Charles University

Faculty of Social Sciences
Institute of Economic Studies

MASTER'S THESIS

Financial Secrecy and Its Impact on Cross-Border Deposits

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Declaration of Authorship

The author hereby declares that he compiled this thesis independently; using only the listed resources and literature, and the thesis has not been used to obtain a different or the same degree.

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Prague, May 19th, 2017

Signature

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Abstract

The role of tax havens in the global issue of tax evasion has been illustrated by numerous studies. In 2009, a major international initiative has been launched by G20 and OECD with a purpose to put an end to offshore tax evasion. Yet the outcomes of this tax haven crackdown are often contested. This thesis brings new findings to the empirical research that has been done on the field of crackdown's evaluation. First, I confirm the results of earlier academic papers and I find a negative impact of information exchange treaties on the value of funds placed in tax havens. Second, I extend the existing research shifting the attention to deposits in non-havens, concluding that also the money from tax havens placed on non-havens' bank accounts disappear after signing a treaty. In the final part of the thesis, I – for the first time in literature – link the data on cross-border deposits with a measure of financial secrecy. I find that a decrease in secrecy score corresponds to a decline in deposits on a sample of all countries and non-havens. All my findings suggest that weakening the financial secrecy is associated with a significant outflow of cross-border deposits.

JEL Classification	C23, C33, E26, F21, G21, G28, H26, K42
Keywords	Financial secrecy, tax havens, offshore financial center, tax evasion, information exchange, regulation, secrecy jurisdiction

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Abstrakt

Role daňových rájů a jejich přispění ke globálnímu problému skrývání majetku a krácení daní byla popsána mnohými empirickými výzkumy. Učinit přítrž rozsáhlým daňovým únikům skrze offshore centra má za cíl globální iniciativa s názvem 'Tax haven crackdown', jež byla spuštěna roku 2009 pod záštitou G20 a OECD. Její výsledky a celková efektivita na cestě k eliminaci globálního problému daňových úniků jsou však často zpochybňovány. Tato práce přináší nové poznatky právě na poli empirické evaluace této iniciativy. V první části práce nalézám negativní dopad

bilaterálních smluv o výměně bankovních informací na depozita v daňových rájích vlastněná subjekty z ostatních zemí, čímž potvrzuji výsledky předchozích výzkumů. Dále rozšiřuji existující výzkum přesunutím pozornosti na prostředky uložené subjekty z daňových rájů na účtech v ostatních zemích. Docházím k závěru, že také v tomto případě vede podpis smlouvy o výměně informací k poklesu depozit. V poslední části propojuji data o přeshraničních depozitech s indikátorem míry finančního tajemství, čímž představuji zcela nový přístup k výzkumu provázanosti finančního tajemství a pohybů na bankovních účtech. Výsledkem je identifikace významně pozitivní korelace mezi hodnotou přeshraničních depozit v zemích, jež nejsou daňovými ráji, a mírou finančního tajemství v těchto zemích. Všechny hlavní výsledky mé práce tak ukazují na jasnou provázanost mezi změnami v rozsahu finančního tajmství a vývojem přeshraničních depozit.

Klasifikace JEL	C23, C33, E26, F21, G21, G28, H26, K42
Klíčová slova	Finanční tajemství, daňové ráje, offshore financial center, daňový únik, výměna informací, regulace, secrecy jurisdiction

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Acronyms

BIS	Bank for International Settlements
CEPII	Centre d'Études Prospectives et d'Informations Internationales
CIA	Central Intelligence Agency
DTC	Double Tax Convention
FATCA	Foreign Account Tax Compliance Act
FE	Fixed Effect
FDI	Foreign Direct Investment
FSI	Financial Secrecy Index
G20	Group of Twenty
GDP	Gross Domestic Product
GIFCS	Group of International Finance Centre Supervisors
LBS	Locational Banking Statistics
OECD	Organisation for Economic Co-operation and Development
OFC	Offshore Financial Center
R&D	Research & Development
TIEA	Tax Information Exchange Agreement
TJN	Tax Justice Network
UN	United Nations

Master's Thesis Proposal

Author:	Bc. Daniel Džmuráň
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Defense Planned:	June 2017

Proposed Topic:

The End of Bank Secrecy? An Evaluation of Tax Haven Crackdown

Motivation:

Shifting profits and wealth to offshore tax havens has become a prominent topic in economic and political debate. As recent studies show, the influx of foreign assets is no more a domain of small island nations only. Instead, some of the developed and well-governed countries also come into focus, when speaking about tax havens (Cobham, Janský, and Meinzer 2015). Furthermore, the significance of tax havens in terms of the volume of wealth and profits sheltered in there has risen dramatically over the past decades. Zucman (2014) sees two main reasons for that: globalization and technological progress. Whereas the former has made it much easier for corporations to move their profits offshore, the latter simplified the shift of assets for wealthy individuals.

There are numerous attempts among economists to estimate the financial costs resulting from shifting assets to tax havens. Their conclusions differ, however, due to differences in methodology and availability of data. According to the estimate by Henry (2012), the value of global financial wealth held offshore is $21 trillion, which, under numerous conservative assumptions, would result in the loss in corporate tax revenue of $189 billion per year. Another estimate by OECD (2015) claims that the base erosion and profit shifting (BEPS) causes the yearly loss of 4-10 % of the global corporate income tax revenues, which would correspond to the tax loss of $100-240 billion each year. Zucman (2013), one of the leading experts in the field, estimates that 8% of the global financial wealth of households is held offshore. In another work, Zucman (2015) also estimates that 20 % of all US corporate profits are booked in tax havens, which he believes is the main cause of a 33% decline in the US effective corporate tax rate since the late 1990s. Even more alarming is the fact that both proportion of individuals' offshore wealth and corporate profits booked offshore have significantly increased during the last decades (Zucman 2015).

The abuse of offshore tax havens by companies and individuals has become one of the big topics pronounced by political authorities around the globe. The first coordinated action against the offshore financial centres was launched in late 1990s, when a group of economically powerful nations established the first global anti-offshore scheme in cooperation with the OECD. Its goal was to encourage the existing tax havens to exchange financial information under the threat of blacklisting and economic sanctions. The next big step came after the 2007-08 financial crises, when fighting tax havens has become one of the top political priorities (Johannesen and Zucman 2014). The mechanism that was launched at the G20 summit in April 2009 urged each tax haven to sign at least 12 bilateral treaties concerning the exchange of financial information. Under the threat of economic sanctions, more than 300 treaties were agreed right before the end of 2009.

The policymakers welcomed the 2009 crackdown with the hope that it will finally bring the era of bank secrecy to an end (G20 2009). Whether this action was successful is in question, though. When Johannesen and Zucman (2014) came with the first empirical assessment of the scheme, they found that rather than repatriating funds, the crackdown led to a relocation of assets from cooperating tax havens to those, which were not covered by the treaties. It seemed therefore, that the least cooperating havens are in the end the ones that benefited the most from the anti-offshore policy.

In my thesis, I intend to replicate and expand the research made by Johannesen and Zucman (2014) with more actual data. The first goal will be to determine, whether their unsatisfying results are rather stable, or whether they demonstrate just a temporary shock caused by the anti-offshore program. The key question that I will try to answer is whether or not there can be distinguished a significant relocation of foreigners' assets from countries involved in the 2009 tax haven crackdown scheme. If yes, I will then attempt to explain it and propose possible policy implications. In the second part of the thesis, I will add the data on financial secrecy and examine, whether the level of secrecy is somehow related to the effectiveness of tax haven crackdown in respective countries.

Hypotheses:

1. The 2009 tax haven crackdown led to a stable relocation of foreigners' assets from countries involved in the anti-offshore scheme.
2. There was a stable increase in the value of foreigners' assets in those tax havens, which did not participate in the 2009 tax haven crackdown.

3. The effect of 2009 tax haven crackdown was significantly weaker in countries with higher Financial Secrecy Index.

Methodology:

The replication of the research by Johannesen and Zucman (2014) will be done using an econometric analysis with similar but more actual data on the cross-border bank deposits that I intend to obtain from the database of the Bank for International Settlements.

For the analysis of the role of financial secrecy, I will use the Financial Secrecy Index published by Tax Justice Network as a measure of the level of financial secrecy in observed countries during the period of 2009-2015. For the accounting data and statistics about financial flows, I will use the databases of International Monetary Fund, Bank for International Settlements and the United Nations.

Expected Contribution:

The main contribution of the thesis lies in its actuality. Its main goal is to provide an empirical assessment of a very recent policy. The thesis deals with an extremely current topic, which is among the top political issues, but suffers from lack of more comprehensive empirical evidence. Thus, the results presented can provide an empirical base for important policy implications in the field of anti-offshore policy.

Outline:

1. Introduction to the topic, basic definitions (tax haven, illicit financial flow etc.), literature review
2. History of the policy actions against tax haven abuse, 2009 tax haven crackdown scheme
3. Research by Johannesen & Zucman (2014): findings, limitation, extension
4. Primary model: determination of effectiveness of the 2009 tax haven crackdown: description of data and methodology, presentation of results
5. Effect on financial secrecy: addition of Financial Secrecy Index data in the model, presentation of results
6. Policy implications
7. Conclusions

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Author **Supervisor**

1 Introduction

"The era of banking secrecy is over," says the official communique from the 2009 G20 summit in London (G20 2009, p. 4). The statement perfectly illustrates the enthusiasm and huge expectations of participating global leaders, after they agreed on what was supposed to put an end to offshore tax evasion once and for all.

Tax havens have been an integral part of the global financial system for decades. Despite many concerns about their negative influence on tax inequality and social welfare or their involvement in organized crime, there was no effective pressure to cease their offshore activities for a long time. This changed with the financial crisis, during which the danger tax havens pose for global stability was demonstrated more loudly than ever before (Tax Justice Network 2017b). The shift in attitude of authorities, endorsed by growing public outrage, resulted in a new global initiative – the Tax Haven Crackdown.

The idea of G20 crackdown was simple. Under the threat of economic sanctions, tax havens were pushed into signing bilateral treaties, ensuring effective exchange of information. Each haven was supposed to sign at least 12 such treaties to avoid sanctions. The policymakers bubbled over with optimism, describing the incentive as the beginning of an end to widespread tax avoidance (Winnett and Conway 2009).

Since the very start, however, the crackdown's ability to achieve its goal was highly contested. Critical voices warned that the minimum requirement of 12 treaties is too modest and can be easily bypassed (Shaxson and Christensen 2011, Elsayyad and Konrad 2012), and that the treaties on its own are inefficient (Sheppard 2009). The first complex empirical evaluation of the 2009 crackdown was executed by Johannesen and Zucman (2014a). On a sample of 13 major tax havens, they concluded that signing a treaty between tax haven and non-haven is followed by almost 11 percent decrease in value of cross-border deposits placed by the non-haven entities on the tax haven bank accounts. They also estimated, however, that the funds do not return bank to their home countries and instead are sent away to other tax havens that have not concluded any treaty with the non-haven.

Employing a complex econometric approach and the dataset by the Bank for International Settlements (BIS), this thesis extends the research by Johannesen and Zucman (2014a). Using a similar, but much larger dataset and a longer time-frame, I first replicate their basic model. I identify a 13.51 percent decrease in the value of haven-based deposits owned by non-haven entities after a treaty is signed. Such result is consistent with that of the original paper, as the deviation is attributable to differences between samples. Second, I extend the research by Johannesen and Zucman (2014a) by estimating the same model for a sample of non-haven countries. I find that, after signing a treaty, the deposits of haven-based entities in non-haven bank accounts decrease by 20.70 percent. I argue that the relationship might be attributed to concerns of tax evaders that their offshore sham corporations, through which they invest the hidden wealth back to the home country, might be disclosed.

In the second part of the empirical analysis, I link the BIS dataset with a measure of financial secrecy by the Tax Justice Network. For the first time in literature, I use these datasets to estimate, whether there is a relationship in time between the level of financial secrecy and the value of cross-border bank deposits. I estimate that a 1-point decrease in financial secrecy score is associated with a 0.64 percent outflow of deposits. In case of non-haven countries, the relation is even stronger – 1.07 percent. If the sample is restricted to tax havens only, on the other hand, the relationship fades out.

The thesis brings in new findings to the literature on the 2009 Tax Haven crackdown and its evaluation. It also contributes to research on the role of financial secrecy and its implications to cross-border deposits. Additionally, the thesis examines the empirical potential of financial secrecy score and suggests it as a promising starting point for further research.

The thesis is organized in 7 more chapters. Chapter 2 presents the theoretical concepts and reviews the existing literature on tax havens. Chapter 3 covers major approaches to the fight against tax havens, culminating with the G20 Tax Havens crackdown and its evaluation. In the end of the chapter, the research hypotheses are introduced. Chapter 4 provides detailed information on the empirical strategy and datasets employed in the thesis. Chapter 5 goes through the empirical process on the impact of information treaties on cross-border deposits. Robustness tests and an identification

strategy are performed. Chapter 6 examines the association between financial secrecy and deposits and opens the discussion on the empirical potential of secrecy score. Chapter 7 provides suggestions for further research and concludes.

2 Tax havens: Yesterday and Today

Tax havens, secrecy jurisdictions, offshore financial centers – there are not many other three expressions with so much in common. Each one of them has countless definitions. Each one of them has been established with a special purpose and desire to define itself against the other two. They all are very unclear and ambiguous. And yet they all usually point at the same direction. In this chapter, I intend to disclose, what direction it is, along with reviewing the empirical discussion on the matter.

2.1 Definitions

The phenomenon of intentional profit shifting and tax avoidance has raised a lot of attention across many scientific fields. Theoreticians of law, such as Orlov (2004), attempt to contribute with a legal analysis of tax havens. Other scientists aim to inquire into the topic from a historical point of view. Gordon (1981), for example, points on the earliest accounts of tax haven practices in ancient Greece and Grapperhaus and Massotty (1989) explore similar measures offered to colonists in New Netherland (today's US Northeast).

Each of the fields, whose resources are being spent on the study of tax havens and related topics, naturally approaches to the investigation using its own prevalent assumptions, methods and categories. Therefore, even the most basic definitions, which are used in the research, differ significantly across respective fields. Besides, not even economists, who compose by far the largest portion of researchers interested in the topic, have come up with any unified and consistent classification and a basic framework of definitions. As Cobham et al. (2015) argue, such lack of basic definitional consistency has contributed to significant systemic weaknesses in the resulting empirical analysis. The most pronounced weaknesses include arguable robustness of results and selection bias, as a consequence of inconsistent methodology of data selection.

The definitional inconsistency would make it very difficult for a reader to understand and orientate within the text of this thesis, if the most commonly used terms would not

be clearly defined. In this section, I will therefore provide such definitions, so the reader can be sure, how to perceive the basic terms, to which I will refer.

