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The way exchange of information impacts money laundering

Empirical analysis on how exchange of information agreements impacts trade gaps between tax havens

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Abstract

Is there a trade gap between tax havens, and is this trade gap affected by exchange of information agreements? This thesis aims to show that value preserving objects can be used as a mean for money laundering or tax evasion across borders. This is done through trade gap and difference-in-differences analyses. The trade gap analyses show that there exists a positive trade gap and that this gap increases with the partner countries' secrecy. The difference-in-differences analyses reveal that this gap starts to diminish slightly before and after an exchange of information agreement is signed. These trends were not observed in the robustness check when testing industrial diamonds and mineral ores/scraps.

Keywords – Tax Havens, Financial Secrecy Index, Trade Gap, Evasion Gap, Money Laundering.

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Section 1 - Introduction

Since the financial crisis in 2008, more resources have been put in place in the fight against money laundering. But even though anti-money laundering has come into increasing focus, the principle focus is still on the financial sector and more recently crypto currencies (European Parliament, 2018). In this thesis, I will look at how value-preserving objects can be used in money laundering, and what impact exchange of information agreements have on this.

One of the problems when studying money laundering is that it is very difficult to measure. I circumvent this by applying the method of trade gap analysis, which is a method that measures the difference between reported imports and exports. In this thesis, I study what Switzerland reports in terms of imports, compared to what partner countries report having exported to Switzerland.

The background for choosing Switzerland is that Switzerland is known for its bank secrecy, and previous literature finds that tax evaders and launderers prefer to send their money between countries with strong bank secrecy laws (Johannesen & Zucman, 2014). I therefore expect money launderers to use Switzerland when sending money to tax havens. Since there is a strong incentive for importers to report while importing, and less so for exporters when moving valuables secretly, I expect there to be a difference in the reported trade. The question I want to answer in this thesis is therefore:

> *Have exchange of information agreements impacted the flow of valuables (for example: art, gold, diamonds, etc.) between countries implicated in Money Laundering?*

I try to answer this problem by applying two hypotheses, where the first is to control that there exists a flow of valuables, and the second, whether that flow is affected by exchange of information agreements. The products I test are products that Teichmann (2017) identified in his study as being linked to money laundering.

I apply trade gap analyses closely following the method proposed by Fisman and Wei (2004) and control the gap against the Financial Secrecy Index to test the first hypothesis. Previous literature on this topic mainly considers the relationship between trade gap and corruption. In this thesis the Secrecy Index is used because countries that score highly on the Secrecy Index are countries normally listed as tax havens and implicated in money laundering.

To test the second hypothesis, I use difference-in-differences to measure if there has been a change after information agreements are signed. This is further controlled through an event study, to see how trade gap change over time before and after signing the agreement. I also control for whether the changes are different for tax havens and non-tax havens.

This thesis finds that there is a significant relationship between trade gap and secrecy for almost all value-preserving objects. This was not the case when testing the trade gap for industrial diamonds and mineral scraps/ores, showing that the trade gap does not come from a lack of reporting, but rather a lack of recordings.

The difference-in-differences analyses show that the trade gap gets negatively affected from signing exchange agreements, which means that the agreements reduce the trade gap. Countries that are classified as tax havens show, for the most part, a significant negative relationship. There was also little change when omitting the top and bottom 2.5 percent of the observations, meaning that it is not outliers driving the results.

The implications of these findings are that there are indications that value-preserving objects are used for money laundering and tax evasion purposes. Exchange of information has an effect on this praxis. More efforts should be put in to see to which degree these objects are used for money laundering or tax evasion, and the anti-money laundering standards might need to focus more on this sort of money laundering.

