Tax Evasion: Responses to Tax Information Exchange Agreements

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Preface

I would like to thank my supervisor, Gaute Torsvik, for the idea for this thesis and invaluable feedback during the writing process.

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Any inaccuracies and errors in the thesis are solely my responsibility.
Abstract

In late 2008 and early 2009, the G8 and the G20 pressured remaining non-cooperative jurisdictions with sanctions if they failed to commit to the OECD standards of transparency and exchange of information for tax purposes and sign 12 agreements that met these standards. Leading up to this event was the continued work of the OECD to construct a treaty network to combat tax evasion by means of tax information exchange agreements (TIEAs).

In this thesis, I investigate if the pressure to implement the network of tax information exchange agreements reduces tax evasion activities in jurisdictions providing banking secrecy. To measure the effect of these tax information exchange agreements I use the value of service charges banks and other financial institutions in a country apply to their foreign clients that own financial assets there. These charges are for each country included in the category financial services export in the Balance of Payments (BOP) data set. And this is the data used to analyse potential effects. In other words, I use financial services export as a proxy for foreign financial assets. The statistical software package used in this thesis is Stata 14.1.

There are two methods that I use to estimate an effect of the pressure to commit to the OECD standards and sign 12 agreements that meet the standards. The first approach is the fixed-effects (FE) model, and it is used to measure the change in financial services export as a percent of goods and services export for all countries that goes from being uncooperative to cooperative in exchanging tax information. The overall effect on the data set is then measured by this method. The second approach is called the synthetic control method and is used on the data to estimate a potential effect on an individual country’s financial services export. I apply it to Switzerland as it historically has been the place to hide financial assets, with a banking secrecy law enacted in 1935, and an almost complete hegemony over the international wealth-management market until the beginning of the 1980s.

By using the fixed-effect model and, in this context, the previously unused Balance of Payments data set, I find evidence that committing to the OECD standards and signing at least 12 tax information exchange agreements to the OECD standards has no significant effect on the cumulative amount of foreign financial assets. I theorise that this is a result of heterogeneous effects, caused by spillover effects of foreign financial assets from highly cooperative jurisdictions to less cooperative jurisdictions. By using the synthetic control method on an individual country known to provide banking secrecy, Switzerland, I find a large decrease in foreign financial
assets from committing to the OECD standards and signing tax information exchange agreements to the OECD standards. From highly cooperative jurisdictions to less cooperative jurisdictions. By using the synthetic control method on an individual country known to provide banking secrecy, Switzerland, I find a large decrease in foreign financial assets from committing to the OECD standards and signing tax information exchange agreements to the OECD standards. This strengthens the theory of heterogeneous effects from the fixed-effects model, as a reduction in Switzerland necessitates a similar opposite effect in other countries that have committed to the OECD standards and signed at least 12 agreements that meet the standards. The concerns that the bilateral agreement network does not cover enough country pairs to effectively prevent tax evasion seems to be valid. The network for each country is far from complete, and a large part of the world is completely left out because of administrative costs of implementing and enforcing agreements. This continues to provide the opportunity for a tax evader to transfer financial assets, with little risk of detection, to countries not covered by an agreement with the home country of the tax evader.
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Tax Evasion: Responses to Tax Information Exchange Agreements

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1 Introduction

In March 2009, countries such as Switzerland, Luxembourg, and several other states that had been identified as tax havens or secrecy jurisdictions, began making more commitments to exchange information for tax purposes (TJN, 2009). Leading up to this event was the continued work of the Organisation for Economic Co-operation and Development to construct a treaty network to combat tax evasion by means of tax information exchange agreements (OECD, 2009).

In 2002 OECD and non-OECD countries issued the Model Agreement on Exchange of Information on Tax Matters, a template for tax information exchange treaties aimed to promote international cooperation in tax matters, through the Global Forum. A forum established in 2000 under OECD with the aim to be an inclusive platform to promote international standards of transparency and exchange of information for tax purposes. Stating that: “All countries, regardless of their tax systems, should meet such standards so that competition takes place on the basis of legitimate commercial considerations rather than on the basis of lack of transparency or the lack of effective exchange of information.” (OECD, 2009, p. 9). This initiated a surge of endorsements of the standards, but a lacking amount of agreements signed.

Due to the financial crisis of 2007-2008 and scandals surrounding tax havens, renewed efforts were made in 2008 by the G8 and the G20 to pressure remaining jurisdictions to implement the standards of transparency and effective exchange of information and that failures to do so would be “vigorously addressed”. In April 2009, the G20 threatened non-cooperative jurisdictions with sanctions, which lead to commitments to the standards and to sign the required amount of 12 agreements that met the standards from the remaining jurisdictions on the list of uncooperative tax havens (OECD, 2009). According to the announcement of the G20 after the April 2009 summit, the era of bank secrecy was over.
The purpose of this thesis is to estimate to what degree the pressure to commit to the OECD standards and the implementation of tax information exchange agreements, as well as later improvements, has reduced tax evasion activities in Switzerland and other tax havens. This is done by looking at changes in the amount of foreign-owned financial assets. Has the tax information exchange agreements network, increasing the perceived or real risk of getting caught, made tax evaders give up their hidden foreign accounts? Have tax havens become more compliant or are factors of tax evasion unaffected by this treaty network? Both of the events from 2000-2002 and 2008-2009 has brought publicity to the topic of tax havens and tax evasion, as can be seen from Figure 1, which displays the percent of all news articles that mentions tax havens. I find it unlikely that these increases in publicity would go unnoticed by both tax evaders and their advisers.

Figure 1: Tax Havens in News Articles. Percent of all news articles that mentions tax havens.

There have been few attempts at estimating an effect of the agreements network. What makes this thesis especially interesting is the use of data and methods that, to the best of my knowledge, has not been applied to this issue previously. The general view of tax evasion is negative; the practice is perceived as undesirable and undermining the present worldwide financial system. It is seen as a tool to make rich people richer without contributing to the society of which they are a part of. With more frequent exposure of shady dealings and increasing discontent with tax havens, this thesis provides an analysis of the work trying to prevent tax evasion.
The questions I aim to answer in this thesis is:

1. Does the implementation of bilateral tax information exchange agreements reduce the amount of foreign-owned financial assets in a jurisdiction becoming cooperative?

2. Are bilateral tax information exchange agreements reducing the total amount of foreign-owned financial assets in all previously uncooperative jurisdictions?

Section 2 of this paper is used to discuss other studies estimating shocks on tax havens and tax evasion or the amount of hidden financial wealth, followed by necessary definitions and explanations of core concepts related to tax havens, tax evasion and the tax information exchange agreements network in the beginning of section 3.

To measure the effect of the tax information exchange agreements, I use the value of service charges banks and other financial institutions apply to financial assets owned by clients from abroad. As the clients country of residency is different to that of the bank, the financial assets are thus foreign financial assets. If foreign financial assets are undeclared to tax authorities at home, then the value of service charges on foreign financial assets are expected to decrease when the risk of detection increases with the wave of signed agreements. If the total amount of foreign financial assets situated in a country decrease, it will lead to a loss of volume and/or customers for financial services providers and thereby a loss in income from service charges like margins, fees, and commissions. These income payments are reported to the Balance of Payments (BOP) data set as export of services and is included in a subsection named financial services, and it is the data I use to analyse potential effects. In other words, I use financial services export as a proxy for foreign financial assets. This is a more indirect way to estimate an effect than directly measuring the effect on the amount of foreign financial assets. The obvious alternative is to measure foreign financial assets directly, but the data on such figures are severely lacking in tax havens due to the level of secrecy, and because more liabilities than assets are recorded on a global level it leads to an anomaly in the data (Zucman and Piketty, 2015, p. 37). By directly using financial assets, the size of the missing assets must first be estimated to be able to assess the effect on hidden financial assets as a result of the information exchange agreements network. Service charges provides an alternative approach to circumvent this problem. The data is described in more detail in section 3.

There are two methods that I use to estimate an effect of the pressure to commit to the OECD standards and sign 12 agreements that meet the standards. The first approach is the fixed-effects (FE) model, and it is used to measure the change in
financial services export as a percent of goods and services export for all countries that goes from being uncooperative to cooperative in exchanging tax information. The overall effect on the data set is then measured by this method. The second approach is called the synthetic control method and is used on the data to estimate a potential effect on an individual country’s financial services export. I apply it to Switzerland as it historically has been the place to hide financial assets, with a banking secrecy law enacted in 1935, and an almost complete hegemony over the international wealth-management market until the beginning of the 1980s (Zucman and Piketty, 2015). The synthetic control method was first introduced by Abadie and Gardeazabal (2003) when they presented this method to study the effect of conflict on economic growth, and I apply the method to estimate the effect of the pressure to commit to the OECD standards and sign 12 tax information exchange agreements to the OECD standards. Normally, we would not be able to observe what would have happened to a tax haven if the implementation of tax information exchange agreements did not occur, we can only observe what actually happened to the tax haven. By applying the synthetic control method, we get an effective way of constructing predictions of these unobserved observations and can compare the difference between the real tax haven observations and the predicted observations. Section 4 is dedicated to describe the empirical approach in detail.