First, it is important to clarify the distinction between 'jurisdiction' and 'country'. Although some authors, such as Downes and Goodman (1995), use the term 'country', when referring to individual geographical units defined as tax havens, the most of researchers prefer the other expression. The reason is that not all the territories that are individually assessed on the matter of tax avoidance are independent or sovereign countries. This is the case of dependent territories, whose independent legal system enables them to offer zero or low tax rates and financial secrecy (Tax Justice Network 2007). As Richard Murphy notes, "the difference in status does not matter; what characterizes these places is their ability to create law that can have impact outside their own territories" (Murphy 2009, p. 5). Examples of such territories include the British Crown dependencies (Jersey, Guernsey and Isle of Man), some of the British Overseas Territories (Cayman Islands, Bermuda or British Virgin Islands), the Dutch dependencies (Curacao or Sint Maarten) and other dependent territories, sub-states or special regime zones (Puerto Rico, Delaware, Labuan, Dubai).

For the sake of accuracy, I will also stick to the general rule and use exclusively the term 'jurisdiction' in the general debate. Therefore, the word 'country' will be used only in specific cases, when referring to individual independent countries.

2.1.1. Tax haven vs. Offshore financial center

There is no single and internationally accepted definition of tax haven. According to Hampton (1996), this is caused by the difference in growth paths of certain industries and legislation since the Second World War. Whereas many industries were quickly getting a transnational scope, the development of regulatory framework and responding legislation lagged behind. This resulted in the lack of internationally standardized accounting and fiscal laws, and thus also the globally accepted clear definition of tax haven.

Hampton himself, in his book *The Offshore Interface: Tax Havens in the Global Economy*, defines tax haven as "a jurisdiction that has no or at best, low, direct and indirect tax rates compared with the other jurisdictions" (Hampton 1996, p. 10). A very similar and also purely tax-related definition is listed in the *Dictionary of Finance and*

Investment Terms: the tax haven is a "country offering outside businesses and individuals an environment with little or no taxation" (Downes and Goodman 1995, p. 590).[1]

Throughout the time, however, the tax avoidance became a matter of more than just zero or low tax rates and the term 'tax haven' became insufficient. OECD, one of the leading authorities in the field, reacted to the situation developing a new definition. It goes a little further, as it enriches the purely tax-related definition with a reference to the elements of financial secrecy. In 1998, when the organization launched its project aimed on the fight with 'harmful tax practices', OECD has decided that the label 'tax haven' would be given to any jurisdiction, which "has (i) no or only nominal taxes; (ii) lack of effective exchange of information; (iii) lack of transparency; and (iv) no substantial activities" (OECD 1998, p. 22) .[2]

Still, the concept of tax havens suffers from one significant shortcoming. That is the absence of clear distinction between jurisdictions that are tax havens and those that are not. Since such a distinction is crucial for performing a robust economic analysis, the deficiency can have an adverse effect on the strength of models' inference. Jason Sharman concluded the dialogue on tax haven definition: "The term 'tax haven' lacks a clear definition, and its application is often controversial and contested" (Sharman 2006, p. 21). In my thesis, I will tackle the issue of inconsistent differentiation between haven and non-haven jurisdictions with robustness check in Section 5.3.

'Offshore financial centers' (OFCs) is another widely-pronounced expression in the economic literature. Similarly to tax havens, it also lacks an internationally accepted definition. In 2008, the UK's Treasury Committee quoted that "there is no internationally agreed definition of what constitutes an offshore financial center, but there are some common perceptions. (…) Generally, there is a tendency to adopt the approach of 'you know one when you see one'" (Treasury Committee 2008, 15).

[1] For other definitions of tax haven, see for example Roberts (1994), Orlov (2004), Murphy (2009), or Tax Justice Network (2013a)

[2] For full definition, see OECD (1998, pp. 22–23) at https://www.oecd.org/tax/transparency/44430243.pdf

According to Cobham et al. (2015), some researchers, such as Roberts (1994), started to use the term 'OFC' rather than 'tax havens', because the latter was perceived as too narrow and outdated. They preferred the newer term, because it reflects the reality more accurately. Whereas 'tax haven' refers only to favorable tax system, 'offshore financial center' has the ability to cover more elements, including weak regulation of financial sector, support for financial secrecy, anonymous company ownership etc. Roberts defines OFC as "a jurisdiction that has a deliberately less-regulated and less- (or un-) taxed financial sector and offers a range of financial services" (Roberts 1994, p. 91).

Roberts also argues that in many cases, OFSs developed out of initial tax havens (i.e. the jurisdictions with zero or low tax rates), after their authorities realized the great financial potential that offshore status provides. It is important to note that many of present-day OFCs were originally relatively poor territories. Financial benefits, such as fees and commissions that flew in from foreign companies and wealthy individuals seeking secrecy status, therefore looked quite appealing for such jurisdictions.

A little different understanding of the relationship between tax havens and OFCs can be seen in the paper by Murphy (2009). Referring to the Tax Justice Network's project *Mapping the Faultlines*, he also speaks about a causal relationship between the two, but in a slightly different way.[3] Whereas tax havens are "the legislative, judicial, fiscal and regulatory spaces provided by jurisdictions that encourage the relocation of economic transactions to that domain," OFCs should be rather perceived only as a "commercial response to the provision of such spaces by those seeking to profit from the opportunities they provide" (Murphy 2009, p. 1).

Although the term 'OFC' may be more precise and up to date than 'tax haven', the problem with an ambiguous distinction between 'offshore' and 'onshore' still prevails. Zoromé (2007) addresses the drawback establishing a new definition. He proposes that OFC is "a country or jurisdiction that provides financial services to nonresidents on a scale that is incommensurate with the size and the financing of its domestic economy" (Zoromé 2007, p. 7). In order to distinguish between offshore and onshore, he then

[3] Mapping the Faultlines has been a research project by Tax Justice Network, whose primary objective is to study, how secrecy operates through global financial markets. For more details, see Tax Justice Network (2016a)

develops a statistical method. Using the ratio of net exports of financial services to GDP, he identifies 22 OFCs on a sample of 100 jurisdictions.[4]

Another point of critique, which is common for both terms, originates from their prevalent popular perception. As Murphy (2011) or Treasury Committee (2008) argue, both expressions establish a stereotyped image of a small island paradise, in which the tax evaders hide their assets. Such perception is largely imprecise, however, because many jurisdictions labelled as tax havens or OFCs are landlocked countries (e.g. Liechtenstein, Switzerland) or belong among the world's major developed economies (e.g. Netherlands, Switzerland, City of London).

In conclusion, there is a number of key points, which constitute the critique of terms 'tax haven' and 'offshore financial center'. First, it is the definitional inconsistency, resulting in the weakened robustness of empirical results and possible selection bias in related research. Second, it is their dichotomous nature, which further harms the empirical validity through the ambiguous distinction between 'haven' and 'non-haven' or 'offshore' and 'onshore'. Third, both expressions are criticized for setting up a popularly predominant image of small island nations and dependencies, which contradicts the reality. Additionally, the term 'tax haven' is also under fire for referring solely to tax measures, which gives people the wrong impression of tax policies being the only legislative or regulatory tool used to attract tax evaders.

2.1.2. Secrecy jurisdiction & Financial Secrecy Index

Partly responding to the critique of both older expressions, Murphy (2009) comes with a new term – 'secrecy jurisdiction', which is defined by a combination of two characteristics:

i. "Firstly, secrecy jurisdictions create regulation that they know is primarily of benefit and use to those not resident in their geographical domain."
ii. "Second, secrecy jurisdictions create a deliberate, and legally backed, veil of secrecy that ensures that those from outside that jurisdiction making use of its regulation cannot be identified to be doing so" (Murphy 2009, p. 5).

[4] Out of these 22 jurisdictions, 19 were listed also on the IMFs list of OFCs. The three exceptions are Latvia, United Kingdom and Uruguay (Zoromé 2007).

The role of tax policies is not explicitly mentioned in the definition, as the primary emphasis is put on secrecy. It is nevertheless evident from the definition that the favorable tax provisions constitute only one of many tools, which the secrecy jurisdictions' authorities can use to attract foreign companies and individuals to hide their assets before their domestic authorities. The concept of 'secrecy jurisdictions' is strongly promoted by Cobham et al. (2015). They argue that "more robust research findings and greater definitional consistency are likely to emerge only when the focus of attention is shifted away from tax aspects or offshoreness onto (specific, measurable components of) the financial secrecy" (Cobham et al. 2015, p. 283).

Relative to the other two terms, the concept of 'secrecy jurisdiction' has one major advantage. Thanks to the shift in focus of attention on secrecy, it enables to overcome the dichotomy trap. According to Cobham et al. (2015), both of Murphy's characteristics are measurable, which enables researches to put the 'secrecy' under a quantitative assessment. Individual jurisdictions can therefore be ordered with respect to the scale of their secrecy. That is in line with the appeal by Dariusz Wójcik, who claims that the question whether a jurisdiction is offshore or onshore "cannot be answered with a simple yes or no. Just like world cityness, it is a matter of degree" (Wójcik 2013, p. 336).

A practical example of such empirical scale is the Financial Secrecy Index. FSI was developed by an international group of economists, who came together within the project called Tax Justice Network. It combines a qualitative measure of secrecy (based on 15 individual indicators) with a quantitative measure of jurisdictions' global significance and results in a complex index measuring the jurisdictions' level of involvement in global financial secrecy.[5] The final Secrecy Ranking, which ranks individual jurisdictions according to their involvement, has been published biennially since 2009. As of March 2017, the latest final ranking is therefore the 2015 Secrecy Ranking with a coverage of 102 jurisdictions.[6] It is topped by Switzerland, Hong Kong, USA, Singapore and Cayman Islands.

[5] For details about the methodology behind Financial Secrecy Index, see Tax Justice Network (2016a).

[6] See Tax Justice Network (2016b) - http://www.financialsecrecyindex.com/introduction/fsi-2015-results.

The major purpose of my thesis is to estimate how the value of cross-border financial deposits is affected by bilateral treaties, which should ensure an effective exchange of information between tax authorities of different jurisdictions. Therefore, rather than tax measures, the primary concept for the thesis is secrecy. Keeping that in mind, I will employ the definition by Markus Meinzer, one of the economists involved in the Tax Justice Network. In his paper, *Where to draw the line? Identifying secrecy for applied research*, he defines secrecy jurisdiction as a jurisdiction, which "provides facilities that enable people or entities escape or undermine the laws, rules and regulations of other jurisdictions elsewhere, using secrecy as a prime tool" (Meinzer 2012, p. 1). I have selected Meinzer's definition due to its relative clarity and straightforwardness and due to the fact that it depicts the true nature of tax avoidance phenomenon quite accurately and in all of its aspects. Consistently with Meinzer (2012), Cobham and Gibson (2016) and Tax Justice Network (2013b), I will use 'secrecy jurisdiction' interchangeably with the term 'tax haven' (which I will often use is a shortened version as 'haven').

2.2 The story of tax havens

Tracking down the historical development of offshore finance world, Palan et al. (2013) claim that the first tax havens have existed since the beginning of 20th century. Already at this point, they served to many purposes, including tax avoidance (the dominant purpose), money laundering and capital flight. Interestingly, the tax havens became very popular for spouses at that time, as they searched for mechanisms that would protect their wealth from costly divorce settlements.

It was not until the late 1950s, however, that tax havens started to emerge in a significant scale and usurp a nonnegligible role in globalizing capitalism-led world. The grounds for havens' expansion were built with the formation of Euromarket, when the first modern offshore financial center was developed in London City – the heart of the European common market (Palan et al. 2013). Christensen claims that the "environment of legalized secrecy is purposefully created by not requiring disclosure of ownership information for corporations, trusts, foundations and other legal entities; through non-participation or ineffective participation in judicial cooperation and information exchange; and through laws to protect banking secrecy arrangements" (Christensen 2012, p. 325). Lacking almost any form of financial regulation and

institutional supervision, the London market then quickly attracted the attention of wealthy individuals, corporations and tax evaders. First, from within the Euromarket, but throughout the time also from other parts of the world.

As British banks quickly realized the huge potential that tax havens provide, they started to establish subsidiaries in the Crown dependencies to serve booking offices for Euromarket transactions. It did not take long until banks from other European countries started copying the scheme, helping to the development of integrated financial systems (Johnston 1983). The North American banks saw the potential, too, and entered with their subsidiaries on some Caribbean islands. The main building blocks for the subsequent spread of offshore financial activities were laid.

Zucman (2014), similarly to Hampton and Christensen (1999), sees two major reasons why the spread accelerated in last decades and resulted in a massive growth of wealth placed in tax havens. First, it is the technological progress that makes it much easier for individuals and business entities to manage their wealth on long distance. The second factor is globalization, which simplifies the process of shifting profits and funds from one country to another without difficulties and excessive costs. Many years before Zucman, another explanation of the spread among the island nations was given by Park (1982). He argues that for the small islands, hosting offshore financial services provided a great opportunity to attract FDI, promote internationality and become economically more competitive.

Hampton and Christensen (2002) agree, but they remind that exactly because of such attitude the small island havens are now most endangered by the global anti-offshore initiatives. Focusing almost entirely on provision of financial services, these jurisdictions have invested the most of resources in financial sector, leaving the other sectors crowded out or underdeveloped. Now, the nations are overly dependent on demand for offshore services, which makes them even more reluctant to adopt institutional and regulatory framework common for non-havens.

Among the most prominent examples of overdependent tax havens is Jersey. Hampton and Christensen (2002) claim that over 90 percent of island's government revenues

come from the offshore activities.[7] In the Cayman Islands, also more than 50 percent of economy depends on the offshore services (Tax Justice Network 2005). If the anti-offshore initiatives were to substantially diminish the role of tax havens in global economy, then some of the small tax havens would be left with underdeveloped economies and lacking aa extraordinarily important source of revenues and employment.

Throughout the time, tax havens emerged around the entire globe. There are, however, three regions, in which their concentration is by far the densest – the Caribbean (Cayman Islands, Bahamas, Virgin Islands), the European periphery (e.g. Channel Islands, Monaco, Cyprus) and the Pacific area (Vanuatu, Samoa, Cook Islands). Secondary clusters include the Southeast Asia (Singapore, Hong Kong, Macao) and Indian Ocean (Seychelles, Maldives) and together with a few isolated havens (Liberia, Lebanon, Chile), they make the nowadays 'map of the offshore world' complete.

Of course, the geography of offshore world is widely dependent on the exact methodology, according to which the dividing line between havens and non-havens is drawn. I will address this issue in more detail in Section 5.3, where I will compare various lists of tax havens for the purposes of my empirical model's robustness check.

Dharmapala and Hines (2009) employed in interesting cross-country approach to analyze the likelihood of small countries becoming tax havens based on various geographical and political characteristics. They concluded that probability of a jurisdiction to be a tax haven decreases with population and distance from global financial centers. Most interestingly, however, they identified a governance quality as a major determinant. Better-governed countries are far more likely to become tax havens than countries with poorer institutions.

A similar approach, but of the firm level, was employed in a study by Desai et al. (2006). On a sample of American firm and their affiliates, they concluded that the likelihood of a company to seek for offshore financing increases with its size, international overlap, intensity of intrafirm trading and engagement in R&D.

[7] In their earlier work, Hampton and Christensen (1999) also claim remark that Jersey's offshore industry employs directly about 20 percent of local labor force.