Section 2 - Money Laundering: Background

2.1 Definitions

2.1.1 Money laundering

According to US Department of the Treasury, ***money laundering*** is:

> …the process of making illegally-gained proceeds (i.e., "dirty money") appear legal (i.e., "clean"). … First, the illegitimate funds are furtively introduced into the legitimate financial system. Then, the money is moved around to create confusion, sometimes by wiring or transferring through numerous accounts. Finally, it is integrated into the financial system through additional transactions until the "dirty money" appears "clean". (*History of Anti-Money Laundering Laws | FinCEN.Gov*, 2021)

The goal of money laundering (ML) is to make the money seem as though it was obtained from a legal source. All ML involves money obtained through illegal means and making it appear as if it came from a legitimate transaction. There are two levels of ML, low-level and high-level ML (Levi, 2002). A low-level or “street-level” launderer is a launderer who is laundering small amounts of money, this could be for example a low-level criminal who launders a few thousand dollars a year from dealing drugs. A high-level or “organized-level” launderer is a launderer who launders large amount of money, this is usually done through a network on a global scale (Levi, 2002).

The ML process can be described quite simple. It is in essence only three steps (Schneider & Windischbauer, 2008):

1. Placement – Placement is where illegally-generated money first enters a legal bank/economic system. Most common methods are cash based, such as inflating cash receipts from a cash-heavy business or making an expensive purchase such as art or jewelry with cash. These days there are restrictions in almost every country on depositing large amounts of cash, so placement is often done with the use of ‘structuring’ (Reuter, 2004). Structuring involves using multiple accounts controlled by the money launderer and depositing cash in amounts right under the reporting

threshold. The problem with structuring is that although it can be used for low- and mid-level money laundering, it would not be efficient for a high-level money laundering operation (Reuter, 2004). For example, to structure 5 billion NOK through DNB would take over 50.000 deposits, even if using the relatively rare 1.000 NOK note.

2. Layering – Layering is where the money launderer hides the laundering activity. The primary purpose of this step is to separate the illicit money from its source. There are mainly two methods here, the first is that the money launderer buys financial instruments using a financial institution (Schneider & Windischbauer, 2008). The other is buying a material asset using cash, then selling it.

3. Integration – Integration is the last step in the ML process. It is here the money launderer regains control of the money which has now been cleaned through a series of financial transactions (Schneider & Windischbauer, 2008).

What is important to note is that not all three phases need to come into play. Financial fraud is an example of this, as when the money is transferred from a legitimate fund to a fraudulent (or under a fake identity) account, the proceeds are already in the financial system (Levi & Soudijn, 2020). Another example of this is if the cash is used directly to purchase an asset, then the money launderer can skip both placement and layering.

2.1.2 Tax Havens

The term ‘tax haven’ similarly to money laundering, is a recent term. The term ‘tax haven’ in modern terms has no agreed upon definition. When talking about tax havens today we usually describe a tax jurisdiction or a country as being a tax haven when it has no or very low corporate taxes. But what is a tax haven? One of the most well-known definitions of a tax haven today is from the OECD’s report from 1998 which proposed four key factors:

1) No or nominal tax on the relevant income;
2) Lack of effective exchange of information;
3) Lack of transparency;
4) No substantial activities (OECD, 1998).

The first key factor is that tax havens have low or no taxes on income, but that in itself is not sufficient to classify a country as a tax haven according to the OECD (OECD, 1998). The second and third factors address the lack of transparency and exchange. These factors are part of the business model of a tax haven, which is to enable banks or other financial institutions to accept capital from anywhere without disclosing any information about its origin. Thus, this makes them ideal for people wishing to hide the origin of their capital (typically criminals) (Schjelderup, 2015).

The 4th and last key factor comes from that most tax havens forbid companies to have any activity if they use the favorable part of the tax system, often named "foreign investor regime" (Schjelderup, 2015). It indicates that a jurisdiction does not provide a legal or commercial environment that would attract any substantive business activities (OECD, 1998).