In Section 5, I find from the fixed-effects model that the tax information exchange agreements network has not had a significant effect on the financial services export and thus the amount of foreign financial assets in jurisdictions going from uncooperative to cooperative status. I theorise that this is caused by heterogeneous effects in tax havens. Some jurisdictions may have had a reduction in tax evasion activities, while others may have had an increase, depending on their cooperation efforts. Furthermore, I observe that Switzerland experienced a reduction of 17 percent in financial services export from the start of 2009 until the end of 2009, and it continues to decrease after 2009. According to the synthetic control method, I also find evidence that Switzerland has had a noticeable decrease in foreign financial assets relative to other jurisdictions, and that the financial services export of Switzerland would be 50 percent larger in 2011 and twice the size it is in 2015. These numbers are expected to be overestimated, but the numbers undeniably conclude that there has been a large decrease in foreign financial assets in Switzerland. This strengthens the theory of heterogeneous effects from the fixed-effects model, as a reduction in Switzerland necessitates a similar opposite effect in other countries that have committed to the OECD standards and signed at least 12 agreements that meet the standards.
2 Literature

There is not a lot of research aiming at measuring the effect of anti-tax evasion programs. OECD has its own peer-review evaluation program under the Global Forum on Transparency and Exchange of Information for Tax Purposes that analyses the progress of each country and if agreements are properly drafted and enforced, but the effect of the agreements on tax evasion in tax havens has not been measured by this forum.

Bilicka and Fuest (2014) analyses 565 tax information exchange agreements (TIEAs), and double tax avoidance agreements (DTAs) that meet tax information exchange requirements, signed by tax havens between 2008-2011. They find that tax havens sign more TIEAs with countries they have stronger economic links to, they also find no evidence that tax havens systematically try to undermine tax information exchange by signing TIEAs with irrelevant countries. For a jurisdiction to be considered to have substantially implemented the OECD standards on exchange of information, 12 agreements to the OECD standards must be signed. The requirement of 12 agreements may have seemed to resulted in a decline in the rate of signed agreements after the threshold is reached, and tax havens have signed agreements with roughly half of the five most important economic partner countries, therefore the network of agreements for information exchange is far from complete (Bilicka and Fuest, 2014).

Using data on deposits from the BIS Locational Banking Statistics, Johannesen and Zucman (2014) evaluated the G20 Tax Haven Crackdown and the wave of information exchange treaties that followed. They found no reduction in the total value of bank deposits in tax havens, but a relatively small but statistically significant transfer of deposits from more cooperative tax havens to less cooperative tax havens. This seem to fit well with the finding of Bilicka and Fuest (2014) that the network of tax information exchange agreements is not complete. The data on deposits from the BIS Locational Banking Statistics can only be used to measure the impact on bank deposits. While they can measure the direct effect on deposits, I am only able to measure an indirect effect on transfers stemming from financial services, on the other hand financial services include other financial assets often used in tax evasion and not only bank deposits. According to Zucman (2012), of the amount of funds owned by foreigners in Switzerland, 25% are bank deposits while 75% are equities, bonds and mutual funds shares. Thus, the approach of this paper reaches a broader part of tax evasion by individuals. Since BOP data includes service fees on bank deposits and other financial assets alike, the data this paper utilizes covers all foreign financial assets that are placed in a tax haven.
There are other policies aiming at reducing the level of tax evasion activities, like the European Union Savings Directive. The EU Savings Directive is a policy where offshore centers apply a withholding tax to the interest income of households from countries in the European Union and transfer a large part of the tax revenue to the home countries of the household, while not revealing the identity of the tax payer to tax authorities of the home country. If the household allow the offshore bank to reveal the interest income, then the withholding tax is not applied. As a result, the tax is only applied to household unwilling to report their offshore interest income. Johannesen (2014) estimate the effect of implementation of the EU Savings Directive in 2005 on undeclared offshore deposits of households, and finds that the directive reduced EU-owned bank deposits in Switzerland by 30-40%. He finds that the stock of offshore bank deposits responds strongly to a policy that only affected tax evaders, that a significant amount of offshore wealth is undeclared and that there are signs of shifting from directly held accounts to accounts owned through holding structures in other offshore centers. This shows an undesired tendency of the tax evader, but not a surprising one. Tax evaders have already chosen to evade taxes, and given the choice of doing it again, this action is most likely repeated. The tax information exchange agreements network of OECD, on the other hand, has an aspect of risk for the tax evader, which distinguish the effect measured by this paper to the effect measured by Johannesen. Nonetheless, we might expect to observe such a behaviour of tax evaders as a response to the agreements network as well.

3 Data

In the following sections I present and explain relevant information regarding exchange of information, before I describe and discuss the data.

3.1 Tax Havens and Tax Evasion

There does not seem to be a unified agreement on the definition of a tax haven or secrecy jurisdiction. The OECD (1998) established a set of criteria describing the jurisdictions often labelled as tax havens: no or only nominal taxes, lack of effective exchange of information, lack of transparency and no substantial activities. They are effectively helping people escape laws, rules and regulations of their home jurisdictions in favour of a lower or non-existing tax rate and a small service charge in another jurisdiction. “Tax havens typically have in place laws or administrative practices under which businesses and individuals can benefit from strict
secrecy rules and other protections against scrutiny by tax authorities thereby prevent-
ning the effective exchange of information on taxpayers benefiting from the low tax jurisdiction. (OECD, 1998, p. 23)

Apparently, the list over tax havens from OECD compiled in 2000 exclude OECD members, therefore I will in this paper use a more inclusive list from Hines (2010) as basis to indicate if a jurisdiction is a tax haven or not. It also fits the timing of the OECD standards requirements. The difference in the lists is from the definition of what characterises a tax haven. As OECD judges a tax haven to have no substantial activities or than providing for banking secrecy and tax minimising opportunities, it excludes countries such as Switzerland that has a larger variety of activities than most other tax havens. In this paper, I will be using tax haven and secrecy jurisdiction interchangeably when describing their role in tax evasion.

Tax evasion is the act of hiding your tax base from relevant tax authorities, and this may take different forms. The size and type of taxes differ from one country to the next based on country legislation, for the purpose of illustration I use a generic example where certain activities are expected to generate a tax base and not paying is considered illegal. In most cases, it involves an individual that decide to transfer his money or other type of assets into a bank account in a foreign jurisdiction. If this foreign bank account is located in a tax haven or secrecy jurisdiction characterised as having a high level of banking secrecy and neither the individual nor the bank report the account, the information about the account will not be available to tax authorities responsible of taxing the owner. Income such as interest, capital gains or dividends as well as wealth remain unreported. In these situations, opportunities for tax evasion occurs from lack of information provided by tax havens. Another layer of secrecy can be added by establishing a shell company in a third country, also a tax haven, that has the sole purpose of hiding the ownership of the financial assets located in the second tax haven. This tendency was apparent to avoid the Savings Directive withholding tax of 35 percent (Johannesen, 2014).

3.2 Information Exchange Agreements and the OECD Standard

Bilateral agreements to exchange information, that is agreements between two countries, has been seen as a way to remedy the lack of information on economic activities individuals in one country has in another country. There are two main types of agreements backed by the OECD that incorporates exchange of information on request related to tax evasion, and these are Tax Information Exchange Agreements (TIEA) and Double Taxation Agreements (DTA) also called Double Taxation Conventions
DTAs are most known as comprehensive tax treaties that aim at encouraging foreign investment. The other type, the TIEA, is more specialized in the subject of information exchange and describe detailed rules and procedures for how information exchange between different jurisdictions is to occur. Whereas TIEAs have a focus on information exchange, the purpose of a DTA has traditionally been to prevent income or profits from international economic activity being taxed twice (TJN, 2009).

The principles of transparency and effective information exchange on request for tax purposes are primarily reflected in the 2002 OECD’s Model Agreement on Exchange of Information on Tax Matters and in Article 26 of the OECD Model Tax Convention (OECD, 2016). As stated by OECD (2010), the international standards of transparency and exchange of information for tax purposes has several requirements: It requires the possibility of exchange of information on request where it is “foreseeably relevant” to the administration and enforcement of the domestic laws of the treaty partner. It also requires no restrictions on exchange caused by bank secrecy or domestic tax interest requirements as well as availability of reliable information and powers to obtain it. This combined with 12 signed agreements with other jurisdictions is considered to have implemented the internationally agreed tax standard.

