
Finland	*Denmark*
Finland	*France*
Finland	*Japan*
Finland	*Romania*
Finland	*Slovakia*
Guernsey	*Estonia*
Italy	*Iceland*
Korea	*Iceland*
Korea	*Lithuania*
Mexico	*Germany*
Mexico	*Japan*
Macao SAR	*Bulgaria*
Macao SAR	*Croatia*
Macao SAR	*Hungary*
Macao SAR	*Iceland*
Macao SAR	*Lithuania*
Netherlands	*Chile*
Netherlands	*Croatia*
Netherlands	*Czechia*
Netherlands	*Estonia*
Netherlands	*France*
Netherlands	*Hungary*
Netherlands	*Lithuania*
Netherlands	*New Zealand*
Netherlands	*Poland*
Netherlands	*Slovakia*
Netherlands	*United States*
Sweden	*Mexico*
Brazil	*Australia*
Brazil	*Austria*
Brazil	*Bulgaria*
Brazil	*Denmark*
Brazil	*Finland*

Brazil
Brazil
Brazil
Brazil
Brazil
Brazil
Brazil
South Africa
South Africa
South Africa
South Africa

Israel
Korea
Mexico
New Zealand
Norway
Sweden
Turkey
Chile
Croatia
Hungary
Romania

A.6. Descriptive statistics on cross-border deposits (aggregate data)

Group/country	*N*	*Mean*	*Standard Deviation*	*Min. value*	*Max. value*
All observations	1777	199 734.9	377 875.7	148	2 049 284
Offshore Financial Centres	512	144 183.4	140 532.6	6025	573 984
Non-offshore locations	1265	232 645.5	435 957.2	148	2 049 284
Australia	64	44 195.6	20 775.49	20 006	88 218.52
Austria	64	59 127.09	8668.214	43 923	74 045
Belgium	64	167 313	73 831.57	59 598.31	319 517
Brazil	64	3352.391	3107.261	540	12 405
Canada	64	117 979.7	65 126.34	65 126.34	285 571.6
Chile	64	3278.961	3087.917	149.385	11 521
Chinese Taipei	64	62 495.91	21 614.87	27 598	106 651
Denmark	64	43 289.07	11 170.31	18 582	68 044.98
Finland	64	26 999.8	18 258.71	2755	63 577.11
France	64	518 809.5	360 428.4	107 478	1 180 965
Greece	64	23 129.54	18 105.94	5620.816	73 226
Guernsey	64	39 102.9	14 078.78	21 323.63	66 721
Hong Kong SAR	64	275 196	112 967.5	88 667	452 725.8
Ireland	64	122 986.8	80 953.91	50 537.78	335 794
Isle of Man	64	35 774.97	10 851.86	23 211.78	61 259
Italy	64	64 684.99	11 775.21	42 238	93 590.88
Jersey	64	84 630.23	42 038.33	52 234	217 219
Korea	64	11 432.81	9226.485	1505	31 510.87
Luxembourg	64	163 720.2	24 261.69	128 057	225 363
Macao SAR	64	22 255.91	12 225.89	6025	47 316.72
Mexico	63	835.57	930.5842	148	4646.979
Netherlands	64	310 658.5	47 437.55	162 902	387 353.8
South Africa	50	4349.8	1179.524	2296	6794
Spain	64	98 282.5	39 869.21	61 224.04	240 709
Sweden	64	31 503.72	10 606.78	17 368	56 448.73
Switzerland	64	409 799.8	78 987.09	275 611.5	573 984
United Kingdom	64	1 640 185	194 525.4	1 141 590	2 049 284
United States	64	1 161 358	304 939.8	594 858	1 881 602

Note: Observed values in millions of USD. Observations indicate the aggregate outstanding amount of cross-border deposits in a deposit country in a given quarter.

A.7. Full results from extension (US relocation effects)