2.3 Discussion on offshore activities

To follow up on the opening paragraph in this chapter, there is one more thing that tax havens, secrecy jurisdictions and offshore financial centers have in common – they all have a prevalently negative connotation. Most of policymakers and researchers tend to picture them as territories, whose policy and institutional framework provides assistance to tax evasion, money laundering, financing of terrorism and other illicit activities. Hampton (1996) do not hesitate to call tax havens the 'new pirates' of international financial capital.[8] In last decade, however, there has emerged an alternative stream of economic research that also tries to identify and emphasize some positive consequences that offshore activities provoke (Dharmapala 2008). In this subsection, I am going to introduce the discussion by presenting the most pronounced arguments of both sides. Doing so will later enable me to identify a starting point for my own empirical analysis.

2.3.1 Traditional 'negative' view on tax havens

The negative view of the offshore world is still prevalent in the literature. The authors most often stress the negative consequences in huge losses of tax revenues in non-havens, widening of gap between the haves and the have nots and interconnection between the offshore world and illicit financial flows. Some researchers, such as Slemrod and Wilson (2009) also estimate that if tax havens were at least partially eliminated, the welfare in non-havens would improve.

Loss of tax revenues

The value of tax revenues that are lost as a consequence of individuals and corporations hiding their wealth in tax havens is arguably the most visible cost of global financial secrecy. Many researchers attempt to estimate these numbers. The definitional inconsistency together with the secrecy character of examined assets, however, results in quite significant difference among various estimates. The outcomes of researchers' efforts thus differ in both the value of hidden wealth and uncollected tax revenues.[9]

[8] Hampton (1996) likened the role of present day tax havens' to that of 18th century privateers from Jersey, who used to attack French sailors under the protection of British navy.

[9] With the term 'hidden wealth', I refer to the financial and non-financial wealth that individual or corporations hold in secrecy jurisdiction instead of their home countries. I will use the term interchangeably with a similar expression, 'offshore wealth'.

In his influential paper, *The price of offshore revisited*, James S. Henry estimates that at least $21 to $32 trillion has been placed offshore in 2010. Besides, he marks the estimations as 'conservative' and notes that the numbers include only financial wealth. "A big share of the real estates, yachts, racehorces, gold bricks and many other things that count as non-financial wealth" are also owned via offshore structures and thus the real value of hidden wealth would be significantly higher (Henry 2012, p. 5).

Other attempts to estimate the value of hidden wealth result in smaller amounts. Zucman (2014), who focuses only on the financial wealth of households, claims that 8 percent of such wealth, that is $7.6 trillion, was held in tax havens at the end of 2013. Zucman further estimates the annual loss on global tax revenues. He concludes that the total value of uncollected taxes due to keeping wealth offshore reaches $190 billion (out of which $71 billion is lost in the world's poorest countries – Africa, Latin America and Asia excluding Russia and Gulf countries[10]). In the United States, for example, Zucman (2014) estimates that the effective corporate tax rate fell from 30 to 20 percent over the period of 1998 – 2013, adding that 6 to 8 percentage points out of the 10 percent decline can be attributed to the role of low-tax offshore centers.

The Global Wealth Report by Boston Consulting Group mentions the value of private wealth to be worth $8.9 trillion booked offshore (Boston Consulting Group 2014). Fröberg and Waris (2011) report that due to transfer mispricing and unreported flows of money to tax havens and rich countries, the low-income countries lose at least $160 billion on tax revenues each year – that is more than constitutes the value of aid they receive.

Illicit financial flows

Another important point of the offshore world's critique related more to the secrecy element. The reason is that it is in this secrecy unregulated space with lack of supervision, where there is a big potential for illicit financial flows to occur. As Murphy (2009) argues, these unreported funds can be proceeds of corruption, criminal actions, blackmailing or just the profits that should be reported and taxed in territories, in which they arose, so their owners hide them offshore in order to avoid a proper taxation.

[10] The regional breakdown of tax revenue loss according to Zucman (2014) in as follows: Europe - $75 billion, United States - $36 billion, Asia (excl. Russia and Gulf countries) - $35 billion, Latin America – $21 billion, Africa - $15 billion, Canada - $6 billion, Russia - $1 billion, Gulf countries - $0 billion.

Natarajan (2010) adds that the increase in offshore banking has made it much simpler for criminals and traffickers to hide their assets safely in havens and not worry about the law enforcement. In general, the secrecy arrangements that tax havens provide helped towards the globalization of crime.

Murphy (2009) also refers to Baker (2007), who estimates the annual value of cross-border illicit financial flows to reach $1 to $1.6 trillion each year. Similarly to other authors, he calls the estimate conservative. Adding that roughly half of this amount comes from the developing countries, he also makes the comparison with the value aid provided to these regions. Building on the number from 1990s, he concludes that for each $1 granted by rich countries within financial aid, some $10 of illicit funds are flowing away from the third world through tax havens.

Secrecy jurisdictions are also often being associated with financing of terrorism or money-laundering. Van Fosses (2003), for instance, examines the practice of money-laundering in Pacific tax havens, such as Nauru or Vanuatu.

Tax havens as the cause of inequality and social injustice

The wealth inequality in the world is growing. While the bottom half of world's adult population collectively owns less than 1 percent of global wealth, the top 1 percent dispose of more than 50 percent of all global household wealth (Davies et al. 2016). The same source claims that people belonging to the richest decile own 89 percent of all global assets. Additionally, the combined wealth of ten wealthiest individuals according to Forbes magazine exceeds the annual gross domestic product of countries like Nigeria (the most populous African country), Belgium or Thailand ("Global Inequality" 2016).

There are many factors that economic literature lists as sources of the widening gap between the rich and the poor. Therefore, the literature on the topic is quite extensive. Jaumotte, Lall and Papageorgiou (2013) identify a statistically significant positive relationship between the value of Gini coefficient and technological progress, suggesting that the benefits of technological changes are captured mostly by people in higher income quantiles. Using a panel data from Latin American countries, Herzer, Hühne and Nunnenkamp (2014) attribute the gap widening to inflow of foreign direct investments. Claessens and Perotti (2007) point on the adverse effect of financial

deepening. IMF (2015) adds that the phenomenon could be also explained as a result of unequal access to education or changes in certain institutional factors, such as union membership, minimum wage or labor market flexibility.

While discussing the causes of growing inequality, Cobham and Gibson (2016) turn their attention to the topic of financial secrecy. They argue that, being promoted by secrecy jurisdictions around the world, it also plays a significant role in widening the gap between the rich and the poor. The uncollected funds from taxation of corporations and individuals that use to hide their wealth offshore are missing in countries' budgets. As a result, governments are often forced to impose higher taxes on consumption, such as the value-added tax, which mostly hurt the people at the bottom of the income distribution.

Participating on the offshore environment that contributes to widening income gap and creating imbalance of wealth distribution, the Tax Justice Network (2005) sees tax havens among the entities carrying the largest responsibility for the problem of social and tax injustice. Enabling international corporations and wealthy individuals to hide their profits and assets offshore decreases the competitiveness of those, who cannot afford it, which even more widens the gap between the groups.

2.3.2 Alternative view: benefits of offshore activities

In opposition to the traditional negative perception of tax havens, there is a number of empirical studies that draw attention also to positive aspects of offshoreness. Using various methodologies and various offshore elements as explanatory variables, their authors are usually searching for the positive consequences either in non-haven countries within the same region or in the domestic countries of havens' users.

Desai et al. (2006), for example, belong to the first group. They conclude that companies that enjoy reduced tax costs thanks to their engagement in offshore activities are also more likely to support investments in nearby non-haven countries. The explanation is that the haven users benefit from reduced investment costs, which enables them to expand into more non-haven markets.

More studies, however, are dedicated to the tax haven benefits n their users' countries. Qing and Smart (2007) discovered that assets shifting into tax havens decreases the investment rate's responsiveness to corporate tax rate in non-havens. Building on that,

they conclude that while the outflow of income to OFCs does reduce tax revenues, it also opens a space for non-haven authorities to increase corporate tax rates without risking a significant outflow of FDI. Dharmapala (2008) adds that – under specific conditions – the existence of offshore financial centers can potentially mitigate tax competition and stimulate the efficiency in non-havens. Rose and Spiegel (2007) add to the discussion, suggesting that proximity to an OFC might have a positive impact on competitiveness in the non-haven banking sector.

3 No Tomorrow? The Tax Haven Crackdown

Considering all the negative consequences mentioned in Chapter 2, it is no wonder that tax havens have been a thorn in especially developed countries' side. Adding a predominant negative perception of the tax havens' role by the general public, there has been a long-lasting interest to curtail the role they play in the global economy.

The 'fight against tax havens' has been led primarily by two types of entities. First, it was the international institutions, such as the UN, OECD, G20, Financial Action Task Force or Financial Stability Forum, which have tried to exert pressure on tax havens to comply with principles of fair taxation (International Monetary Fund 2000). As the principal part of the pressure was in the form of research, evaluation, issuance of standards, lists making and verbal pressure, it did not truly motivate tax havens to cease the offshore activities – especially the ones that were dependent on their provision.

The second, much younger group is represented by various non-political expert organizations and think-tanks, such as Tax Justice Network, Global Financial Integrity or Global Alliance for Tax Justice. These institutions contribute mostly by making research, moderating discussion, raising public awareness and making pressure on both national and international authorities. Their primary goals are to push for systemic changes in order to resolve issues related to tax havens, enhance transparency of international financial flows and to secure a functionate oversight and redistribution of wealth (Tax Justice Network 2017a, Global Financial Integrity 2017, and Global Alliance for Tax Justice 2016).

3.1 From words to action

During the 1990, the OECD started to pressure on tax havens with an effort to make them sign bilateral treaties on information exchange with other jurisdictions (preferably non-havens). The purpose of such treaties is to establish an environment, in which the treaty counterparties exchange information about owners of cross-border deposits automatically or at least upon request. Provided that such exchange works

properly, the tax authority of say Germany would be entitled to request information on a German taxpayer, who owns a deposit in say Luxembourg, if it is 'foreseeably relevant' for carrying out the provisions of the treaty (OECD 2010).[11] The Luxembourgian bank is then obliged to provide such information.

As Figure 1 depicts, the willingness of tax havens to sign treaties was not great from the beginning. The turnaround came with the financial crisis, to which the activities of tax havens apparently contributed in a large scale (Tax Justice Network 2017b). The crisis brought the international institutions and non-havens together to address the problem more resolutely. The issue of tax havens became a top political priority.

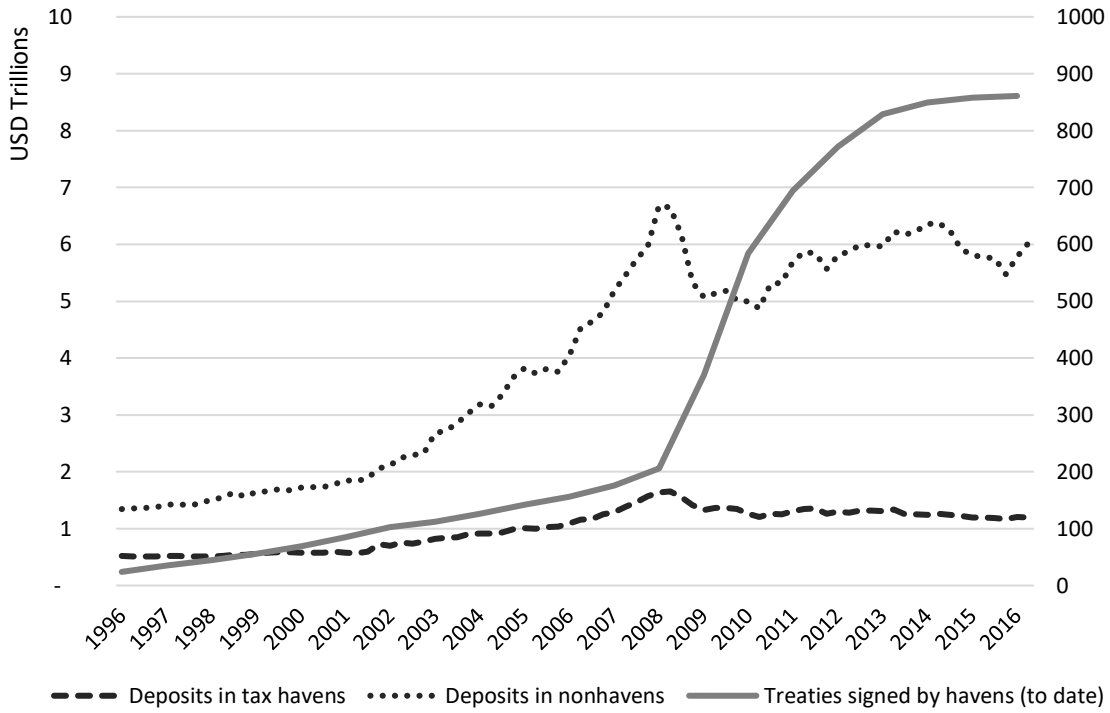
In April 2009, representatives at the G20 London Summit agreed to urge tax havens to sign the treaties under the threat of economic sanctions. "We stand ready to deploy sanctions to protect our public finances and financial systems. The era of banking secrecy is over" (G20 2009, p. 4). The G20 members ruled that the sanctions could be imposed to any tax haven that does not sign at least 12 bilateral agreements on exchange of information.[12]

The turnaround in tax havens' behavior is clearly visible in Figure 1. While in 2008 only 30 treaties were concluded by tax havens, the year after there were 164 agreements signed. From that point of view, it appears that the G20 crackdown was a resounding success, as the aggregate number of treaties concluded by tax havens tripled within 2 years after the summit. A quick look on the dynamics of cross-border deposits placed in tax havens suggests that response of their owners was immediate, as the increasing trend of deposits value stopped. This might, however, be caused by the financial crisis rather than by the launch of G20 crackdown. I will tackle this issue in detail in the empirical part in Chapter 5.

[11] This foreseeable relevance regards to a rational suspicion that the German taxpayer uses his/her bank account in Luxembourg for tax evasion or other illicit action related to tax policy (Johannesen and Zucman 2014a).

[12] Only a few months later, G20 crackdown was joined by arguably the most significant national initiative in the field - The Foreign Account Tax Compliance Act (FATCA). Being passed in 2010 in the United States, FATCA demands from foreign banks to provide the US tax authorities information on bank accounts of US taxpayers.

Figure 1 – Value of cross-border deposits and the treaties with tax havens



Source: BIS Locational banking statistics, OECD Exchange of Tax Information Portal (as of March 2017)

3.2 Evaluation of Tax Haven Crackdown

Given its recentness, the evaluation of G20 crackdown is still rather fresh and incomplete. The international organizations, such OECD or G20, that stay behind the whole initiative claim that the crackdown has been a global success. OECD (2011), for example, refers to a substantial increase in tax revenues, improved fairness of the tax system or the changes in banks' attitudes towards facilitation of offshore evasion. Braun and Weichenrieder (2015) add on the example of Germany that concluding treaties with tax havens is associated with a 46 percent decrease in number of German affiliates in havens and also with fewer offshore financial operatins.