There were a number of significant positive developments to the network of tax information exchange agreements that occurred in 2009. Andorra, Liechtenstein, Monaco and Singapore endorsed the OECD standards and committed to working on relevant legislation as well as begin the process to enter into agreements for the exchange of information for tax purposes. Austria, Belgium, Luxembourg and Switzerland removed their reservation of Article 26 (Exchange of Information) of the OECD Model Tax Convention, renegotiating its existing DTAs and stated that they will be including the OECD standards in its new DTAs (OECD, 2009). A DTA can then be used in a similar way as a TIEA to request exchange of information on taxes of all kinds as stated in Article 26 (TJN, 2009).

In 2000, a network of DTAs that permitted information exchange were already in place. The process of signing agreements from year 2000 onwards was slow. From the beginning of 2000 until November 2008, only 44 TIEAs had been signed (OECD, 2012), while DTAs were more popular. According to the assessment made by the Global Forum and OECD (2006), there were a total of 1516 DTAs with a broad exchange clause, permitting information exchange for the administration and enforcement of domestic tax laws. From 2006-2007 a total of 90 DTAs with a broad exchange clause were signed (OECD, 2007). From 2007-2008 a total of 69 DTAs with
a broad exchange clause were signed (OECD, 2008). However, from 2008 until 2011, 700 TIEAs and DTAs had been signed (OECD, 2011). Thus, the few years following the pressure to commit to the standards experienced a large increase in the rate of signed treaties as is also shown in Figure 2. The pace slowed down considerably from 2011 and onward, possibly reflecting the desire of some tax havens to reach the threshold of 12 agreements (Johannesen and Zucman, 2014). The total number of bilateral agreements are hardly enough to cover all the combinations of country pairs, potentially leaving substantial leeway for tax evaders to undermine the network. In this paper, I use TIEA to refer to both the Tax Information Exchange Agreements and the Double Taxation Agreements to the OECD standard as they have the same purpose.

The Tax Justice Network (2009) pinpoints a few weaknesses of the tax information exchange agreements network. Since the agreements are of a bilateral nature and not multilateral, major sections of the world are left out of the network, this especially applies to developing countries that do not have the necessary resources or administration to negotiate, draft and enforce the numerous bilateral agreements. This is a major weakness as it leaves large gaps in the network. A multilateral network, where the signature of one country would mean that they exchange information with all other signatories, would be more comprehensive and effective than the bilateral links between two and two countries. Secondly, the agreements are usually on request, which means that you have to know what you are looking for
before you request it, and that would necessitate either that the tax evader or the financial institution that provides the services leak the information. The Tax Justice Network elevate automatic exchange of information as a superior alternative to on request. Third, the information requested might not be registered in the jurisdiction that has to provide information, or the jurisdiction has restrictions on access to bank information. These are all valid concerns of the tax information exchange agreements.

From 2011, the Global Forum has published and worked to increase commitments to implement the new automatic exchange of information (AEOI) standard that will commence information exchange from 2017 and 2018 (OECD, 2015).

### 3.3 Balance of Payments data from IMF

To determine the effect of tax information exchange agreements on tax evasion in tax havens, I use publicly available data from the International Monetary Fund (IMF). The data set is called Balance of Payments (BOP) and is a record of all economic transactions between residents and non-residents of a country collected over a period of time. Collected by 204 economies on behalf of the IMF from the earliest data entry year of 1948, the data set is substantial in size. Unions are removed from the set as they are summing up the jurisdictions they include, and the data set thereby consist of 193 jurisdictions. This is a panel data set where each time period is specified on a yearly basis and each jurisdiction is determined by legislation, i.e. Anguilla being overseas non-self-governing territories of the United Kingdom but is still reporting to IMF as an independent jurisdiction. The data is displayed in US dollars, but other alternatives are available.

It is essential to clearly specify how the data set is constructed. An economy consists of all the institutional units that are residents in a country. There are two main types of institutional units, households on the one hand and corporations, non-profit institutions and government units on the other hand (IMF, 2010, p. 52). Each institutional unit is a resident in only one country, and this applies naturally to households, but corporations with substantial economic activity in several countries over a long period of time is split up into units according to the location of their activities. A foreign affiliate or branch of an enterprise with a significant amount of production of services in a different country is then regarded as an individual unit separable from the rest (IMF, 2010, p. 72).

In this paper, I only use a part of the data set related to the current account that contains data on export of goods and services. This is services that institutional units residing in a country supplies to non-residents. If a resident buys services from
non-residents, the transfer is then regarded as import of services in the country of the first resident and export of services in the country of the other, and this is a crucial distinction. Tax evaders that use company structures, such as shell-companies, to hide ownership of wealth is thus included in this data as long as the shell company is not registered in the same country as the money or other type of assets resides. Legal activities by companies is also included but they are not expected to be affected by the tax information exchange agreements.

In a subcategory under current account we find services, and in the subcategory of services we find financial services, which is the data relevant to estimating the effect of exchange of information on request. Each section contains data of similar services aggregated and summarized for all institutional units in each country. Financial services cover financial intermediary and auxiliary services, except insurance and pension fund services. This includes services usually provided by banks and other financial corporations like deposit taking and lending and clearing of payments, as well as financial advisory services, custody of financial assets, financial asset management, stock exchange services and trust services (IMF, 2010, p. 172). These services result in explicit charges, a variety of fees, commissions and account charges. For a complete list, see Balance of Payments Manual Sixth Edition (IMF, 2010). What financial services measures is then all transactions from fees, commissions or other methods of billing, explicit or implicit, related to services for foreign wealth, not only bank deposits but also other financial assets like stocks, bonds and shares, in a country. This indirectly covers activity related to income and wealth that is either declared or undeclared to the relevant tax authorities of the residency of the owner.

Financial service providers charge their customers in a variety of ways, for example an hourly rate, fee based on performance or a percentage of assets under management. There are no universal way service providers charge their clients, but a percentage of assets under management seems to be the most popular way. The incentive for the service provider seems to be more in line with the incentives of the client. With an hourly rate the provider earns more money by charging for more hours of the client’s time, while percentage of assets under management provides the incentive for the service provider to increase the value of assets over time.

According to Zucman and Piketty (2015, p. 45) most of the offshore wealth takes the form of financial securities like stocks, bonds and shares in mutual funds. Rather than letting their money sleep in a tax haven savings account, wealthy households prefer to invest in financial securities (Zucman and Piketty, 2015, p. 36-37). An increase in the amount of foreign financial assets in accounts in tax havens gives
increased fees and commissions to the bank that holds the accounts, which in turn provides an increase in financial services export as reported in the Balance of Payments. This makes our data set interesting in that it has the ability to reveal movement of financial assets otherwise shrouded in secrecy. They also estimate that in 2014 approximately 80% of global household wealth in tax haven is undeclared, which is a significant fraction (Zucman and Piketty, 2015, p. 48). I expect that the volume of charges for financial services related to the foreign wealth will fall as the pressure on tax havens to cooperate intensifies and owners in fear of exposure either reveal their accounts and transfer the assets to more practical locations or transfer the undeclared wealth to as of yet unaffected tax havens. The next section provides more discussion of how service charges relates to financial assets.

The Balance of Payments data reporting is guided by a manual called the Balance of Payments Manual to make the reporting consistent across time and jurisdictions. This manual was improved on in 2010 from the fifth edition to the sixth edition. All changes are described in Appendix 8 of BPM6, but concerning the data used in this thesis, it is mainly the introduction of financial intermediation services indirectly measured (FISIM) that might cause inconsistency. Institutions provide services for which they charge their clients indirectly by means of paying their depositors interest at a lower rate than the rate that the institutions charge their borrowers. The change in reporting may influence the comparability of data before and after in some jurisdictions, and this is specified by IMF for each jurisdiction in the metadata of BOP. However, there does not seem to be large unexplainable disparities in reported values for countries going from BPM5 to BPM6.

As the range of economies in the Balance of Payments data set is from the smallest and least developed countries to the more advanced and complex economies it can be problematic to maintain consistent data entries for all countries in all periods. Because of this, there are time periods where certain countries fail to report. This does not cause issues in the FE approach, but it might do so in the synthetic control approach. As synthetic control method requires observation for all pre-treatment years as well as data on all post-treatment years, this could pose a problem of having to either reduce the number of years in the analysis or the number of countries in the control group. Countries with missing observations in the middle of the entire time span can not be included either.
3.4 Export of Financial Services as a proxy for Foreign Financial Assets

In this thesis, a country’s export of financial services is used as an approximation of foreign financial assets located in that country. For export of financial services to be a good approximation of the amount of foreign financial assets, the values should move together. For example: on the individual level, say that a client with foreign financial assets in an account in a foreign country decides to transfer it back home and close the foreign account. The amount of foreign financial assets has then decreased to zero. In this case, the client no longer has need of the services provided by the financial institution, and regardless of which method is used to pay for the services, the reported financial services export should also be reduced to zero. Now, imagine that the same client does not close the account, and transfer only a certain percentage of the foreign assets back home. The variety of methods of charging might behave differently. With advisory fees, charges applied on an hourly basis, it is uncertain how financial services export evolves, as it might decrease, stay put or even increase depending on the circumstances. However, based on the amount of assets, one can expect that a higher amount requires more advisory hours and thus a higher overall cost for the client. If this is the case, then advisory fees are a good approximation of foreign financial assets. Transaction charges, individual billing of every single transaction to the client, behaves in a similar way as advisory fees. The client will often pay a percentage of the transaction volume every time he buys or sells an asset, but when the charges are tied to the activity of assets rather than the amount it is hard to say if it is suitable for approximating foreign financial assets. With performance fees, a reduction in the assets will in turn reduce the value of the performance fees unless the performance is abysmal, thus in this case there are variations in the effect based on how well the assets under management perform. Lastly, with charges as a percentage of assets managed, export of financial services is reduced by the exact same percentage as foreign financial assets, which then is an extremely accurate approximation.