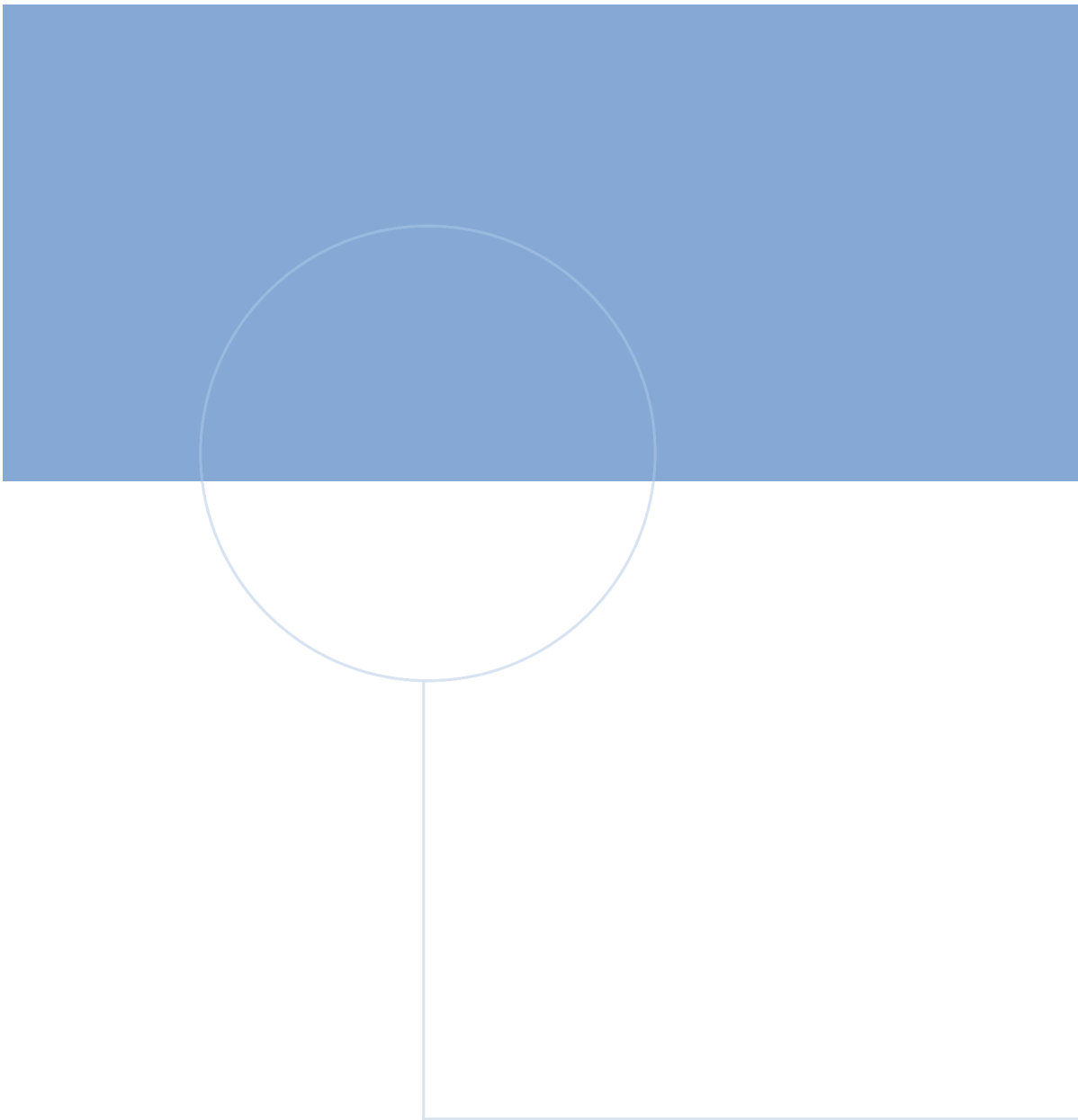
CRS specification:	*First wave adopters effective date*
	(1)
	log_deposits
CRS_firstwave_US	0.180**
	(0.0886)
CRS_firstwave_OFC	-0.392***
	(0.0698)
FATCA	-0.0208
	(0.0994)
SVD	0.0605
	(0.0522)
log_GDP_repcountry	0.352***
	(0.0775)
log_GDP_counterparty	0.434**
	(0.208)
Observations	29920
R^2	0.041
Adjusted R^2	0.040

Notes: Cluster robust standard errors in parentheses, clustered at the country pair level. All regressions include country pair and quarter-year fixed effects. Sample period running from Q1 2013 until Q4 2021.
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

A.8. Additional results from extension (US relocation effects): dynamic TWFE

	(1) log_deposits
CRS_firstwave_OFC	-0.365***
	(0.0696)
lead8	-0.419***
	(0.0812)
lead7	-0.103
	(0.0895)
lead6	-0.0787
	(0.0882)
lead5	-0.0202
	(0.0823)
lead4	0.0358
	(0.0752)
lead3	0.0204
	(0.0596)
lead2	0.0181
	(0.0646)
lag1	-0.0544
	(0.0602)
lag2	0.0204
	(0.0912)
lag3	0.0132
	(0.0689)
lag4	0.0508
	(0.0738)
lag5	0.00132
	(0.0637)
lag6	-0.0582
	(0.0678)
lag7	-0.0326
	(0.0704)
lag8	0.0923
	(0.0700)
Observations	29920
R^2	0.034
Adjusted R^2	0.032

Notes: Cluster robust standard errors in parentheses, clustered at the country pair level. All regressions include country pair and quarter-year fixed effects. Leads and lags are based on treatment variable CRS_firstwave_US. The first lead is omitted and serves as the benchmark period. * p < 0.1, ** p < 0.05, *** p < 0.01



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