There has, however, also emerged a number of critique voices against the G20 crackdown. Two major points were raised by Shaxson and Christensen (2011) in their article for the *Financial Times*. First, they criticize the need for a justified request on information, which requires the information seeker to first have a reasonable suspicion on a particular taxpayer. Sheppard (2009) agrees, adding that even such prior knowledge in a form of a suspicion is difficult to obtain. Second, Shaxson and

Christensen (2011) consider the requirement of 12 treaties too lenient and insufficient. If the tax haven signs treaties only with other havens or with non-haven with negligible financial connections, it is whitelisted and safe from sanctions. In such case, however, the initiative cannot have any significant effect. The idea was then empirically developed by Elsayyad and Konrad (2012), who concluded that signing multiple bilateral treaties is more costly a less efficient that the alternative of one multilateral agreement. Still, the authors agree with the OECD that measures evoked by the crackdown are better than nothing.

The first complex empirical assessment of G20 crackdown was concluded by Johannesen and Zucman (2014a). On a sample of 13 tax havens, they estimated that signing a treaty between a non-haven and a haven leads to roughly 11 percent decrease of deposits owned by the non-haven's entities in the haven. On the other hand, the funds do not return back to their owners' countries, but rather they are deposited in other havens (preferably those that have not concluded treaty with owner's country). The results suggest that the concern about 12 treaties being too little to have an actual impact was legitimate. Consistently with Elsayyad and Konrad (2012), the authors propose a comprehensive multilateral agreement as a more efficient way how to tackle tax evasion than a large number of bilateral treaties.

3.3 Research hypotheses

My thesis has two major empirical parts. In the first one, I intend to expand the research by Johannesen and Zucman (2014a). I will begin with the replication of their basic model, searching for an effect of information exchange treaties on the value of cross-border deposits in tax havens. Using a newly published dataset of BIS, I will then will extend their research from haven-non-haven pair to other specification, most importantly to deposits from tax havens placed in non-haven bank accounts.

Compared to the analysis by Johannesen and Zucman (2014a), I will use a slightly different methodology. While the original authors examined the role of both new bilateral treaties and changes in domestic law, my research is focused solely on new treaties, allowing me to assess their effect in particular. Second I will use much larger sample of treaties and a longer time-frame. The sample of treaties in my disposal counts 4205 events compared to 861 by Johannesen and Zucman (2014a) and the period

covered is 59 quarters since January 2002 compared to 32 quarters since October 2003. Third, to assess, whether the potential effect comes after the treaty signature or rather only after the treaty enters into force, I will run the model separately for the date of legal force as a key variable.

In the second part, I will – for the first time in literature – link the data on cross-border deposits with a measure of financial secrecy. This will allow me to infer, whether or not there is an association in time between the level of secrecy and foreigners' deposits in both tax havens and non-havens.

The research hypotheses that I am going to examine in the thesis are as follows:

A. There is a negative impact of information exchange treaties in the value of cross-border deposits in tax havens held by entities from non-havens.

B. There is a negative impact of information exchange treaties in the value of cross-border deposits in non-havens held by entities from tax havens.

C. The value of cross-border deposits in tax havens is positively associated with the financial secrecy score.

The empirical approach related to hypotheses A and B is executed in Chapter 5. Hypothesis C is then examined in Chapter 6.

4 Empirical Strategy

In this chapter, I provide an overview and basic descriptive statistics of the data that will be used in the empirical analysis. There are three major sources. The data on bilateral treaties were obtained from the database of OECD, the locational banking statistics on the value of cross-border financial deposits come from the Bank for International Settlements (BIS) and the secrecy scores from the Tax Justice Network (TJN). Additional data on jurisdictions' GDP and various geographical characteristics were obtained from the databases of World Bank, CIA and CEPII Institute. As of December 2016, all the data used to assemble the final dataset were publicly and freely available on the websites of respective institutions.

4.1 Identification of tax havens

A robust strategy on differentiation between tax havens and non-havens is among the most fundamental assumptions for a proper execution of the empirical analysis. In the economic literature, however, these is no general consensus on which jurisdictions should be identified as tax havens. There is also no clear and general methodology on how to identify a tax haven. And even if there was one, the economic, political, legal and regulatory environment around the world changes so dynamically that the desired 'list of tax havens' would stick around without significant changes for only a limited period of time. Additionally, especially large and economically significant countries have a tendency to protest against being identified as tax havens. Therefore, as Gravelle (2015) points out, the identification process is no stranger to attempts of political pressure.

Coming up with my own methodology for havens identification and releasing an original list of tax havens would be far beyond the scope and ambitions of this thesis (not to mention my qualification). However, since my study is built on the research by Johannesen and Zucman (2014a), the solution of the haven identification problem suggests itself. As drawing a comparison between my result and those by authors of the original paper is among the main goals of this thesis, I will use the same list of tax havens as they have. The list comprises of the total of 52 jurisdictions and is attached

in the Appendix. For the sake of robustness of tax havens identification, I will also check, whether my estimates would be consistent with estimates based on other differentiation methods. The robustness check will be concluded in Section 5.3.

4.2 Data on information exchange treaties

As a general rule, the exchange of bank information between different jurisdictions is being ensured by bilateral tax treaties. In order to be able to assess the direct impact that information exchange has on the value of deposits, it is therefore crucial for the empirical analysis in this paper to obtain a complex and evident data on such treaties.

Being one of the leading authorities trying to promote the exchange of information, the Global Forum on Transparency and Exchange of Information for Tax Purposes gathers such data from all its members and publishes them on the OECD's *Exchange of Tax Information Portal*. The Portal is publicly available online and releases all the treaties that were concluded by any of 140 members of the Global Forum (either with another member or with a non-member jurisdiction).[13] Among the 140 participants, one can find all the countries of OECD as well as all G20 members and also all major tax havens, which ensures that the Portal provides a significant coverage of the global universe of information exchange treaties.[14]

Based on whether the counterparties are among the Global Forum members or not, one can identify three types of contractual relationship. Thanks to the Portal, I can obtain a complete set of information on two of them:

1) Treaties between two members of Global Forum – complete information on 3194 bilateral agreements among the 140 members are published.
2) Treaties between a member and a non-member – complete information on 1011 agreements between among members and the total of 72 non-member jurisdictions are published.
3) Treaties between two non-members – there are no data on such agreements.

[13] See Exchange of Tax Information Portal with a complete information about bilateral tax treaties on http://www.eoi-tax.org/#default

[14] All jurisdictions considered tax havens by Johannesen and Zucman (2014a) are among the members of Global Forum

Hence, as of December 31, 2016, the universe of reported signed treaties comprised of 4205 bilateral agreements that have been concluded among the total of 212 jurisdictions since 1947.[15]

4.2.1 Peer-review process of concluded treaties

OECD's Exchange of Tax Information Portal offer several other information that are helpful to the upcoming analysis. Besides the distinction between two basic types of treaties (DTC – Double tax convention and TIEA - Tax information exchange agreement[16]), the Portal releases the exact dates, on which each treaty was signed and on which it entered into force. The date of signature is going to be of a big importance in the empirical part, since it opens the period, in which the potential consequences of agreement are expected to appear.

It is not the quantity, however, which gives the best idea about individual jurisdictions' level of transparency and willingness to participate in the international exchange of bank information. That is why the OECD staff invests considerable amount of resources to evaluate, whether or not each of the concluded treaties is in compliance with the Principles of Transparency and Effective Information Exchange. OECD (2006) mentions three key aspects, on which the process of evaluation aims:

1. Exchange of information mechanisms – existence of mechanisms enabling the exchange of information with foreign tax authorities; ensuring that the information can be available for exchange 'upon request';
2. Appropriate access to information – existence of legal basis providing domestic tax authorities with the access to bank information and information about ownership, identity and accounting;
3. Availability of information – existence of mechanisms ensuring that the information required for tax, regulatory, anti-money laundering or commercial law purposes are reliably gathered and kept for a sufficient time period.

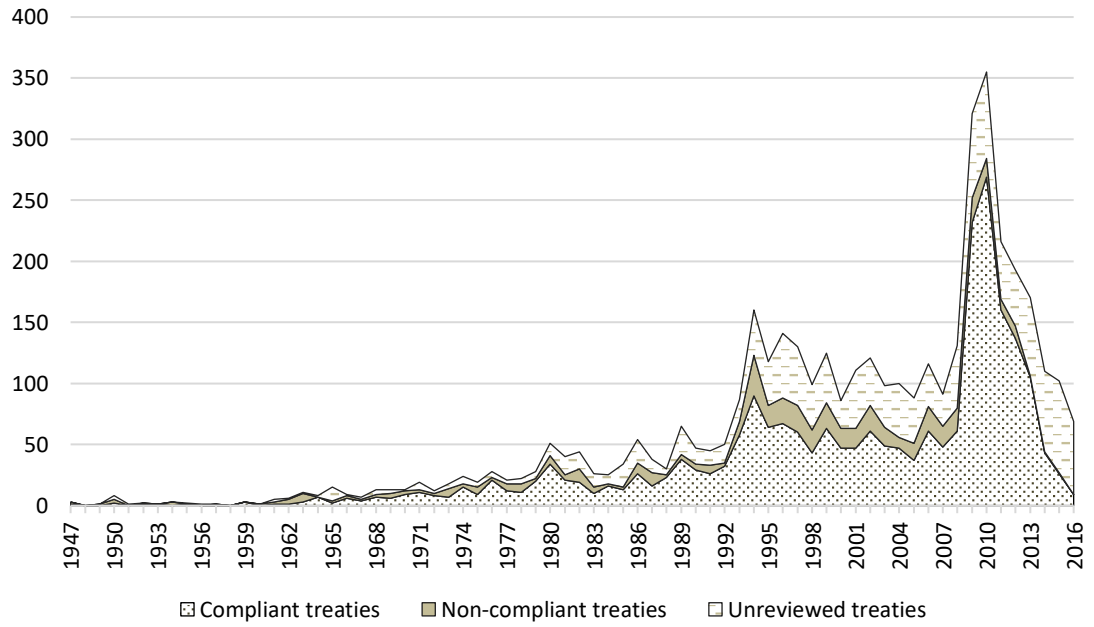
[15] All data on treaties from the Exchange of Tax Information Portal that were used in this thesis were extracted from the Portal's website as of December 31, 2016.

[16] DTCs are complex treaties concerning also with taxation of cross-border economic activity, whereas TIEAs are aimed solely on the exchange of information for tax purposes. DTCs are much more common. However, many jurisdictions, such as Bermuda, Bahamas, Cayman Islands, Guernsey, Jersey or Monaco prefer TIEAs, since it enables them to avoid making commitments on the issues on taxation (Johannesen and Zucman 2014a).

Based on the evaluation process, the OECD issues a final yes-or-no verdict, stating whether or not the individual agreements contain sufficient provisions concerning the exchange of bank information. Although all treaties are publicly available on the Portal, reviewing each and every one of them myself would be far beyond the scope of both this thesis and my qualification. I will therefore use the OECD verdict as a key variable in the upcoming analysis. The final dataset on treaties is projected to contain only those agreements, which were granted a 'yes' verdict, i.e. those that comply with all the OECD principles of effective information exchange.

Out of the 4205 agreements concluded since 1947, there are 2356 compliant treaties and 497 non-compliant treaties. The remaining 1352 agreements has not been reviewed yet. Figure 2 shows, how the number of information exchange agreement developed since 1947, when the first such treaty was signed between the United Kingdom and British Honduras (now Belize). Figure 2 also offers a distinction between agreements that are compliant with the OECD standards, those that are not and those that have not gone through the peer-review process.

Figure 2 - Treaties on information exchange (signed in 1947-2016)



Source:OECD, Exchange of Tax Information Portal (2016)

The dynamics revealed in Figure 2 is in line with the effort of OECD that strengthened in 1990s and reached its peak during the financial crisis (as mentioned in Section 3.1). The number of new treaties signed almost tripled between 2008 and 2009, after

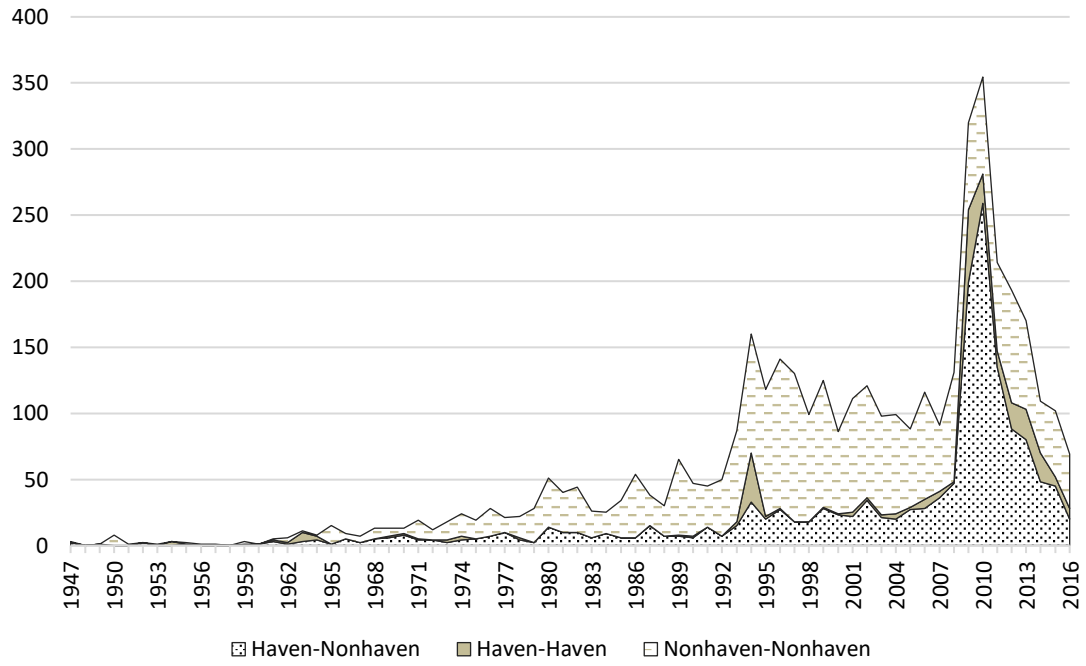
representatives on the G20 summit decided to urge tax havens to sign treaties under the threat of blacklisting and imposing economic sanctions.

4.2.2 Treaties by tax havens and non-havens

As I already mentioned in Chapter 3, the critics of the tax haven crackdown argued that the initiative does not secure that the tax treaties will be concluded between havens and non-havens. Tax havens can therefore sign the required number of treaties with each other, satisfy the crackdown requirement, and still keep all the funds from non-havens without any obligation to disclose information on their depositors. Under such scenario, the whole initiative could not meet its goals. It is therefore of capital importance to find out, whether or not the boom in 2009 was driven by treaties concluded between havens and non-havens.

To answer that fundamental question, Figure 3 might be of a good help. Once more it shows the number of treaties concluded between 1947 and 2016, but this time the treaties are classified into three groups based on whether the parties are tax havens or not. It suggests that the concerns of critics were legitimate. Since 1995, the share of haven-haven treaties has never exceeded 6 percent of all concluded agreements. In 2009, however, the ratio increased to more than 17 percent and has not fallen below 5.6 percent ever since. On the other hand, it still leaves a substantial share of treaties concluded between havens and non-havens. Specifically, out of 1563 treaties signed since 2009, only 11 percent were signed between two tax havens and 32 percent between two non-havens. By far the largest share of agreements, 57 percent, was therefore concluded between a haven jurisdiction on one side and a non-haven on the other. Despite the understandable concerns of critics, the pessimistic scenario has not come true, as the wave of new agreements was largely driven by the most concerned group of country-pairs. For the sake of completeness, it is obligatory to note that 66.77 percent of treaties signed between a haven and a non-haven since 2009 are compliant with the standards for an effective information exchange.