Fees as a percentage of total financial assets managed seems to be the most common way to charge for financial services, but a combination of different charges is often used. The use of export of financial services as an approximation of the amount of foreign financial assets should therefore be accurate.

On the individual level, the percentage fee on asset managed varies with the amount each individual has. For an example of a price structure, the price of having less than 2 million US dollars in an account might be 1% of the assets managed, while the price of having between 2-5 million might be 0,5% and the price of having
more than 5 million might be 0.35%. The fee price is tiered based on the amount of assets managed. If the client base consists solely of homogeneous high-net-worth individuals that faces the fee price of 0.35%, then the measure of foreign financial assets by using export of financial services might not provide a good comparison to countries with a heterogeneous client base. Export of financial services would underestimate the amount of foreign financial assets in the homogeneous client base country. The client base in a country is however assumed to be heterogeneous, based on the fact that the financial institutions in each country provides services to the whole segment of clients.

If the fee prices do change based on the amount of assets in a country, financial services export relatively to the amount of foreign financial assets would then vary differently between countries, and this could introduce a problem of bias to the coefficient of interest in the analysis of this thesis. An example of this is Switzerland in the 1970s. Switzerland had hegemony over the international wealth-management market, and as the only country that offered the protection of banking secrecy, bankers took advantage by increasing the fees they charged (Zucman and Piketty, 2015, p. 21). This is a case where the fee prices relative to the amount of foreign financial assets change differently between countries, and thus export of financial services would over-represent the amount of foreign financial assets in the country with higher fee prices. In the context of the TIEAs, it is possible that when tax havens have committed to the OECD standards and signed enough tax information exchange agreements to be considered as compliant, the other competing tax havens that is not yet compliant has the possibility of increasing the fee prices. This is potentially not a problem when the number of non-compliant tax havens is large, but when there is only a few left, the potential of creating a cartel with equal high fee prices across the tax havens increases substantially. Luckily, OECD decided to go for an all in one approach for the remaining non-compliant tax havens in 2009, which most likely has hindered an increase in the fee prices. I therefore make the assumption that the fee prices are mostly constant between countries over time. That being said, I do expect the fee rates to be slightly higher in tax havens as they can profit from their clients evading taxes. Tax havens that become compliant then have the potential to slightly overstate the results in the analysis if they adjust their fee price rates slightly to stay competitive. Judging from the number of tax havens present in 2009, the competition limits the extra gain from providing banking secrecy to such a degree that the fee price rates in tax havens are slightly above or close to equal non-tax havens.
3.5 Movement of Foreign Financial Assets

The effect of TIEAs on foreign financial assets as measured by the proxy financial services export rests on to which degree tax evaders repatriate assets or transfer assets to other financial centres. When a TIEA is signed between two jurisdictions of which a tax evader is a resident of country A and has hidden financial assets in country B, the tax evader has three options. The first option is to do nothing and risk detection. The second option is to disclose the information about the hidden account to tax authorities in country A. The third option is to transfer the assets to a third country, C, which is not part of the agreement. In the third option, there will be a measurable effect in country B and C after the transfer, as there will no longer be any service charges applied to the account in country B and country C has service charges on a new account. In the first and second option, the tax evader may leave the assets in country B or repatriate the assets to country A.

An individual’s placement of financial assets is based on several decision factors. To get an indication of what these decision factors may be, I refer to a survey done by Deloitte (2015), a firm that provides audit, tax, consulting, enterprise risk and financial advisory services, that lists the importance of different factors on wealth management. Where reputation of the bank, quality of relationship, distance and ease of access to consultation and assets seems to be important factors for wealth management clients. Thus, maintaining the relationship between the client and the adviser and addressing complex investment issues is easier.

Since tax evaders primarily use tax haven accounts for the banking secrecy they provide, observing repatriation of assets when the secrecy is lifted is to be expected. After voluntarily giving up accounts used for tax evasion, continued use of these accounts would also most likely be associated with tax evasion and thereby involve social stigma. Especially if the tax evader does not voluntarily report the accounts but is revealed by tax authorities at home. One could also argue that as uncooperative jurisdictions with banking secrecy become cooperative, clients with accounts in banks previously able to evade taxation now faces taxes by the authorities at home as well as fee prices that are presumed to not be competitive. However, after a short adjustment period this difference should level out.

There are also arguments for increased compliance and keeping the accounts in tax havens after banking secrecy is lifted. A bank providing accounts previously used for tax evasion has had the opportunity to establish and maintain a relationship with clients over a certain period of time and is probably interested in providing incentives for clients to keep the accounts. And by providing for opportunities to evade taxes, the banks and financial institutions of a country has had the opportunity to develop
the financial system and provide all services related to wealth management. Hence it has the possibility of establishing itself as a financial centre with high quality services and a way to differentiate itself from competition.

That tax evaders leave their assets be can then not be fully excluded, but I regard it as unlikely that this happens on a large scale.

3.6 Control Variables from the World Bank

The control variables used in this thesis is extracted from the World DataBank on the World Bank webpages, which is publicly available to everyone. GDP per capita in US dollars, GDP per capita annual growth, inflation and deposit interest rate are all extracted from the World Development Indicators, while rule of law is extracted from the Worldwide Governance Indicators (WGI) project.

The Worldwide Governance Indicators are aggregated indicators that gather the views of a large number of enterprise, citizen and expert survey respondents in developed and developing countries. The indicators are combined from over 30 individual data sources produced by a variety of survey institutes, think tanks, non-governmental organizations, international organizations, and private sector firms. Rule of Law is estimated based on this. It captures the extent to which people have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, the courts, and the likelihood of crime and violence. As individuals are concerned for the safety of the variety of assets they own, this variable is a necessary addition for the analysis of this paper.

The World Development Indicators that I use are all variables that display the economic situation in a country. These indicators are compiled from officially-recognized international sources. Starting with gross domestic product (GDP) per capita, it is the sum of gross value added by all producers in an economy divided by the midyear population. GDP per capita in US dollars and GDP per capita annual growth rate are both often used as an indicator of how well off a country is. The economic situation of the country is thus measured to some degree, and with rule of law these are assumed to have explanatory power over foreign financial asset placement. Inflation as measured by the consumer price index reflects the annual percentage change in the cost to the average consumer of acquiring a basket of goods and services. For cross-border investment, inflation is an important factor in the decision as it determines how the value of assets change in relation to goods and services offered. The Deposit Interest Rate is the rate paid by commercial or similar banks for bank deposits. Inflation and deposit interest rate thus indicates the profitability of placing assets in a jurisdiction.
These control variables are combined with the IMF Balance of Payments data to construct the data set for the analysis described in section 4.

### 3.7 Descriptive Statistics

There are 193 countries in the Balance of Payments data set. Trying to display all of these countries in a graph in a meaningful way is not possible. As such, I will settle for several countries in two groups. One group of 5 countries which are not known to be tax havens, and a second group of 5 countries known to be tax havens. The purpose of this is to show the general trend of financial services export over the entire time period, and how tax havens differ from non-tax havens. Figure 3 shows the amount of financial services export in billions reported for 5 non-tax haven countries over a period of 27 years. These countries are Germany, Netherlands, Norway, United Kingdom and United States.

![Figure 3: Financial Services Export shown in billions for 5 non-tax haven countries.](image)

As can be seen from Figure 3, financial services export has had an almost exponential growth in the United Kingdom and the United States, with the exception of the immediate years after the financial crisis of 2007-2008. There is an increasing trend for most countries. It is well known that London is an important financial centre in Europe, which could explain the growth in the United Kingdom. The amount in the United States could on the other hand be more due to the sheer size of the country.
Figure 4 shows the amount of financial services export in billions reported for 5 tax haven countries, namely Aruba, Luxembourg, Panama, Singapore and Switzerland. As the data is unbalanced, it does not have observations for all periods as can be seen from the line in the graph representing Singapore that starts in 1995 and Luxembourg that starts in 1999, which is the first year they report financial services export independently as a subcategory of the general services export category. Luxembourg and Switzerland seems to display the same exponential growth prior to 2008. From 2008 to 2009, it would seem from Figure 4 that all tax havens experience a decrease in the financial services export, although it is hard to see for Aruba. The vertical dashed line indicates the beginning of 2009, which is when G8 and G20 pressure uncooperative tax havens to commit to the OECD standards and sign 12 tax information exchange agreements to the OECD standards. It is, however, difficult to distinguish an effect on financial services export stemming from the financial crisis of 2007-2008 and an effect stemming from TIEAs, which is one reason why I employ the methods introduced in the next section of this thesis.