Figure 3 – Treaties by tax havens/non-havens (signed in 1947-2016)[17]



Source: OECD, Exchange of Tax Information Portal (2016)

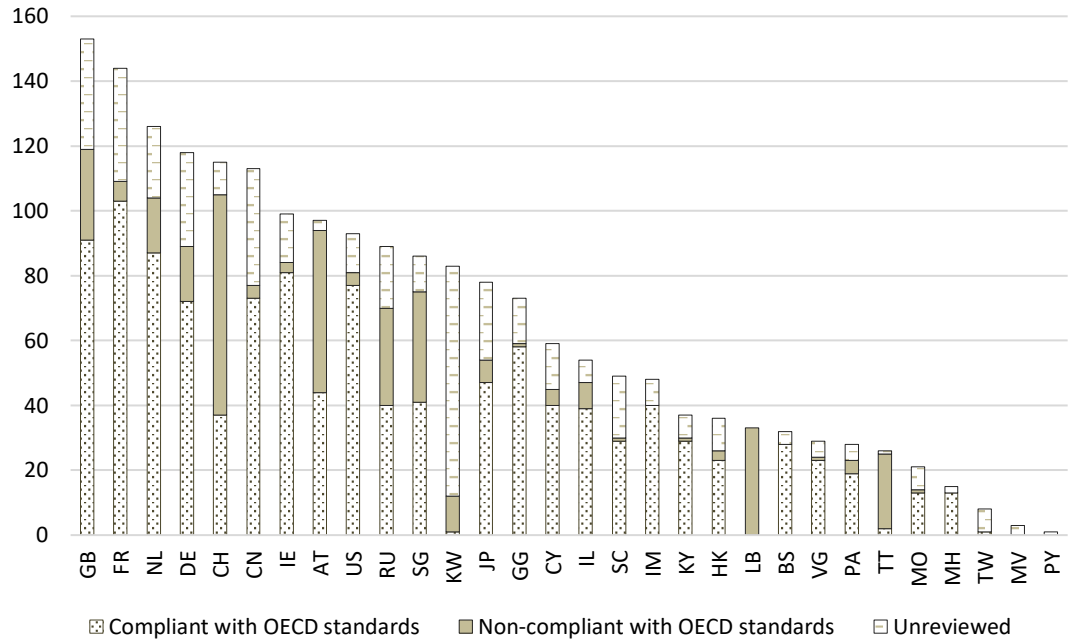
The number of treaties signed by individual jurisdictions varies quite significantly. Whereas the United Kingdom concluded treaties with 153 jurisdictions, countries like Paraguay, Dominican Republic or Maldives entered into agreement with less than 10 counterparties. A more illustrative look on the number of treaties concluded by selected jurisdictions is provided in Figure 4.

Filtering the treaties with respect to the OECD's verdict on their real effectiveness in promoting the exchange of information gives yet another view on the jurisdictions' true commitment to the cause. Among the most evident cases is the situation of Switzerland. Although the country concluded quite respectable 115 bilateral treaties since 1954, only 37 of them (slightly over 32 percent) were marked as compliant with the OECD information exchange standards. Besides, a closer look at this case reveals that among the jurisdictions, with whom Switzerland has not concluded treaties ensuring an effective exchange of information, is a number of big and significant partner countries (and therefore locations of considerable amount of financially interesting subjects), such as France, United Kingdom, United States or Italy. Much more straightforward

[17] Distinction between havens and non-havens made as per Johannesen and Zucman (2014a)

are the cases of Trinidad and Tobago (two satisfactory agreements out of 26) or Lebanon (none of 33 treaties complies with standards).

Figure 4 – Treaties signed per jurisdiction[18]



Source: OECD, Exchange of Tax Information Portal (2016)

On the first sight, a very similar conclusion could be made about Singapore and Austria. In both cases the share of compliant treaties is below 50 percent. Unlike Switzerland, however, the vast majority of non-compliant treaties was concluded with economically smaller and less significant counterparties, mostly Eastern European and Asian countries. Only a handful of exceptions is represented by Germany and Russia in the case of Singapore and the United States and Russia in the case of Austria.

A total of 1352 treaties has not been reviewed yet. For the most recent agreements, the reason for that is obvious. There are, however, even many older treaties that have not gone through the review process yet. This can occur for two reasons. First, one of the parties is not a member of the Global Forum, and thus some of the necessary data cannot be gathered. This is the case especially for the countries with the most agreements concluded, such as the United Kingdom, France or Germany. Second, the reporting country is new to the Global Forum, and the peer-review process has not been

[18] For the list of jurisdictions' abbreviations, see Appendix.

launched yet. This is the example of Kuwait, which is the newest member of the Global Forum and thus 82 percent of its 83 treaties are still marked as unreviewed.

This observation is well in line with the inference suggested by the 2015 Financial Secrecy Index, which is a product of the Tax Justice Network. The list, whose aim is to rank jurisdictions according to their secrecy and the scale of their offshore financial activities, is topped by Switzerland, while Singapore is on the fourth place (Tax Justice Network 2016b).

Table 1 – Basic statistics: Data on tax treaties[19]

Statistics	Value	Notes
Number of jurisdictions	140	Members of Global Forum
Number of counterparties	212	
Number of treaties	4205	Concluded by members of GF
Number of compliant treaties	2356	56.03 %
Number of non-compliant treaties	497	11.82 %
Most treaties signed	153	(United Kingdom)
Least treaties signed	1	(Paraguay)
Average number of treaties signed	53.23	
75th percentile	81	
25th percentile	26	
Average time between treaty signature and entry into force	667 days	72.4 % of treaties come into force within 2 years
Average time since current treaties waiting to come into force were signed[20]	1813 days[21]	747 such treaties

Source: OECD, Exchange of Tax Information Portal (2016)

4.2.3 Limitations of the data on treaties

Despite the detailed information that the OECD's Portal discloses about the information exchange treaties, the dataset concluded from such information suffers from a number of limitations that have not been not pointed out so far.

[19] Statistics relate only to members of the Global Forum. There might be jurisdictions outside the GF that have not signed any treaties.

[20] As of December 31st, 2016.

[21] The actual duration of 'waiting treaties' would be significantly shorter. As Johannesen and Zucman (2014b) note, a number of treaties have been signed in past and also have already come into force, however the latter has not been reporter to OECD, and thus the Porta does not dispose of that information.

First, the information, which are available in the Portal, fully rely on self-reporting from individual members of the Global Forum. Therefore, the sample of treaties might be incomplete not only for smaller economies, which are not among the members, but also for some very relevant jurisdictions. The potential effect of this imperfection on the estimation results presented in Chapter 5 is ambiguous, depending whether the effectivity of the unreported treaties would be higher or lower than average of the reported agreements. The probability of a treaty not being reported is significantly reduced, however, because every treaty between two members should be reported twice (once by each of the two parties).

Second important limitation comes from the fact that the treaty itself does not automatically ensure that the exchange of information will take place. Once the treaty is reviewed and labeled as compliant, it practically means that the institutional framework in both jurisdictions enables the effective exchange of information. It depends primarily on the jurisdictions, however, whether or not they will engage in the process. On the other hand, such jurisdictions' independence can have an opposite effect, too. Motivated by various factors, such as public pressure, effort to enhance a negotiating position with other countries, or an economic transition, the jurisdictions can make the steps towards effective information exchange internally, without concluding bilateral treaties and reporting them to the OECD. In such case, the deposits might react to events that the estimation could not capture, which would underestimate the effect of treaties, should there be one.

Another shortcoming originates in the time lag between signature and conclusion of the peer-review process. Only the compliant treaties are included into the sample, which means that there are most likely many other treaties, which comply with the OECD standards just the same, but they cannot be included because their review has not ended yet. This means that a number of effective treaties might be left out from the analysis, which would decrease the sample coverage and representative value of the estimation.

4.3 Data on deposits

The core of the upcoming analysis is to assess the effect that bilateral treaties enforcing information exchange have on the value of cross-border financial deposits. Once the

data on treaties are secured, it is therefore crucial to obtain complex and quality data on such deposits.

Based in Basel, Switzerland, the Bank for International Settlement (BIS) is the world's oldest international financial institution (Toniolo and Clement 2005). Its mission is to "serve central banks in their pursuit of monetary and financial stability, foster international cooperation in those areas and act as a bank for central banks" (Bank for International Settlements 2016, p. 135). Since the pursuit for monetary and financial stability can be perceived as aiming towards the public good, the BIS makes some of its research outcomes available for the general public. Being an inherent part of bank's agenda, extensive and detailed international banking and financial statistics are among the available research outcomes. These include also *Locational banking statistics* (LBS), which are the second major source of research data for my thesis.[22]

Locational banking statistics are issued on a quarterly basis since 1977. They capture the outstanding balance sheet positions of banking sectors in all BIS reporting jurisdictions. As of December 2016, there were 46 such jurisdictions.[23] Among them, there are all of the world's largest economies as well as the most of major tax havens (such as Switzerland, Singapore, Hong Kong, Luxembourg, Cayman Islands, Bahamas, Jersey or Isle of Man).[24] In 2015, the banking sectors of 46 BIS reporting jurisdictions covered collectively roughly 93 percent of all bank's cross-border claims worldwide (Bank for International Settlements 2016b).

Apart from the volume of balance sheet positions, the LBS provide the geographical breakdown of banks' counterparties, which is the primary point of interest for the purposes of my research, and a number of other useful information, such as currency or sector breakdown.[25] The data are collected on a country level and do not reveal any information about individual banks' clients. Thanks to that, any secrecy arrangements

[22] See the Bank for International Settlements for the complete information on Locational banking statistics on http://www.bis.org/statistics/bankstats.htm.

[23] For the full list of BIS reporting jurisdictions together with years, in which they started to report their financial statistics, see Appendix.

[24] The 'world's largest economies' refer to 15 countries with the highest GDP in 2015 according to the World Bank's World Development Indicators database – see World Bank (2016).

[25] Currency and sector breakdown refer to an information about the currency, in which the deposit is denominated, and about the sector, in which the counterparty belongs (e.g. banks, non-bank financial institutions and others)

that the banks can potentially offer to depositors are not violated (Johannesen and Zucman 2014a). The real share of all foreign and international claims that are covered by LBS varies depending on the country. The Bank for International Settlements (2012) claims, however, that the coverage ranges between 90 and 100 percent, which allows me to make a justifiable inference from the analysis of LBS. US dollar is the primary reporting currency of LBS.

For the purposes of this thesis, I am going to utilize LBS to extract the total amounts of all deposits that are held in any currency by non-bank entities of any jurisdiction on banking accounts in BIS reporting countries. The primary focus will be laid on the development of deposits values for specific country-pairs. That is, for example, the total value of deposits by British non-bank entities on the bank accounts in Jersey, the value of German deposits in Switzerland or the value of Australian deposits in Hong Kong.

4.3.1 Limitations of the data on deposits

Unfortunately, such a restrictive specification of the employed data has a negative impact on a sample size, which is by far the most significant limitation of the BIS dataset. Even though 46 jurisdictions currently report their banking statistics to BIS, the data that are fundamental for the analysis in this thesis are available for only 29 of them. And even for these 29 jurisdictions the data are not always compete for the whole period of concern. Therefore, the sample is not perfectly balanced in terms of statistics on deposit values. For the full sample of 29 jurisdictions, whose locational banking statistics are explored in the empiric part, see Table 2.

Among the 29 jurisdictions, I also dispose of data for 10 tax havens – specifically Austria, Belgium, Chile, Guernsey, Hong Kong, Isle of Man, Jersey, Luxembourg, Macao and Switzerland.[26] Although such limited sample could seem to represent only a small subset of all tax havens, it accounts for 24.47 percent of global financial services exports (author's computations based on Tax Justice Network (2016b)). Considering that all 51 tax havens account for a 35.96 percent share in global financial services exports, it means that despite having the data for only 10 tax havens, the sample in my possession still covers more that 68 percent of total financial services

[26] Based on the list of tax havens per Johannesen and Zucman (2014a)

exports from tax havens. Because the value of financial services exports was showed to be significantly correlated with the asset stock value, it allows me to use it as an appropriate approximation of global financial significance of offshore jurisdictions (Tax Justice Network 2016a).

Table 2 – Jurisdictions included as reporting countries in the analysis

List of jurisdictions (* denotes tax havens)			
Australia	France	Jersey*	Sweden
Austria*	Germany	Luxembourg*	Switzerland*
Belgium*	Greece	Macao*	Taiwan
Brazil	Guernsey*	Mexico	United Kingdom
Canada	Hong Kong*	Netherlands	United States
Chile*	Ireland	South Africa	
Denmark	Isle of Man*	South Korea	
Finland	Japan	Spain	

Source: Bank of International Settlements, Locational Banking Statistics (2016)

Unfortunately, unavailability of complete data is only the most visible shortcoming of the BIS dataset. In fact, there are more limitations. The deposits values in LBS are gathered on the basis of immediate ownership. Thus, it is only possible to track the deposit owner to the first-level counterparty, whereas the ultimate beneficiary remains disguised. For example, if an American resident opens a bank account in Luxembourg through a sham corporation based in Cayman Islands, the LBS will assign the assets to Cayman Islands. As Johannesen and Zucman (2014a) note, such deposits that belong to entities in other tax havens, constitute about 25 percent of all deposits placed in tax havens. The authors have, however, discovered that even if a treaty is concluded between the country, in which the deposit is held, and the country of the ultimate beneficiary, the response of deposits is significant(Johannesen and Zucman 2014a).

Lastly, the data gathered by BIS represent only the part of entities' wealth that is invested in the form of bank deposit. It does not reflect investments in bonds, equity, real estates and other assets, in which evaders often invest in tax havens. Unsurprisingly, tax havens do not usually disclose information about what share among all of the assets placed in them by foreigners is in the form of bank deposits. In fact, Switzerland is the only haven to do so. According to Zucman (2013b), the share of bank deposits within all offshore wealth in Switzerland is 25 percent, leaving the majority of 75 percent to bond, equity and other portfolios. It is unclear, however,

whether the ratio would be at least similar in other tax havens. Henry (2012) used the data from 30 tax havens to estimate the share of bank deposits within global offshore wealth to be between 22 and 33 percent.[27]

In conclusion, despite significant shortcomings resulting from the unavailability of complete data, the final sample is still large and fairly economically significant, which allows me to make a reasonable inference from the upcoming empirical analysis.

4.4 Financial secrecy data

Data on financial secrecy score will become one of the major sources for the analysis in Chapter 6. The dataset with the final results of 2015 Financial Secrecy Index was downloaded from the website of Tax Justice Network.[28] Also results from all previous editions of FSI (2009, 2011, and 2013) were retrieved from the website's archive, so the panel of secrecy score could be created. In Chapter 6, the final dataset will be used to examine the relationship between secrecy and the value of deposits in tax havens. The data are also used for the computations of the global scale weight in Section 4.3.