Looking at the plain amount of financial services tells us the scale of activity related to financial assets, that in 2009 the United Kingdom provided approximately 79 billion worth of financial services to residents outside of the United Kingdom measured in US dollars, the United States provided approximately 63 billion, Luxembourg provided approximately 43 billion while Switzerland provided approximately 29 billion.

However, it is more interesting to look at the relative numbers for each country, as
Figure 5: Financial Services Export as percentage of Goods and Services Export for 5 non-tax haven countries.

This more clearly shows changes in only financial services export relative to changes in goods and services export in general. The United Kingdom has a larger share of financial services export relative to goods and services export than the other non-tax haven countries in Figure 5, with around 10 percent in later years. The four other countries stay below 5 percent. As can be seen from Figure 6, Luxembourg has a continued high financial services export percentage of goods and services export of between 40 and 50 percent. Luxembourg increases from 2003 until 2007 where it falls for a few years before returning to the 2007 level. For the rest of the tax havens, I refer to Figure 7 instead, where Luxembourg has been excluded to be able to show the rest. For the tax haven countries, they show different signs in 2009. Switzerland has a relative decrease along with Panama and Luxembourg, while Singapore and Aruba has a relative increase. However, Switzerland’s development from before 2008 to after is noteworthy, as it goes from having a larger percent of than the United Kingdom to a steady decrease until it is on par with the United States in Figure 5. Financial services export relative to goods and services export in Switzerland has had a similar decrease as financial services export alone, and is thus not caused by a general downturn in the economy. It is also interesting to observe for certain tax havens how large financial services export is relative to goods and services export.
Figure 6: Financial Services Export as percentage of Goods and Services Export for 5 tax haven countries.

Figure 7: Financial Services Export as percentage of Goods and Services Export for 4 tax haven countries. Luxembourg is excluded.

There are 38 countries with no reported data on financial services export for the entire duration of the data set time period. These are Angola, Anguilla, An-
tigua and Barbuda, Bahamas, Bahrain, Brunei Darussalam, Central African Republic, Chad, Comoros, Republic of Congo, Djibouti, Dominica, Equatorial Guinea, Gabon, Gambia, Ghana, Grenada, Haiti, Israel, Libya, Maldives, Marshall Islands, Mexico, Micronesia, Montserrat, Myanmar, Nepal, Oman, Palau, Qatar, Seychelles, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, Trinidad and Tobago, Vietnam, West Bank and Gaza, Yemen and Zimbabwe. Two countries report financial services export for only one time period, Mauritania and Myanmar. Ecuador, Jordan, Nicaragua, Samoa and Zambia report for two time periods, while Denmark and Liberia report for three.

4 Empirical Approach

The statistical software package used for the purpose of calculation, analysis and creating figures is Stata 14.1.

4.1 Fixed Effects Method

To answer if the implementation of bilateral tax information exchange agreements is effective in reducing the amount of tax evasion in all previously uncooperative jurisdictions I use the FE method. This is a common approach to questions revolving effects of policy interventions and policy changes. The model in this section is taken from Wooldridge (2007).

As there was a lot of media attention and a continuous aggressive stance by G8, G20 and OECD from mid-2008, it is difficult to exactly pinpoint when a potential effect of the agreements network is expected to happen for each country, but for the sake of this thesis the treatment is defined as when each tax haven has committed to the OECD standards and signed 12 tax information exchange agreements to the OECD standards to be considered as compliant. This is the requirement for a country to be considered to have substantially implemented the standards of exchange of information on tax matters. As the focus of this thesis is mainly on the events that transpired in 2009 and afterwards, I have decided to limit the time periods to include data from year 2000 onwards. The data then consists of countries that are considered to be compliant during the whole period from year 2000-2015, countries that successfully become compliant during the same period and countries that are not considered to be compliant or are not part of the process for other reasons. Examples of the last group are countries outside OECD regarded as having low level of financial secrecy and developing countries outside OECD with limited resources to follow up on the administrative part of the agreements.
The specification of the FE model includes country and time fixed effects. Country fixed effects vary across countries but are constant over time. Time fixed effects are constant across countries but vary over time. The process eliminates omitted variable bias from two sources. The model removes unobservable variables that vary across country but are constant over time and variables that vary over time but are constant across countries, and end up with a measure of the change in financial services export as a percent of total goods and services export from becoming compliant. To estimate the effect of committing to the OECD standards and entering into the required number of agreements I utilize the panel structure of the data and estimate a model with both time and country fixed effects. I estimate this model:

\[ y_{it} = c_i + \gamma_t + \beta_{tiea} + \sigma x_{it} + u_{it} \]  

where \( c_i \) are time-invariant country effects, \( \gamma_t \) are the time-fixed effects, \( \sigma \) is a vector of parameters on the control variables \( x_{it} \) and \( u_{it} \) is the error term, the changes in the dependent variable that are not explained within the model. The treatment effect is represented by the coefficient \( \beta \), \( tiea_{it} \) is an indicator variable that switches from 0 to 1 when a country commits to the standards for information exchange and has signed twelve agreements to the standards. For countries that are compliant during the whole period, the indicator variable is 1. The other countries switch from 0 to 1 in the year that they become compliant. For most countries in the BOP data set that are classified as tax havens the \( tiea_{it} \) indicator switches from 0 to 1 in 2009, 2010 or 2011. A relatively large group of countries are either not a part of the Global Forum and the agreement network or does not become compliant, and the indicator variable for this group stays at 0 for the entire period. By the FE model, \( \beta \) is interpreted to be the treatment effect of the tax information exchange agreements, which is the parameter of interest in this case. I have created Table 4 which is a list of when each country has met the requirement of the OECD standards based on yearly assessments made by the Global Forum peer-review evaluations which is placed in the Appendix.

The data is an unbalanced panel data set, with countries that have zero observations, one observation, observations for some of the years over the time period or observations for the whole period. Countries with some observations over the period are treated the same as countries with observations for the entire period. Countries with no data or only one observation of financial services export for the entire period provides nothing to the regression and thus cause no trouble for the analysis. This is because the process of finding \( \beta \) demeans all the dependent and independent variables from their country and time-period means. Time-demeaning
for such observations yields all zeros, which are then not used in the estimation (Wooldridge, 2013).

There are few obvious variables that could serve as controls for export of financial services, or foreign financial wealth, in a country. What are the determining factors of placing financial assets abroad? The omitted variable bias from constant variables is taken into account in the FE model, so variables that are constant within a country over time is not necessary to include as control variables. An example of this is distance between financial centres and asset holder’s country. As this does not change over time, it is automatically omitted from the regression. It is also not compatible with the specification we are using here.

However, there are a few suitable control variables. The first control variable is deposit interest rate. A high deposit interest rate is expected to attract more clients, as an increase in the deposit interest rate increases the profitability of deposited financial assets over time. This does apply to all bank deposits, and not only foreign owned deposits, but that does not make it less suitable. There should be a positive relation between the deposit rate and the amount of bank deposits. One drawback of this control variable is that it only applies to a part of the financial assets.

For the second control variable, GDP per capita in US dollars is chosen. This shows the level of economic activity in a country and thus indicate how developed it is. Generally, developed countries have more secure financial systems and are able to attract investment and savings from abroad to a larger degree than developing countries. Judging from the fact that tax havens almost exclusively are in jurisdiction with a decent level of GDP per capita, this should provide a suitable control variable.

The third control variable is inflation. The effectiveness of inflation as a control variable depends on how much of the foreign financial assets that is converted into local currency and if services are charged in local currency or not. The fourth control variable, rule of law, indicates people’s perception of how safe it is to place financial assets in a jurisdiction.

The results of the model are displayed in section 5.

4.2 Synthetic Control Method

To answer the question of the effect of implementing tax information exchange agreements for a single tax haven, I apply the synthetic control method on a country known for its banking secrecy: Switzerland. The synthetic control method allows us to create a synthetic control country with similar values as Switzerland with respect to financial services export in the pre-implementation period, that can be
used to make a comparison of the post-implementation period. The synthetic control country is then an estimation of Switzerland as if it did not experience pressure to commit to the OECD standards. Think of it as a parallel universe where there are no tax information exchange agreements while everything else is equal. What synthetic control method actually does is to calculate weights based on the predictors and create a weighted combination of the other countries in the control group such that the synthetic country is similar to Switzerland in the pre-implementation period. The same weighted combination of countries can then be used to predict what happens to the synthetic country after the implementation, regardless of what actually happens to Switzerland. The period of interest is obviously the post-commitment years, as the financial services export values in this period for the synthetic Switzerland can be predicted by the pre-implementation period weights. If we compare Switzerland and the synthetic country for these years and observe that they diverge, it is likely that it is a result of the implementation of TIEAs. The seven countries in the control group are: Canada, France, Germany, Italy, Netherlands, United Kingdom and United States. They were chosen based on similarities in historical and economical traits, where proximity to each other, being members of international institutions like UN, WTO, IMF and OECD, as well as being developed countries are important factors. The data provided from these countries also allows for further investigation of consistency of the results, as it is provided for such a large period of time.

As with the problem of finding relevant control variables in the FE-model, the same issue applies to the synthetic control method. The choice of predictors for the synthetic control method requires that each country has a large number of observations over the pre-implementation period. The restriction is not as strict as for the outcome variable financial services export, which requires observations for all time periods. Deposit interest rate is a predictor that does not meet the requirement of the model for all countries, and thus I am unable to use it. I am left with three predictors: GDP per capita growth, inflation and rule of law.

The usual assumption in the synthetic control method of no interference between units is assumed to be satisfied. That is, I do not expect that the treatment of Switzerland has an impact on the countries in the control group.

In the following I explain the model by Abadie, Diamond and Hainmueller (2010). For more detail and additional information and calculations see Abadie and Gardeazabal (2003), Abadie, Diamond and Hainmueller (2010) and Abadie, Diamond and Hainmueller (2015).
4.3 Theory of the Synthetic Control Method

In the synthetic control method applied to Switzerland there are a total of eight countries observed as \( i = 1, \ldots, J + 1 \). Switzerland, the only country in this group of eight that experiences pressure to commit to the OECD standards in 2009, is defined as country 1 and the remaining \( J \) countries is in the control group that has the potential to be weighted. The pressure to commit to the OECD standards has possibly had an effect on the outcome before the implementation of the tax information exchange agreements in 2009 through exposure by media and a continuous aggressive stance by G8, G20 and OECD from mid-2008 (OECD, 2009), but for the purpose of the analysis I continue to use 2009 as the first year Switzerland is considered compliant. The time periods are defined as \( t = 1, \ldots, T \), where \( T = 28 \) is the number of years spanning from 1988-2015 and \( T_0 = 21 \) is the number of pre-implementation years from 1988-2008. The year of \( T_0 + 1 \), the first year Switzerland is expected to be effected by the pressure, is then 2009. The outcome that is observed in period \( t \) for country \( i \) in the absence of the event is denoted by \( Y_{it}^N \), for periods \( t = 1, \ldots, 28 \) and countries \( i = 1, \ldots, 8 \). The outcome that is observed in period \( t \) if country \( i \) is exposed to the event in periods \( T_0 + 1 \) to \( T \), that is 2009-2015, is denoted \( Y_{it}^C \). Since the event is expected to have no effect on the outcome in the years prior to it, \( Y_{it}^C \) for \( t = 1, \ldots, 21 \) is equal to \( Y_{it}^N \) for all countries. If we let \( \alpha_{it} = Y_{it}^C - Y_{it}^N \), this is the effect of the event for country \( i \) at time period \( t \) if country \( i \) experience the event in years \( T_0 + 1 \) to \( T \). Rearranging this function gives \( Y_{it}^C = Y_{it}^N + \alpha_{it} \). The first of the two equations below shows the observed outcome for country \( i \) at time \( t \). In the second equation, a dummy variable \( D_{it} \) is defined as equal to 1 when country \( i \) is exposed to the event at time \( t \), and 0 otherwise.

\[
Y_{it} = Y_{it}^N + \alpha_{it} D_{it} \quad (2)
\]

\[
D_{it} = \begin{cases} 
1 & \text{if } i = 1 \text{ and } t > T_0, \\
0 & \text{otherwise.}
\end{cases} \quad (3)
\]

The goal of this method is to estimate the effect of implementing the tax information exchange agreements, \( \alpha_{1t} \), on financial services export, \( Y_{1t} \), but as you can see from the first equation above before it was rearranged, this can not be done until we find \( Y_{1t}^N \). This is the outcome of Switzerland if they were not exposed to the event at all, where the years 2009-2015 is unobserved. Since \( Y_{1t}^C = Y_{1t}^N \) only for \( t < T_0 + 1 \), we need to estimate the rest of \( Y_{1t}^N \) to find \( \alpha_{1t} \). This is done by using
this model of unaffected outcomes:

\[ Y_{it}^N = \delta_t + \theta_t Z_i + \lambda_t \mu_i + \varepsilon_{it} \]  

(4)

\( \delta_t \) is an unknown constant term that is the same for all countries, \( Z_i \) is a vector of covariates with a \( \theta_t \) vector of unknown parameters for each respective vector of covariates, \( \lambda_t \) is a vector of unknown factors equal for all countries with a vector \( \mu_i \) that indicates how strongly each factor moves with the outcome variable for each country. Finally, we have error terms \( \varepsilon_{it} \) with zero mean for all countries as the unobserved transitory shock over time on financial services export.

Define a vector of weights \( W = (w_2, w_3, ..., w_{J+1}) \) where each weight is equal or larger than zero and the sum of all are equal to one, that is \( w_j \geq 0 \) for \( j = 2, ..., J + 1 \) and \( w_2 + ... + w_{J+1} = 1 \). These weights are applied to the function above such that each country besides Switzerland is assigned a weight and creates a synthetic Switzerland. Each value of the vector \( W \) represents a weighted average of the control countries. The equation for the outcome variable for each possible synthetic control becomes:

\[ \sum_{j=2}^{J+1} w_j Y_{jt}^N = \delta_t + \theta_t \sum_{j=2}^{J+1} w_j Z_j + \lambda_t \sum_{j=2}^{J+1} w_j \mu_j + \sum_{j=2}^{J+1} w_j \varepsilon_{jt} \]  

(5)

The synthetic control is thus constructed by finding the weighted average of financial services export of the synthetic Switzerland such that it is as close as possible or equal to the financial services export of Switzerland in the years prior to the pressure to commit. Thus, the purpose of \( W \) is to minimise the distance between financial services export of the pre-implementation years of Switzerland and the weighted average of financial services export of the control countries in the same time span. By doing that we would ideally get the following:

\[ Y_{11} = \sum_{j=2}^{J+1} w_j^* Y_{j1}, ..., Y_{1T_0} = \sum_{j=2}^{J+1} w_j^* Y_{jT_0} \text{ and } Z_1 = \sum_{j=2}^{J+1} w_j^* Z_j \]  

(6)

For each pre-implementation period, a weighted average of the outcome variable, financial services export, is constructed for the synthetic Switzerland such that it matches Switzerland in each time period. The left hand side of the first equations is Switzerland in each year \( t = 1, ..., T_0 \), while the right hand side is the constructed synthetic Switzerland for the same respective years. In the last equation, the left hand side is the average value of the covariates for Switzerland, and the right hand side is the weighted average of the covariates for the countries in the synthetic Switzerland.
Under fairly standard assumptions shown in Appendix B of Abadie et al. (2010), if the number of years in the pre-implementation period is large relative to the scale of unobserved transitory shock over time, and if the unknown vectors, $\lambda_i \mu_i$, of factors and how much they effect the outcome are of equal value for Switzerland and synthetic Switzerland to such a degree that they cancel each other out, then the equations in (6) suggests using equation (9) to estimate $\alpha_{1t}$. However, to find weights that exactly equates the equations in (6) is not realistic, but the synthetic control method finds weights such that the equations hold approximately.

We proceed to solve the minimization problem of choosing the country weights that best fit Switzerland. Imagine that $X_1$ is a vector $(k \times 1)$ of pre-commitment characteristics, or predictors, for Switzerland. $X_0$ is a matrix $(k \times J)$ of the same type of predictors for their respective control group countries. $W$ is then chosen to minimize the absolute value of the distance between $X_1$ and $X_0W$ subject to $w_2 + \ldots + w_{J+1} = 1$ and $w_j \geq 0$ for $j = 2, \ldots, J + 1$. As a result we choose $W^*$ to be the value that minimizes (7) below subject to the constraints on $w$:

$$
\min_{w \in W} (X_1 - X_0W)'V(X_1 - X_0W) \text{ subject to } w_2 + \ldots + w_{J+1} = 1 \quad (7)
$$

and $w_j \geq 0 \forall j = 2, \ldots, J + 1$

From 1988 to 2008, the difference between Switzerland and synthetic Switzerland with respect to financial services export, inflation, rule of law and GDP per capita annual growth rate is made as small as possible. There are four predictors and to be able to create $W^*$, we require a weighting scheme applied to these four denoted as $V$. Here $V$ is approximated to weight covariates in accordance to their predictive power on financial services export. The solution to the problem is to find $W^*(V)$. $Y_1$ is a vector $(k \times 1)$ of pre-commitment outcomes for Switzerland, and $Y_0$ is a matrix $(k \times J)$ of the outcomes for their respective control group countries. Solving the minimization problem of choosing the predictor weights:

$$
V^* = \arg \min_{v \in V} (Y_1 - Y_0W^*(V))'(Y_1 - Y_0W^*(V)) \quad (8)
$$

Solving (7) and (8) gives $V^*$ with main diagonal equal to $(v_1, \ldots, v_k)$that provides the country weights $W^*(V^*)$. The estimator of $\alpha_{1t}$, the difference in financial services export between Switzerland and synthetic Switzerland, is then $\hat{\alpha}_{1t}$:

$$
\hat{\alpha}_{1t} = Y^C_{1t} - \sum_{j=2}^{J+1} w_j^* Y^N_{jt} \quad (9)
$$
Which is equal to the observed outcome of Switzerland minus the weighted average of the control group countries that make up the synthetic Switzerland. If the pressure to commit to OECD standards and the implementation of the tax information exchange agreements has an effect on financial services export, these two values will diverge such that the difference increases during and after the initial year of 2009.