4.4.1 Limitations of the financial secrecy data

Also the data described in this section suffer from a number of shortcomings. The first one relates to the panel of secrecy score by Tax Justice Network. Since the whole project of Financial Secrecy Index was first launched in 2009, I do not dispose of any earlier data than that. The period of interest for the estimation of secrecy score impact on the value of deposits will therefore start in 2009 and end in 2015. Besides, the extent of the sample, for which the FSI was estimated has grown substantially throughout the years. While the first edition in 2009 worked with a sample of 60 jurisdictions, the most recent one already estimated the index for 102 territories (Tax Justice Network 2016a).

Although all 29 jurisdictions, for which I have the bilateral deposits data from BIS are currently assessed by the Tax Justice Network, for some of them, the estimation of FSI was launched later than in 2009. On the other hand, if I take only the sample of 10 tax

[27] Henry (2012) estimates the global offshore wealth to be at least $21 to $32 trillion as of 2010 and claims the value of offshore bank deposits to be $7 trillion in 2010.

[28] See the dataset on http://financialsecrecyindex.com/introduction/fsi-2015-results and FSI results from prior years at http://financialsecrecyindex.com/archive. Retrieved on April 1st, 2017.

havens, then there is only one (Chile), for which the secrecy score is not available for all four years.[29] For the other nine havens, which still cover 67.72 percent of total financial services exports of all tax havens, I dispose of the full panel. Thus, the absence of data for one extra haven does not prevent me from making a reasonable inference, provided other circumstances allow.

4.5 Additional data

Besides the data on information exchange treaties, locational banking statistics and the secrecy scores, I am going to use three additional sources of data that will play their part during the identification strategy in Section 5.2. Similarly to all the sources of primary data, also the additional datasets are publicly available from respective institutions' websites.

First, the dataset 'World Development Indicator' was downloaded from the database of the World Bank in order to provide data on GDP.[30] Specifically, the annual values of GDP in current US dollars were extracted for all counterparties, that is for all jurisdictions, is which the funds' depositors reside.

Second, the 'GeoDist' dataset was downloaded from the website of French research institution Centre d'Études Prospectives et d'Informations Internationales (CEPII) to enrich the analysis with the data on geographical characteristics for individual country-pairs.[31] For the purposes of identification strategy, two specific variables will be used – distance between jurisdictions within each country-pair and a dummy variable, indicating whether or not the jurisdictions in country-pair are contiguous. Both will serve as explanatory variables for the estimation modelling the likelihood of each country-pair to sign an information exchange treaty.

[29] Chile was added into the sample for 2015 Financial Secrecy Index along with 6 other jurisdictions, in which signals of "secrecy or financial center ambitions were spotted" (Tax Justice Network 2016a, p. 5).

[30] See the dataset on http://data.worldbank.org/data-catalog/world-development-indicators. Retrieved on May 2nd, 2017.

[31] See the dataset on http://www.cepii.fr/CEPII/en/bdd_modele/download.asp?id=6. Retrieved on May 2nd, 2017.

Finally, the dataset on languages was created manually using the information in the online version of CIA World Factbook (2017).[32] The variable concerned is a dummy, which indicates whether the jurisdictions within a country-pair share a common language.[33]

There are few shortcomings of the additional data, too. The most importantly, the data on GDP are taken on the annual basis, whereas the deposits data from BIS are gathered on a quarterly basis. This reduces the total number of periods observed from 59 to 15 and might cause some within-year deposit movements to be overlooked in the estimation.

4.6 Estimation strategy

The major goal of the thesis is to develop an empirical model, which would estimate the role that tax information exchange agreements might play in the shifts of financial deposits of non-haven entities in tax havens. Next, I intend to check for robustness of the main results and perform an identification strategy. Finally, I am going to analyze if the value of deposits is somehow influenced by changes in financial secrecy.

I dispose of a panel dataset of quarterly values of deposits for the period between the 1st quarter in 2002 and the 3rd quarter in 2016. I also dispose of information of all tax information exchange treaties that were concluded during the time span. With such data, I will use the fixed effect estimation with robust standard errors clustered at the level of individual country-pairs.

Therefore, the equation I am going to estimate in the first part of analysis takes the form:

$$\log(amount_{ijq}) = \alpha + \beta \cdot Signed_{ijq} + a_{ij} + b_q + \varepsilon_{ijq} \quad (1)$$

[32] See the data on https://www.cia.gov/library/publications/the-world-factbook/fields/2098.html. Retrieved on April 8th, 2017.

[33] A following strategy was applied while defining the variable on common language: 1) All official languages were taken into account. If there were to many (e.g. South Africa, Liberia, Bolivia), only those languages that are spoken by at least 10 percent of the population are considered); 2) If the official language(s) is/are not the most spoken language(s) at the same time (e.g. Botswana, Djibouti), , then also the most spoken language is taken into account; 3) If there is no official language (e.g. Ethiopia), then the most spoken language is considered.

In the equation, the value of deposits is represented by the variable *amount* and is employed in the logarithm form in order to better detect the change in deposits. The expression $amount_{ijq}$ represents the value of funds deposited by entities from jurisdiction i on bank accounts in jurisdiction j in quarter q. Variable $Signed$ is a dummy equal to one if an information exchange treaty is signed in quarter q and equal to zero otherwise. The term a_{ij} is a country-pair fixed effect, which controls for all time invariant characteristics of jurisdictions i and j (such as historical relations, distance, existence of a common language etc.). The term b_q, on the other hand, denotes the time fixed effect of each quarter q and thus controls for time dependent effects such as business cycle, global recession etc. The term ε_{ijq} stands for the estimation error and α is the intercept.

Finally, β represents the impact of a treaty being signed and is the coefficient of my prior interest. I expect the coefficient β to be statistically significant and negative, which would suggest that a negative impact of treaty signature on the value of deposits does exist.

4.7 Estimation period

All regression models presented in Chapter 5 are estimated for the period between the first quarter in 2002 to the third quarter in 2016 (if not stated otherwise). The panel regressions therefore contain 59 time periods. The estimation period has been selected in consideration of the data availability. A number of significant jurisdictions (Brazil, Chile, Isle of Man, Guernsey and Jersey) started to report their banking statistics to BIS right in 2002 or in the end of 2001. Selecting a longer period would therefore make the estimations even more time-imbalanced. Still, the period of estimation is almost twice as long as the time span explored by Johannesen and Zucman (2014a).

5 Empirical Results

In this chapter, I will present the results of all regressions. First, I will show that there is indeed a negative effect of treaty signature on the value of deposits in tax havens. I will also demonstrate that a similar conclusion can be made using different definitions of tax haven. I will identify the effect of treaties by showing that tax havens do not sign the treaties intentionally with those countries, whose entities place progressively less deposits in them.

5.1 Impact of treaties on the value of deposits

Table 3 presents results of the most basic estimation of the equation 1. It does not differentiate between tax havens and non-havens and simply estimates the effect of treaties for the universe of all country-pairs. According to column 1, the value of deposits decreases by 7.39 percent after the agreement on exchange of bank information is signed between two jurisdictions.[34] The coefficient is barely significant, which is understandable given that the model covers both havens and non-havens. In column 2, the model is estimated with one alteration. Instead of $Signed$ as the explanatory variable, the variable $InForce$ is used. It is a dummy variable equal to 1, if the treaty signed between jurisdictions i and j already entered into force. Otherwise it is equal to 0. The goal of this altered estimation is to assess, whether the treaty impact the deposits value in the moment of signature or rather in the moment, when it comes into force. Since the coefficient of $InForce$ is not significantly different from zero at any conventional level, I conclude that (at least for the sample of all countries) the signature of information exchange treaty has a more significant impact than its actual legal force.

[34] Since the value of deposits is estimated using a log-level model, the final effect in percentage is calculated as: $exp(-0.0768) - 1 \cong -0.0739$. All further results of log-level estimations are adjusted in the same way.

Table 3 - Impact of treaties: All jurisdictions

	BANK: All jurisdictions	
DEPOSITOR:	(1) All jurisdictions	(2) All jurisdictions
Signed	-0.0768* (0.0464)	
InForce		-0.0305 (0.0474)
Constant	2.667*** (0.0264)	2.657*** (0.0262)
Observations	143,918	143,918
R-squared	0.043	0.043
Number of pairs	4,494	4,494
Time FE	YES	YES
Country-pair FE	YES	YES

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Source: author's regression analysis

Deposits in tax havens

A more thorough model is presented in Table 4, which shows the outcomes of regressions on equation 1 using only the subsample of tax havens as the reporting jurisdictions. In columns 1 to 3, there are 3 specifications of the model depending on whether the counterparty (that is, the jurisdiction, where the depositor resides) if from any country, tax haven or from a non-haven country. The coefficients suggest that while there is no significant effect of treaties concluded with other tax havens (column 2), the situation is very different for non-haven counterparties. Column 3 indicates that concluding an information exchange treaty between a haven and a non-haven is associated with roughly 13.51 percent decrease in the value of funds that are deposited in the haven. The result is consistent with the findings of Johannesen and Zucman (2014a) and confirms the first research hypotheses from Section 3.3.[35]

[35] Johannesen and Zucman (2014a) estimated a 10.9 percent impact of treaties. However, the difference is attributable to a difference in methodology. Among the 'treaty' events, they also included changes in domestic law, which they also proved to be less efficient than treaties.

It is important to note that the estimated coefficient relates to flows of all deposits. That is, both funds that are illegally hidden in tax havens and funds that have been properly reported to tax authorities in their home country and are just saved in tax havens for another reason. Since the owners of legal funds apparently have no reason to withdraw their deposits in response the new treaties being signed, it is reasonable to assume that the illegal funds comprise the biggest part of the overall effect. Then the estimates presented in Table 4 would be just lower bounds of the treaties' effect on illegal deposits. If, for example, the illicit funds comprised 50 percent of all cross-border deposits in tax havens, then the average effect of a treaty being signed would be 27.02 percent.[36]

In column 4, the principal model is estimated once more, but this time four different lagged effects are added. The purpose of this specification is to find out, whether the treaty affects the deposits immediately or the impact is rather lagged. The coefficients in column 4 suggest that the impact is very quick, coming right in the first full quarter after the one, in which the treaty is concluded.[37] The coefficient for an immediate effect ($Signed + 0Q$) is very significant and actually even larger than in the specification with no lags. The immediate decrease of deposits' value is estimated at 15.39 percent.

[36] That is: $2 \cdot 13.51 = 27.02$ percent for the specification in Column 3 of Table 4. The estimated distribution of offshore deposits between legal and illegal fund claimed by Johannesen and Zucman (2014a).

[37] The variables on treaty signature always reflect the act of signature in the first full quarter after it occurred. Therefore, it does not depend, whether the treaty is signed on January 1st or March 31st, the variable will reflect both situations in the second quarter. However, the biggest share of treaties are concluded in the beginning of month.

Table 4 - Impact of treaties: Deposits in tax havens

	BANK: Tax havens			
DEPOSITOR:	(1) All jurisdictions	(2) Havens	(3) Non-havens	(4) Non-havens
$Signed$	-0.0761	-0.0190	-0.1451**	
	(0.0614)	(0.1217)	(0.0662)	
$Signed + 0Q$				-0.1671***
				(0.0638)
$Signed + 1Q$				-0.1162
				(0.0834)
$Signed + 2Q$				-0.1697**
				(0.0788)
$Signed + 3Q$				-0.1255
				(0.0854)
$Signed > 3Q$				-0.1671**
				(0.0711)
$Constant$	3.096***	4.134***	2.817***	2.968***
	(0.0315)	(0.0695)	(0.0346)	(0.0320)
Observations	63,998	13,842	50,156	47,731
R-squared	0.052	0.050	0.056	0.053
Number of pairs	1,902	379	1,523	1,521
Time FE	YES	YES	YES	YES
Country-pair FE	YES	YES	YES	YES

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Source: author's regression analysis

Deposits in non-havens

In their study, Johannesen and Zucman (2014a), for the first time in literature, discovered the negative impact of information exchange treaties on the value of deposits in tax havens, which I have just confirmed with results presented in Table 4. Contrary to them, however, I also possess the deposit data for an economically significant sample of non-haven countries, which allows me to estimate the equation 1 separately for non-havens, too. The main purpose of this specification is to see, whether the entities based in tax havens withdraw their money from non-haven bank account in response to a treaty. If such relationship was identified, it might be explained as a reaction of tax evaders, who use round-tripping in order to hide their wealth offshore

before bringing it back to home country. On a small sample of 4 treaties and using data on the US companies, such behavior was first examined by Hanlon et al. (2015).

Assume, for example, that a German company wants to evade taxes. To do so, it can set up an offshore affiliate, to which it sends money for fake services. The money then goes through a scheme of sham corporations, funds or trusts and after the original depositor is disguised thanks to numerous layers of secrecy, the money can come back to the non-haven country. With the help of such illicit scheme of offshore companies, the German company realizes an untaxed income. Once the treaty between the non-haven country and the tax haven, which constitutes the last step of the scheme, is signed, the company can get worried that its illicit actions might be tracked down and withdraw the money.

The result of this specification is presented in column 2 of Table 5. It reveals a very significant and economically substantial impact of treaty signature on deposits in non-haven countries owned by entities from tax havens. The coefficient implies that signing the treaty leads to a 20.70 percent decrease in the value of deposits. Such significant result suggests that the tax evaders, who hide their assets through a scheme of sham corporations, funds and trusts, are indeed worried about being tracked down and exposed. In response, the withdraw the money from the non-haven bank account. The result is consistent with the findings by Hanlon et al. (2015) and confirms the second hypothesis from Section 3.3.

For the sake of completeness, the column 1 shows the impact of treaty signature for the aggregate of all counterparties (both havens and non-havens). Similarly to the model for tax havens as reporting countries, such specification does not yield any significant results. Column 3 suggest, there is also no effect of the treaties between two non-haven countries.

Table 5 - Impact of treaties: Deposits in non-havens

DEPOSITOR:	BANK: Non-havens		
	(1) All jurisdictions	(2) Havens	(3) Non-havens
$Signed$	-0.0677	-0.2319**	0.1194
	(0.0653)	(0.1098)	(0.0870)
$Constant$	2.2820***	3.0709***	2.0073***
	(0.0406)	(0.0834)	(0.0468)
Observations	79,920	18,103	61,817
R-squared	0.061	0.071	0.060
Number of pairs	2,592	539	2,053
Time FE	YES	YES	YES
Country-pair FE	YES	YES	YES

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Source: author's regression analysis

In conclusion, the estimations of different specifications of equation 1 revealed a number of important findings. First, the impact of treaties on deposits in tax havens owned by non-haven entities, as identified by Johannesen and Zucman (2014a), was confirmed. In average, concluding a treaty leads to approximately 13.51 percent decrease in the value of cross-border deposits in tax havens. Second, it was shown that treaty affects the deposits during the first full quarter after the treaty is signed. Finally, the value of deposits from tax havens on bank accounts in non-haven decreases by 20.70 percent after the treaty signature. The hypothesis A and B from Section 3.3 are confirmed.

All regression from Tables 3 to 5 were also run in a different specification with a variable indicating the treaty coming into force instead of being signed. And in every case, the $InForce$ variable was not statistically different from zero, suggesting that the value of deposits is affected primarily by the treaty signature rather than its legal force. This finding adds robustness to the estimate from Table 4, which concludes that the treaties have an immediate impact on deposits during the first full quarter after they are signed.