The results are displayed in the section 5.

5 Results and Discussions

5.1 Fixed Effect Estimates

Table 1 below displays the FE-model with data from 2000 to 2015. All the FE regressions were performed with both country and time-fixed effects.

To see if the time-fixed effects are necessary in the FE-model, I use a joint test to check if the year dummies for all years are equal to zero. The null hypothesis that coefficients for all years are jointly equal to zero is rejected by an F-test for the FE-model specification in column 2 in Table 1. This would normally imply that the time-fixed effects should be included, however the test is not rejected in the specifications in column 1, 3 and 4. These results are displayed in Table 5 in the Appendix. Judging from the data period, including time-fixed effects might remove omitted variable bias from time varying effects that are equal across countries. The period includes the financial crisis of 2007-2008, a global crisis that caused an economic decline in most countries. Therefore, I find it justifiable to include the time-fixed effects.

Apart from the regression in column 1 in Table 1, the rest of the regressions have significant F-statistics. In the first column, TIEA is regressed on the financial services export ratio with no control variables. In column 2, deposit interest rate is added as a control variable. This reduces the standard error of TIEA, but not relatively to the coefficient on TIEA which changes sign to negative. In column 3 and 4, I add GDP per capita, rule of law and inflation as extra controls without much change in the regression output.

The findings in Table 1 shows that the coefficients on TIEA is ambiguous, it is shifting from positive to negative and back to positive again. The coefficients on TIEA in all of the regressions are also statistically insignificant. In light of these findings, it is difficult to argue that there is any evidence of a reduction in export of financial services from committing to the OECD standards and signing 12 tax information exchange agreements. Looking at the cumulative effect on all of the
Table 1: Fraction Financial Services Export of Total Goods and Services Export.

<table>
<thead>
<tr>
<th>FE-model</th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>TIEA</td>
<td>0.00581</td>
<td>-0.00011</td>
<td>0.00042</td>
<td>0.00029</td>
</tr>
<tr>
<td></td>
<td>(0.0057)</td>
<td>(0.0028)</td>
<td>(0.0018)</td>
<td>(0.0018)</td>
</tr>
<tr>
<td>Deposit Interest Rate</td>
<td>0.00003</td>
<td>0.00006</td>
<td>0.00009</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.0001)</td>
<td>(0.0001)</td>
<td>(0.0001)</td>
<td></td>
</tr>
<tr>
<td>GDP per capita</td>
<td></td>
<td></td>
<td>0.00000</td>
<td>-0.00000</td>
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<tr>
<td></td>
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<td>(0.0000)</td>
<td>(0.0000)</td>
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<td></td>
<td></td>
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<tr>
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<td>(0.0000)</td>
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<tr>
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<tr>
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<td>Constant</td>
<td>0.01514***</td>
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<td>0.00918***</td>
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<td>(0.0026)</td>
<td>(0.0028)</td>
<td>(0.0030)</td>
<td>(0.0029)</td>
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* p≺0.1, ** p≺0.05, *** p≺0.01

countries in the regression, it seems that generally there is no large joint effect of the treaty network. It may be unexpected, but it is a result in itself.

One interpretation that can explain this result, is based on the properties of bilateral agreements. It is possible that bilateral agreements is an ineffective tool to prevent tax evasion if the treaty network is not expanded sufficiently to cover all countries. A country that strives to expand its agreement network might have a completely different effect than a country that has chosen to just cross the threshold of 12 agreements. As a result, there might be spillover effects of foreign financial assets from highly cooperative jurisdictions to less cooperative jurisdictions. The findings of the FE model is in line with Johannesen and Zucman (2014), as they observed no reduction in the total value of bank deposits in tax havens, but a relatively small but statistically significant transfer of deposits from more cooperative tax havens to less cooperative tax havens. If there are potentially heterogeneous effects among the tax havens, then the FE-model is not as suitable to describe the tax evasion pattern as first assumed. The synthetic control method in the next section on the other hand has the potential to perform better at this.

The concerns introduced in section 3.2 might also explain why there is no significant negative effect of the TIEAs. The agreements based on tax information exchange on request might not be effective enough in targeting tax evasion, tax authorities can only request exchange of information from other jurisdictions if they have well documented suspicion that residents are evading taxes, and the bilateral network of agreements for each jurisdiction might not cover enough important economic partner countries leaving substantial leeway for tax evaders to undermine the
network.

## 5.2 Synthetic Switzerland

The country weights that is found by solving the equations (7) and (8) in section 4, is presented in Table 2 below. It shows that four countries in the control group are assigned weights different from zero. The countries that makes up the Synthetic Switzerland are Canada, France, Germany and United States.

<table>
<thead>
<tr>
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<th>Weight</th>
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<tr>
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<td>France</td>
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<td>Netherlands</td>
<td>0</td>
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<td>United States</td>
<td>0.359</td>
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<tr>
<td>United Kingdom</td>
<td>0</td>
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</table>

The values of the pre-implementation predictor means for Switzerland, Synthetic Switzerland and the national average is displayed in Table 3. The national averages are computed by first removing Switzerland and then taking the means. The predictor means for Synthetic Switzerland are relatively close to the predictor means for Switzerland, and all of them are an improvement from the national averages. Inflation is the predictor mean with the largest difference for Synthetic Switzerland and Switzerland, but it is still closer than the national average.

<table>
<thead>
<tr>
<th>Predictor Balance:</th>
<th>Switzerland</th>
<th>Synthetic Switzerland</th>
<th>National Average</th>
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</thead>
<tbody>
<tr>
<td>Inflation</td>
<td>1.831625</td>
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<td>2.598439</td>
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<tr>
<td>GDP per capita growth</td>
<td>1.217127</td>
<td>1.704937</td>
<td>1.796709</td>
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<tr>
<td>Rule of Law</td>
<td>1.884398</td>
<td>1.605423</td>
<td>1.469355</td>
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</tbody>
</table>

The computation of these values also produces the Root Mean Squared Prediction Error (RMSPE), and it measures the absolute value of the difference in
pre-implementation values of financial services export between Switzerland and the Synthetic Switzerland for each year. The RMSPE of the synthetic control method here is $1.52 \times 10^9$, or 1,520,000,000 which is 1.52 billion. This is a large number, but relative to scale of financial services export seen on the y-axis in Figure 8, it is acceptable. This is based on the graph of Synthetic Switzerland that is almost equal to that of Switzerland in the whole pre-implementation period from 1988 to 2008. The only exception is a spike for Switzerland in year 2000. This spike in financial services export is assumed to be from the introduction of a new currency in the European Union in 1999, the Euro, in which the Swiss Franc initially appreciated against. This enhances the Swiss Franc as an investment alternative in the short run, but compromises the competitiveness of the export sector afterwards as an increase in the currency value makes it more expensive for other countries to trade with Switzerland. This was also followed by a recession at the beginning of the 2000s.

![Figure 8: Synthetic control method applied on Switzerland.](image)

Figure 8 displays the change in financial services export for Switzerland and Synthetic Switzerland from 1988 until 2015. The dotted vertical line is the year Switzerland committed to the OECD standards and had signed enough agreements
to be considered as having implemented the OECD standards. It is placed at the end of the year 2009 but as the events of the implementation happened early 2009, the whole year is considered to be included in the post-implementation period. There is a sharp decline in financial services export for Switzerland in 2009, which is a reduction of 17% of the total financial services export from the start of 2009 until the end of 2009. It continues to decrease for Switzerland after the end of 2009 as well. It becomes clear that the financial services export for Switzerland and the Synthetic Switzerland diverges sharply from 2009, and the difference continues to grow until 2015. The difference at the end of 2015 is 25 billion measured in US dollars. The financial services export of Switzerland, had it not become compliant, would be more than twice the size it is in 2015 according to Figure 8. Financial services export as a proxy of foreign financial assets then indicates that there has been a large reduction of foreign financial assets in Switzerland, and compared to the Synthetic Switzerland it would potentially have been 50% larger in 2011 and twice the size it is in 2015. Since I assume that the fee price rates in Switzerland might be slightly higher, because of the advantage of bank secrecy, the difference between Switzerland and Synthetic Switzerland is probably slightly less as Switzerland has to adjust their fee prices to stay competitive when banking secrecy is lifted. Another issue that has to be addressed, is that in 2008 it was revealed that the Swiss bank, USB, had 19,000 undeclared accounts by clients from the United States. During 2008-2009, United States finalized an agreement in which Switzerland agreed to give access to almost 4,500 clients from U.S (ASIL, 2009)(Emmenegger, 2015). As can be seen in Figure 8, it is expected that this isolated event has had an effect on foreign financial assets from 2008. Exactly how important this impact was on the reduction of foreign financial assets is unknown, but the reduction in foreign financial assets is not only a result of the TIEAs. However, the result of the synthetic control method is strikingly apparent nonetheless. The reduction in foreign financial assets located in Switzerland after becoming compliant is large, and the relative reduction compared with the Synthetic Switzerland is even larger. This is again consistent with the findings of Johannesen and Zucman (2014).

To evaluate the consistency of the synthetic control method results I apply placebo-tests. Because the data is available for such a large number of years, I have the opportunity to apply several placebo-test to make sure that we do not observe similar effects as the one in Figure 8 when changing the treatment year.

By using an interval of 5 years from the original treatment year of 2009, a placebo-treatment is applied to the years of 1999, 2004 and 2014. Two placebo-tests prior to the commitment and the implementation of the tax information exchange
Figure 9: Placebo-test of Switzerland with placebo-treatment 10 years prior.

Figure 10: Placebo-test of Switzerland with placebo-treatment 5 years prior.
agreements to the OECD standards, and one placebo-test after. If there is a similar observed effect in the year of the placebo-treatments as in 2009, then the result of the synthetic control method is not estimating reliable effects of the information exchange agreements. In Figure 9, the placebo-treatment in 1999 actually shows an immediate increase for Switzerland relative to the Synthetic Switzerland, but the data converges afterwards and is close to equal up until the actual year of interest in this paper. After 2009, Figure 9 displays the same pattern as the original treatment of Figure 8 does, and thus strengthening the synthetic control method result.

In Figure 10, the placebo-treatment applied to 2004 is also consistent with the result in Figure 8. The financial services export of Switzerland and Synthetic Switzerland follows the same path until they clearly diverge in 2009. It becomes increasingly clear that the synthetic control method is suitable to estimate the effect of the tax information exchange agreements.

Figure 11: Placebo-test of Switzerland with placebo-treatment 5 years after.

The placebo-test applied to year 2014 is shown in Figure 11. This placebo-test is limited by only one year of observations after the placebo-treatment. However, the graphs are both moving downwards together from the placebo-treatment year, and the two graphs of Switzerland and Synthetic Switzerland are diverging in 2009.

![Graph showing financial services export](image)
in a similar way as the placebo-tests of 1999 and 2004. As a result, the placebo-tests are providing evidence that the synthetic control method is suitable to estimate the effect of the tax information exchange agreements.

To further evaluate the result of the synthetic control method, I iteratively apply the same method used to estimate the effect of implementation for Switzerland on each country in the control group. It is practically assuming that a country in the control group implemented the OECD standards and the agreements in year 2009 instead of Switzerland, and then use the synthetic control method to estimate the effect on financial services export. This is repeated for all of the countries in the control group. The reason for this is to test if the result of Switzerland is really driven by the implementation of tax information exchange agreements. If there are several other countries that produces similar or larger differences with low RMSPE, then the result of Switzerland might be caused by other reasons. The software was unable to produce a synthetic United Kingdom, and thus it was automatically excluded. It is likely that this is caused by the United Kingdom’s level of financial services export, which is the highest of all the countries in almost the entire pre-implementation period. The synthetic country for Netherlands is also only based on weights on one other country, and is then just a comparison between two countries. Figure 12 shows the result of the iterated placebo-test, and the grey lines shows how much each country differ from their respective constructed synthetic country, where the synthetic countries are standardized to zero. Switzerland is shown in a different colour to separate it from the other countries. Most of the countries do not diverge noticeably from their respective synthetic countries, with the exception of the United States that diverges positively after 2008 and Switzerland that diverges negatively from 2009.

There seems to be rather conclusive results from this placebo-test. The gap of Switzerland is unique relatively to the gap of the other countries in the post-implementation period.

The argument that the agreements based on tax information exchange on request might not be effective enough in targeting tax evasion is proved wrong by the synthetic control method applied on Switzerland. On the other hand, as foreign financial assets in Switzerland has been reduced, and the FE-model found inconclusive results, it necessitates that some countries that became compliant during the years 2000 to 2015 have experienced an increase in foreign financial assets. Thereby not rejecting the argument that the bilateral network of agreements leaves substantial leeway for tax evaders to undermine the network, and strengthens the theory of heterogeneous effects.
Figure 12: Placebo-test of iteratively applying the synthetic control method on the control group. (Switzerland in different colour to the rest)
6 Conclusion

In this thesis, I investigate how tax information exchange agreements affects tax evasion activities by measuring the change in financial services export as a proxy for foreign financial assets. The main objective is to see if the agreements network reduced the cumulative amount of foreign financial assets in countries becoming cooperative in exchange of information in tax matters. By using the fixed-effect model and, in this context, the previously unused Balance of Payments data set, I find evidence that committing to the OECD standards and signing at least 12 tax information exchange agreements to the OECD standards has no significant effect on the cumulative amount of foreign financial assets. I theorise that this is caused by heterogeneous effects, caused by spillover effects of foreign financial assets from highly cooperative jurisdictions to less cooperative jurisdictions. By using the synthetic control method on an individual country known to provide banking secrecy, Switzerland, I find a large decrease in foreign financial assets from committing to the OECD standards and signing tax information exchange agreements to the OECD standards. This strengthens the theory of heterogeneous effects from the fixed-effects model, as a reduction in Switzerland necessitates a similar opposite effect in other countries that have committed to the OECD standards and signed at least 12 agreements that meet the standards.

The concerns that the bilateral agreement network does not cover enough country pairs to effectively prevent tax evasion seems to be valid. The network for each country is far from complete, and a large part of the world is completely left out because of administrative costs of implementing and enforcing agreements. This continues to provide the opportunity for a tax evader to transfer financial assets, with little risk of detection, to countries not covered by an agreement with the home country of the tax evader.

As a way forward, including Balance of Payments data on coming years gives the possibility of analysing the effects of implementing the new automatic exchange of information (AEOI) standard. It will commence information exchange for countries from either year 2017 or 2018, with early adopters able to report accounts open late 2015 (OECD, 2014).
References


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### A Extra results

Table 4: List of when countries has implemented the OECD standards and signed 12 agreements to the OECD standards

<table>
<thead>
<tr>
<th>Country Name</th>
<th>Time</th>
<th>Country Name</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anguilla</td>
<td>2010</td>
<td>Korea, Republic of</td>
<td>2000</td>
</tr>
<tr>
<td>Antigua and Barbuda</td>
<td>2010</td>
<td>Liberia</td>
<td>2010</td>
</tr>
<tr>
<td>Argentina</td>
<td>2005</td>
<td>Luxembourg</td>
<td>2009</td>
</tr>
<tr>
<td>Aruba</td>
<td>2009</td>
<td>Malaysia</td>
<td>2010</td>
</tr>
<tr>
<td>Australia</td>
<td>2000</td>
<td>Malta</td>
<td>2009</td>
</tr>
<tr>
<td>Austria</td>
<td>2010</td>
<td>Marshall Islands, Republic of</td>
<td>2010</td>
</tr>
<tr>
<td>Bahamas, The</td>
<td>2010</td>
<td>Mauritius</td>
<td>2001</td>
</tr>
<tr>
<td>Bahrain, Kingdom of</td>
<td>2009</td>
<td>Mexico</td>
<td>2000</td>
</tr>
<tr>
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<td>2009</td>
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<td>Japan</td>
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**Note:** Time is marking the year each country has committed to the OECD standards of transparency and effective exchange of information in tax matters and signed 12 agreements to the OECD standards. Countries left blank, or not included in this list, is either not compliant or not part of the Global Forum bilateral tax information exchange agreements process.
The Table 4 list is gathered by cross-referencing the following publicly available sources:

1. Exchange of Tax Information Portal (All DTA and TIEA sorted by country). URL: http://www.eoi-tax.org/jurisdictions


Table 5: Testing for time-fixed effects

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F-value | F(15, 155) = 1.36 | F(15, 126) = 1.81 | F(15, 123) = 1.62 | F(13, 123) = 1.53 |
F-test | Prob > F = 0.1741 | Prob > F = 0.0394 | Prob > F = 0.0782 | Prob > F = 0.1152 |