5.2 Identification strategy – Determinants of a treaty signature

The estimation presented in Section 5.1 comes with clear and significant result, however it faces a risk of endogeneity. The 'tax haven crackdown' initiative urged the haven jurisdictions to sign at least 12 treaties on information exchange under the threat of blacklisting and subsequent economic sanctions. On the other hand, it was enough for the havens to sign exactly 12 treaties in order to be whitelisted and stay 'safe'. In such situation, a rational cost-minimizing tax haven that does not want to suffer from economic sanctions would have an easy choice on how to proceed. It would sign exactly 12 treaties with those countries, whose entities have been recently placing less and less deposits in them. In that way, the treaty requirement would be satisfied, the haven would be safe from sanctions, but the losses from the treaty signature would not be so harsh. In my analysis, such situation could cause a spurious relationship between treaty signature and a change in the value of deposits.

A quick look into the data on treaties suggests that such tax havens might exist. For example, Vanuatu, a small island country in the South Pacific, which is the country with the world's highest secrecy score, has concluded exactly 12 treaties. Samoa, another South Pacific island paradise, has the world's second highest secrecy score and entered into 17 agreements (out of which 12 comply with OECD standards). A similar story could be told about Marshall Islands (14 treaties), Montserrat (15 treaties) or other tax havens.

It is therefore crucial for my analysis to discover, whether some tax havens really use to conclude treaties systematically with those non-haven counterparties, whose entities' total value of deposits was decreasing in recent times (or its growth rate was lower relative to the global trend). In this section, I will therefore estimate a probit model, in which I intend to determine, if the recent changes in deposits' value could have an impact on probability of concluding a treaty. The equation I am going to estimate on the population of tax havens as reporting jurisdictions and non-havens as their counterparties takes the form:

$$Signature_{ijq} = \alpha + \beta_1 \cdot Growth1Y_{ijq} + \beta_2 \cdot Growth2Y_{ijq} + \\ + \beta_3 \cdot Growth3Y_{ijq} + a_{ij} + b_q + \varepsilon_{ijq} \tag{2}$$

In the equation, $Signature_{ijq}$ is a dummy variable equal to 1, if the information exchange agreement between jurisdictions i and j is concluded during quarter q. $Growth1Y_{ijq}$, $Growth2Y_{ijq}$, and $Growth3Y_{ijq}$ are the growth rates of deposits owned by entities from jurisdiction j in jurisdiction I during the first, second, and third year before the quarter q, respectively. The rest is similar to the equation 1 - α represents the intercept, a_{ij} is the country-pair fixed effect, b_q is the time fixed effect for quarter q, and ε_{ijq} denotes the estimation error. If the probability of a tax haven and a non-haven to conclude an information exchange treaty is independent from the rate, at which the deposits placed by entities from the non-haven on bank accounts in the haven grow (or drain), then β_1, β_1, and β_1 will not be statistically different from zero. Otherwise, at least one of the coefficients would be different from zero and the model in Section 5.1 would suffer from endogeneity.

Results of estimation on equation 2 are presented in first three columns of Table 6. In column 1, the most basic model is estimated without controlling for time and country-pair fixed effects. This simple specification suggests that probability of countries signing a treaty is strongly affected by the deposits' growth rate during the last year before treaty signature (i.e. during the span between 4 quarters prior signature and the quarter of signature). This influence however disappears, once the controls for time fixed effect (column 2) and both time and country-pair fixed effects (column 3) are added.

To determine, which variables might have an actual impact on the likelihood of treaty signature between a haven and a non-haven, one can look in the column 4. In this expanded specification, other variables are added using the World Bank's data on GDP, CEPII's data on various geographical characteristics and CIA's data on languages. The equation 2 would then take a slightly different form:

$$(3) \quad Signature_{ijq} = \alpha + \beta_1 Growth1Y_{ijq} + \beta_2 Growth2Y_{ijq} + \beta_3 Growth3Y_{ijq} + \\ + \beta_4 \log(GDP)_{jq} + \beta_5 Contiguity_{ij} + \beta_6 Language_{ij} + \\ + \beta_7 \log(deposits)_{i,j,q-1} + \beta_8 \log(distance)_{ij} + a_{ij} + b_q + \varepsilon_{ijq}$$

Column 4 shows that the only significant determinants of treaty signature in the advanced model are the GDP of depositor's jurisdiction and the distance between the two jurisdictions. Other variables, such as contiguity of the two counterparties,

existence of a common language and the actual value of deposits in the last quarter before the treaty signature, are insignificant. What is important for the principal model presented in Section 5.1 is that all three variables indicating the impact of recent movements in deposits are not statistically different from zero. Thus, the model does not suffer from endogeneity.

Table 6 - Identification: Probit model of treaty being signed

	BANK: Havens & DEPOSITOR: Non-havens			
	(1) Simple model	(2) Time FE	(3) Both FE	(4) Advanced model
$Growth1Y$	-0.0711**	-0.0590	-0.0405	-0.0472
	(0.0341)	(0.0383)	(0.0352)	(0.0651)
$Growth1Y$	-0.0310	-0.0800	-0.0796	0.108
	(0.0493)	(0.0533)	(0.0496)	(0.0710)
$Growth1Y$	-0.0501	-0.0840	-0.0751	0.0752
	(0.0510)	(0.0542)	(0.0522)	(0.0995)
$\log(GDP)$[38]				-0.624*
				(0.360)
$Contiguity$				-0.233
				(0.421)
$Common\ language$				-0.557
				(0.392)
$\log(deposits)$				0.138
				(0.131)
$\log(distance)$[39]				-0.252*
				(0.139)
$Constant$	-2.734***	-3.090***	-2.858***	18.93*
	(0.0301)	(0.304)	(0.376)	(11.13)
Observations	32,484	25,798	10,857	2,527
Time FE	NO	YES	YES	YES
Country-pair FE	NO	NO	YES	YES

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Source: author's regression analysis

[38] Annual values of GDP in current US dollars are used.

[39] Distance within the country-pair is measured as a distance between their most populated cities.

5.3 Robustness check – Tax havens identification

As I already mentioned in Section 4.1, differentiating between tax havens and non-havens one of the most fundamental assumptions for the whole analysis. In order to justify the methodology that I am using in this thesis, I am going to perform a robustness check of tax havens identification. If the differentiation between havens and non-havens Johanessen and Zucman (2014a) is valid, then the estimation results should be consistent with other differentiation methods. Therefore, I am going to estimate the equation 1 using a number of different lists of tax havens that were published by various authors or institutions in the economic literature.

Specifically, I am going to use the lists that were drawn up by – in chronological order – Hines and Rice (1994), Errico and Borrero (1999), Financial Stability Forum (2000), OECD (2000), Hines (2010), Zucman (2013a), and Gravelle (2015). On top of that, I will use the sample of all current members of the The Group of International Finance Centre Supervisors (GIFCS) as the ninth list of tax havens.[40] Table 7 and 8 present the regression results of equation 1 estimation for the universe of tax havens as reporting jurisdictions and non-havens as their counterparties.

In Table 7, the first column recapitulates the main findings from the estimation performed in Section 5.1, based on the differentiation by Johanessen and Zucman (2014a). Columns 2 to 5 present the regression result of the same model, but this time using different lists of tax havens. While the approaches used by Gravelle (2015), Hines (2010) and Financial Stability Forum (2000) return almost identical results as the one that I present, the outcome based on Zucman (2013a) differs quite significantly. This deviation, however, can be explained by the fact that Zucman's (2013a) list does not contain three economically important tax havens that are among the sample of 10 tax havens, for which I have the deposit data. A separate regression using only these three tax havens (Austria, Belgium, Chile) shows that the impact of treaties is much weaker and barely significant in these jurisdictions. Excluding them from the sample then causes the deviation in the estimation results.

[40] List of GIFCS members as of April 16th, 2017. See on http://www.gifcs.org/index.php/about/members-and-observers.

Table 7 - Robustness check: Tax havens identification, part 1

	BANK: Havens & DEPOSITOR: Non-havens				
HAVENS BY:	(1) Johannesen & Zucman 2014	(2) Gravelle 2015	(3) Hines 2010	(4) FSF 2000	(5) Zucman 2013
Signed	-0.1451**	-0.1308*	-0.1320*	-0.1331**	-0.1999***
	(0.0662)	(0.0679)	(0.0680)	(0.0668)	(0.0671)
Constant	2.8175***	2.8994***	2.9005***	2.8680***	3.1247***
	(0.0346)	(0.0379)	(0.0380)	(0.0376)	(0.0384)
Observations	50,156	40,544	40,322	41,602	35,761
R-squared	0.0559	0.0562	0.0558	0.0568	0.0490
Number of pairs	1,523	1,253	1,244	1,297	1,105
Time FE	YES	YES	YES	YES	YES
Country-pair FE	YES	YES	YES	YES	YES

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Source: author's regression analysis

The estimates based on other lists of tax havens, which are shown in Table 8, demonstrate already much more significant deviations relative to my model. But even here a rational explanation can be provided. The estimates in columns 2 and 3 would suggest that the impact of treaties is much harder than I infer. It is necessary to note, however, that the intersections between those specifications' lists of havens and sample of jurisdictions with published data on deposits very small. Specifically, the banking statistics are available for only 3 tax havens from the list by OECD (2000) and for only 4 members of GIFCS.

Despite deviating significantly from my principal model in column 1, the outcome of the estimation presented in column 2 also includes some interesting information. If the regression is restricted only for Guernsey, Jersey and Isle of Man as reporting jurisdictions, then the impact of treaties is much more intense.[41] Specifically, concluding an information exchange treaty between one of the British Crown dependencies and a non-haven jurisdiction causes a 23.91 percent decrease in deposits

[41] Guernsey, Jersey and Isle of Man are the only three jurisdictions identified as tax havens by OECD (2000), for which the BIS locational banking statistics are available.

placed by the non-haven entities in islands' banks. If the set reporting countries is restricted to Guernsey, Jersey, Isle of Man and Macao (i.e. members of GIFCS with data available), then the value of deposits decreases by 21.81 percent after the treaty signature. Thus, the effect of treaties in Macao appears to be less significant.

If the distinction between haven and non-haven by Errico and Borrero (1999) or Hines and Rice (1994) were used, then the estimated impact of treaties would be much weaker and statistically not different from zero. In this case, the deviation might also result from the two lists being obsolete. As I mentioned in Section 4.1, the environment in the offshore world is a subject to continual changes. Therefore, the attempts to differentiate between havens and non-havens dated to 1994 or 1999 might not mirror the nowadays reality as precisely as newer efforts. For example Gravelle (2015) notes that the list by Hines and Rice (1994) itself is based on a number of even older lists and includes some countries that were already eliminated from newer lists, because they adopted higher tax rates.

Table 8 – Robustness check: Tax havens identification, part 2

	BANK: Havens & DEPOSITOR: Non-havens				
VARIABLES	(1) Johannesen & Zucman 2014	(2) OECD 2000	(3) GIFCS as of 2017	(4) Errico & Borrero 1999	(5) Hines & Rice 1994
Signed	-0.1451**	-0.2733***	-0.2460***	-0.0882	-0.0985
	(0.0662)	(0.0740)	(0.0739)	(0.0762)	(0.0673)
Constant	2.8175***	3.0082***	2.7462***	2.6237***	2.8796***
	(0.0346)	(0.0486)	(0.0475)	(0.0378)	(0.0383)
Observations	50,156	16,576	19,500	56,464	41,929
R-squared	0.0559	0.0729	0.0569	0.0360	0.0585
Number of pairs	1,523	510	705	1,747	1,306
Time FE	YES	YES	YES	YES	YES
Country-pair FE	YES	YES	YES	YES	YES

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Source: author's regression analysis

In conclusion, despite some discrepancies, the methodology on distinction between havens and non-havens that I am using in the thesis can be described as robust. Using 6 different approaches out of 8, the estimation results were similar, in 3 cases almost identical. Besides the wide definitional inconsistency, which pervades the whole universe of economic literature concerning tax havens, the discrepancies in estimates are attributable mostly to obsolescence of older lists and a significant limitation of the sample with usable data on deposits. In some cases, the intersection between a respective tax haven list and set of countries with available data is so small, that reasonable and representative inference cannot be made.

6 Financial secrecy and its relationship with deposits in tax havens

In the last part of the empirical analysis, I am going – for the first time in economic literature – to estimate the impact of changes in financial secrecy on the value of deposits in tax havens. There is a global pressure on tax havens to eliminate the elements of financial secrecy from their legal and regulatory frameworks. Tax Justice Network (TJN) one of the leading multinational authorities that promote the removal of financial secrecy in global scale. Every other year since 2009, TJN estimates and publishes the Financial Secrecy Index (FSI) – a measure of individual jurisdictions' contribution to the global problem of financial secrecy.

6.1 Empirical strategy

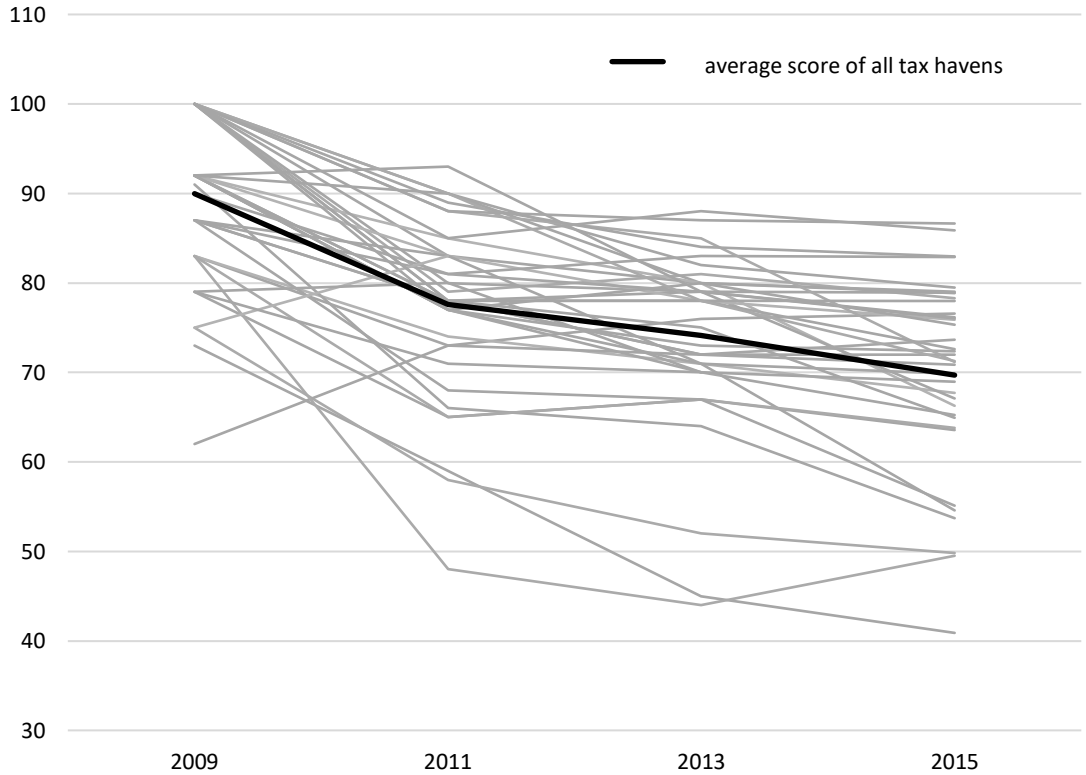
The FSI is constructed using both quantitative and qualitative data. While quantitative data are used to create a global scale weight that estimates the jurisdictions' share in global offshore activities, qualitative measures enable each jurisdiction to be granted with a secrecy score.[42] "Jurisdictions with the highest secrecy scores are more opaque in the operations they host, less engaged in information sharing with other national authorities and less compliant with international norms relating to combating money-laundering" (Tax Justice Network 2016a, p. 2). As such, the secrecy score is going to play a major part in the upcoming model, as I will use it a s an approximation of the level of jurisdictions' financial secrecy.

Since 2009, the TJN published complete financial secrecy data for the total of 38 tax havens. The development of their secrecy score over this time span is demonstrated in Figure 5. It is clear from the Figure 5 that the secrecy score exhibits a downward trend.

[42] For more details about Financial Secrecy Index methodology, see Tax Justice Network (2016a).

The average score for tax havens has fallen from 89.97 in 2009 to 69.70 in 2015.[43] Whether or not such movement in secrecy score has some significant correlation with the amount of deposits in tax havens is unclear, though.

Figure 5 – Historical Secrecy scores for tax havens



Source:OECD, Exchange of Tax Information Portal (2016)

In this part of the analysis, I intend to answer that question. For the first time in economic literature, I will link the TJN's data on secrecy score with the BIS dataset on the value of cross-border deposits of non-bank entities. This way, I will create a panel dataset that will allow me to estimate an equation that takes the form:

$$\log(amount_{ijq}) = \alpha + \beta \cdot Secrecy_{jq} + a_{ij} + b_q + \varepsilon_{ijq} \quad (4)$$

The coefficient of interest s β. If there is a relationship (not necessarily causal) between changes in secrecy score and values of cross-border deposits, then β should be statistically different from zero. Additionally, if the relationship is such that the deposits flow away as secrecy score decreases, then β should have a positive sign. To

[43] Calculated using the See TJN's archived data for previous years at http://financialsecrecyindex.com/archive. Tax havens identified as per Johannesen and Zucman (2014a).

estimate the coefficient in equation 4, I will use the fixed effect model with robust standard errors clustered at a country-pair level. It is important to note, however, that the relation that might be identified with the model based on equation 4 cannot be presented a causal due to high risk of endogeneity.[44]

6.2 Empirical results

The regression results of equation 4 estimation are presented in Table 9. Column 1 shows the regression output for an aggregate of all 29 jurisdictions, for which the deposit data are available. In such specification, the coefficient β implies a strongly significant relationship between jurisdictions' secrecy score and value of cross-border deposits placed in the jurisdictions' banks. Specifically, a 1-point decrease in secrecy score corresponds with 0.64 percent decrease in the value of deposits. Seeming rather economically negligible on the first sight, the correlation is actually quite significant, provided that the actual secrecy score movements throughout the years are taken into consideration. The average secrecy score of all jurisdictions that were assessed in all four years of FSI estimation dropped from 87.61 in 2009 to 67.17 in 2015.[45] Applying the β estimated in column 1 to such movement would correspond with approximately 13.08 percent drop in the value of cross-border deposits.

If the sample of reporting jurisdictions is restricted only to non-havens, then the relationship between value of cross-border deposits placed in them and secrecy score is even stronger. As column 2 suggests, a 1-point drop in secrecy score corresponds to a 1.07 percent decrease in the value of deposits. The United States, for example, are one of two countries with the biggest drop in secrecy score among non-havens, for which the data are available (the other one being Ireland). Since 2009, their score has fallen from 92 to 60, which – according to the estimates in column 2 – is associated with a 34.10 percent decrease in US-based cross-border bank deposits.

To answer the question, whether there is a relationship between tax havens' secrecy score and the amount of deposits placed in there, one can look to column 3. It suggests that if only tax havens are kept in the sample of reporting jurisdictions, then the

[44] The problem of endogeneity is broken down in detail in Section 6.1.3.

[45] See TJN's archived data for previous years at http://financialsecrecyindex.com/archive

significant relationship between deposits and secrecy score disappears. Despite the coefficient has the expected sign (however below my expectation is its magnitude), it is not statistically different from zero at any conventional significance level.

Table 9 - Relationship between financial secrecy and value of deposits

DEPOSITOR:	All jurisdictions			Havens	
BANK:	(1) All countries	(2) Non-havens	(3) Havens	(4) Havens	(5) Havens
$Secrecy - bank$	0.0064*** (0.0018)	0.0106*** (0.0031)	0.0017 (0.0034)	0.0069 (0.0083)	
$Secrecy - depositor$					0.0049 (0.0061)
$Constant$	2.6814*** (0.0955)	2.3929*** (0.1394)	3.057*** (0.2047)	3.980*** (0.493)	4.161*** (0.548)
Observations	9,379	4,506	4,873	1,045	998
R-squared	0.0151	0.0132	0.0242	0.008	0.013
Number of pairs	4,042	2,276	1,766	366	355
Time FE	YES	YES	YES	YES	YES
Country-pair FE	YES	YES	YES	YES	YES

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Source: author's regression analysis

In column 4, I run one additional regression, in which also the counterparties are restricted only to tax havens. It is based on the assumption that a nonnegligible share of tax evaders hide their assets in havens through business entities based in other havens (the practice of round-tripping with the use of numerous layers of secrecy was already mentioned and in Section 5.1). Then it is difficult for the tax authorities to identify the ultimate beneficiary of a haven-based deposit. There is, however, a possibility that a change in secrecy score of the haven, in which the asset is hidden, can correspond to the decline in deposits' value owned by sham corporations based in other havens. For example, if a change in regulatory framework leads to drop of secrecy score in Luxembourg, the American citizen, who owns a Luxembourgian bank account through a sham corporation in the Cayman Islands, might take the deposit away from Luxembourg and place it on another bank account in say the Isle of Man. If such deposit

shifting was taking place in a large scale, then the coefficient would be significant and positive. Results presented in column 4 however suggest that no such relation exists.

Another possibility is to examine the correspondence of deposits amount with the secrecy score of the tax haven, in which the depositor resides (column 5). The story behind such specification starts similarly to the one depicted in column 4. There is one important difference, though. Imagine the changes in regulatory framework happen in the Cayman Islands, not in Luxembourg. Then the American tax evader has no reason to remove the assets from Luxembourg, but might be afraid of his interests in the sham corporation in Cayman Islands being revealed. Therefore, he moves the corporation from Cayman Islands to say the Bahamas, where the secrecy remains at a high enough level. Provided such behavior of tax evaders was widespread, the coefficient of the $Secrecy - depositor$ variable would be significant and positive. Neither in this case, however, the correlation was not found.

6.3 Model limitations

As the model presented in this chapter is not the principal part of the thesis, it is far from being perfect. There is a number of significant shortcomings that need be addressed and resolved, should the result be presented as representative and empirically robust. Its main purpose in my thesis is to approach the topic using a new, different methodology and perhaps establish the ground for further, more robust and extensive research. That is why the inference presented in this subchapter is rather cautious and instead of expressions like ‘to cause’, ‘to imply’ or ‘to affect’, I have rather used much weaker words like ‘relation’, ‘correlation’ or ‘correspondence’.

Similarly to other models in the thesis, the estimation of relation between secrecy score and deposits amount suffer from lack of complete data. The models are restricted to the 29 jurisdictions, for which the BIS data on cross-border deposits are available, and to only 4 different periods, for which the secrecy scores are available.[46] Given the limited sample, the estimations presented in Table 9 should not be taken as binding. For example, despite no relation was identified between the amount of deposits in tax

[46] For some of the 29 countries, however, the secrecy score was not published in all 4 rankings since 2009. Hence the model is unbalanced with respect to time variable. For details, see the description on secrecy data in Section 4.4.

havens and various secrecy scores, it would be incorrect to assert that no such relationships exist.

Most importantly, however, the estimation lacks a proper identification strategy. If such strategy was applied, it would very likely reveal the presence of endogeneity as a result of doubtful identification of causality. It is very possible that the secrecy score itself has no actual effect on deposit. On the contrary, the changes in jurisdictions' legal and regulatory framework might have an effect of two kinds. First, thanks to adoption of more transparent measures the amount of hidden deposits declines. Second, for the same reason, the secrecy score decreases, because the institutional environment is perceived as more transparent and compliant. Thus, the apparent causality might only be a correlation. Even so, on the other hand, there would be a positive empirical value in similar research. If a stable correlation of secrecy score with the value of cross-border deposits was proved to exist, then the secrecy measure (or a subset of its elements) could serve as an empirical approximation for efficiency of adopted anti-offshore policies.

7 Conclusion

Tax havens or at least some elements of offshore services have always been an integral part of a global financial system. Hand in hand with globalization and technological progress, their role increased significantly over the last decades. In 2010, the lower-bound estimate of total wealth held in tax havens reached $21 trillion (Henry 2012). For a long time already, wealthy individuals and corporations from around the world do not seek offshore services only because of lower taxation and weak regulation. Nowadays, the imminent part of offshoreness is also a high level of financial secrecy.

The principal aim of this thesis was to evaluate the interconnection between financial secrecy and cross-border bank deposits. I asked the question, whether or not the deposits of foreigners respond to a change of financial secrecy. I focused primarily on the response in tax havens, however the estimates for non-haven countries were also included for the sake of complexity. Using a recently released dataset from the Bank for International Settlements and publicly available data by OECD and Tax Justice Network, I approached the research question in two different ways, with two different measures of secrecy.

In the first part of the analysis, I used an event-based approach. On the level of country-pairs, I examined the response of cross-border bank deposits on bilateral agreements on exchange of bank information that have been concluded since 2003. Following up an earlier research by Johannesen and Zucman (2014a), I first confirmed their findings, concluding that a treaty signed between a haven and a non-haven leads to a 13.51 percent decrease in the value of deposits placed by the non-haven entities in the tax haven. I performed a robustness check on the tax havens' sample selection and an identification strategy, allowing me to claim that the relationship is causal. Second, I extended the original research by shifting my attention to non-havens, where I found even stronger response to tax treaties. After signing a treaty, the amount of deposits placed by entities from tax haven in a non-haven bank accounts decreases by 20.70 percent. I argue that this response might be attributed to a fear of tax evaders that their round-tripping schemes might be exposed.

For the second part of the analysis, I used a novel approach linking the BIS data on cross-border deposits with empirical estimates if the financial secrecy by the Tax Justice Network. I constructed a panel dataset of individual jurisdictions' secrecy scores since 2009 and using the score as an approximation of the level of secrecy, I estimated, if there is a relationship between the value of cross-border deposits and changes in secrecy. I found that a 1-point decrease in secrecy score is associated with a 0.64 percent outflow of deposits. Interestingly, while for the sample of non-haven countries the relationship exceeds 1 percent, it completely fades out for tax havens, suggesting that the deposits of foreigners in tax havens do not reflect the development of the havens' financial secrecy. Examining what is the reason of this surprising finding is a good suggestion for further research.

In conclusion, both approaches used in the empirical part of my thesis suggest that the level of financial secrecy is closely related to the amount of cross-border deposits. Using an event-based approach, I found that there are strong responses of cross-border deposits in both tax havens and non-havens. Utilization of an empirical measure of financial secrecy revealed a significant correspondence between deposits and secrecy in non-haven countries. More importantly, however, it displayed the TJN's secrecy score as an empirically valuable measure and established the baseline for further research of financial secrecy aspects.

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Appendix

A1. The list of tax havens

Table A1 presents the list of 52 tax havens as identified by Johannesen and Zucman (2014a), which is used for the purposes of tax havens identification in this thesis.

Table A1 – List of tax havens

Andorra	Gibraltar	Niue
Anguilla	Grenada	Panama
Antigua and Barbuda	Guernsey	Samoa
Aruba	Hong Kong SAR	San Marino
Austria	Chile	Seychelles
Bahamas	Isle of Man	Singapore
Bahrain	Jersey	Sint Maarten
Barbados	Liberia	St. Kitts and Nevis
Belgium	Liechtenstein	St. Lucia
Belize	Luxembourg	St. Vincent and the Grenadines
Bermuda	Macao SAR	Switzerland
British Virgin Islands	Malaysia	Trinidad and Tobago
Cayman Islands	Malta	Turks and Caicos Islands
Cook Islands	Marshall Islands	Uruguay
Costa Rica	Monaco	US Virgin Islands
Curacao	Montserrat	Vanuatu
Cyprus	Nauru	
Dominica	Netherlands Antilles	

Source: Johannesen and Zucman (2014a)

A2. The list of jurisdictions' abbreviations

Table A2 provides a list jurisdictions' abbreviations that used in Figure 4. The abbreviations are consistent with the practice of BIS.

A2. The list of jurisdictions' abbreviations

AT	Austria	KY	Cayman Islands
BS	Bahamas	LB	Lebanon
CN	China	MH	Marshall Islands
CY	Cyprus	MO	Macao SAR
DE	Germany	MV	Maldives
FR	France	NL	Netherlands
GB	United Kingdom	PA	Panama
GG	Guernsey	PY	Paraguay
HK	Hong Kong SAR	RU	Russian Federation
CH	Switzerland	SC	Seychelles
IE	Ireland	SG	Singapore
IL	Israel	TT	Trinidad and Tobago
IM	Isle of Man	TW	Chinese Taipei
JP	Japan	US	United States
KW	Kuwait	VG	British Virgin Islands

Source: OECD, Exchange of Tax Information Portal (2016)

A3. The list of jurisdictions' abbreviations

Table A3 provides a list of jurisdictions (countries or dependencies) that report their banking statistics regularly to BIS. Jurisdictions are listed in alphabetical order.

Table A3 – BIS reporting jurisdictions

Jurisdiction	Reporting since	Jurisdiction	Reporting since
Australia	1997	Isle of Man	2001
Austria	1987	Italy	1977
Bahamas[1]	1983	Japan	1977
Bahrain	1983	Jersey	2001
Belgium	1977	Luxembourg	1977
Bermuda	2002	Macao SAR	2006
Brazil	2002	Malaysia	2008
Canada	1977	Mexico	2003
Cayman Islands	1983	Netherlands	1977
Chile	2002	Netherlands Antilles[3]	1983
China	2015	Norway	1983
Chinese Taipei (Taiwan)	2000	Panama	2002
Curacao[2]	2010	Portugal	1997
Cyprus	2008	Russia	2015
Denmark	1977	Singapore	1983
Finland	1983	South Africa	2009
France	1977	South Korea	2005
Germany	1977	Spain	1983
Greece	2003	Sweden	1977
Guernsey	2001	Switzerland	1977
Hong Kong SAR	1983	Turkey	2000
India	2001	United Kingdom	1977
Ireland	1977	United States	1977

Notes: [1] Bahamas report only semi-annual data. [2] Does not report locational by nationality statistics. [3] No longer exist, replaced by Curacao since Q4 2010.

Source: Bank for International Settlements (2016c)