2.1.3 Financial Secrecy Index

Similarly to the tax haven lists there is also the Financial Secrecy Index (FSI). The FSI calculates different measures of secrecy but is different from tax haven lists as the goal is to measure contribution to the problem of financial secrecy (Tax Justice Network, 2021a). The FSI list uses different indicators but shares similarities with the tax haven lists according to the Tax Justice Network (2021a). These indicators can be described in four dimensions:

1) *ownership registration;*
2) *legal entity transparency;*
3) *integrity of tax and financial regulation; and*
4) *international standards and cooperation (Tax Justice Network, 2021a).*

Ownership registration is an indicator that shows if records are clear on who the beneficial owners are and not only the legal owners (Tax Justice Network, 2021b). *Legal entity transparency* ranks how transparent ownership and accounting data are to the general public (Tax Justice Network, 2021b). *Integrity of tax and financial regulation* gives indications for whether or not the local tax laws are enforced and if there is lenient tax residency (Tax Justice Network, 2021b). *International standard and cooperation* covers willingness to enforce international anti-money laundering (AML) standards and exchange information (Tax Justice Network, 2021b).

2.1.4 Reasons to launder

The principle reason for laundering money is to make money earned in an illegitimate way appear to have come from a legitimate one (Cox, 2012)(Cox, 2012). ML is primarily used so criminals can spend their gains earned through illegitimate means while attempting to avoid difficult questions about the source of their earnings (Cox, 2012). ML can also be used to let criminals pay income tax on their ill-gotten earnings in hopes of avoiding arrest for tax-evasion (Cox, 2012).

Despite the desires for some criminals to pay taxes, a second reason to launder money is to avoid paying taxes; by laundering income in such a way that the source of the income becomes obscure, it is possible to conceal that taxes due were not paid to the relevant government (Cox, 2012). Finally, there exists a method that is known as 'reverse money laundering'. This is, as the name indicates, taking money that is legitimate and obscuring its origins so that it can be used to finance criminals and terrorists (Cassella, 2004).

2.2 Money laundering methods

In this section I will describe how ML can be done through smuggling value preserving objects to Switzerland. The objects looked at in this thesis comes from Teichmann (2017), who did an extensive study looking into 12 common ways ML can be done. I single out the objects that can be used for cross-border ML, and those are: raw diamonds, gold, antiques, jewellery, and art.

2.2.1 Money laundering through raw diamonds

Teichmann and Falker (2020b) interviewed German, Austrian and Swiss launderers that have used raw diamonds or laundering. They find that raw diamonds are very suitable for ML. When studying the ML process one can see that raw diamonds fit into all the steps. They are suitable for placement; their origins are not traceable, and with complex structures they can also be used for layering and integration (Teichmann & Falker, 2020b). Launderers who use diamonds in integration are more inclined to establish a legal entity to officially acquire diamonds. (Teichmann & Falker, 2020b). Raw diamonds can be purchased directly from miners, and Kimberley certificates, which is needed to sell diamonds legitimately, can be

bought on the black market (Teichmann & Falker, 2020b). There is therefore no need for the launderer to import illegally.

2.2.2 Money laundering with gold

Teichmann and Falker (2020a) also find that gold is very suitable for ML. Gold is suitable for both placement and layering, as gold is easily melted which gives an effortless option to hide the origins. The main problem with laundering gold into Switzerland comes from registration demand and AML laws. In Switzerland, gold traders must do due diligence on customers (Teichmann & Falker, 2020a). This creates a problem as it shows that the launderer possesses a large amount of cash. The launderer would therefore seek to purchase gold from a private person or foreign-based vendors (Teichmann & Falker, 2020a). Italian jewellers are known to prefer investing in goods without providing a receipt, and this opens up for a black market in which large amounts of gold are traded (Teichmann & Falker, 2020a).

2.2.3 Money laundering with antiques

Teichmann (2019) finds that the antiquities market in Germany, Austria and Switzerland is not regulated, and that in many cases AML laws do not apply. Further the antiquities market is characterized by high revenues, which makes it possible to sell antique objects for large amounts of money without raising suspicion. This makes antiques suitable for placement, layering and integration. Ideally a launderer would set up a company to trade antiques. They then purchase and sell real antiques, but also report to have purchased and sold fictitious antiques which do not exist (Teichmann, 2019). They can also create fictitious customers and report that they sold items with cash since Switzerland's AML laws do not apply for cash payments of less than 100.000 CHF (Teichmann, 2019).

2.2.4 Money laundering with art

Teichmann (2017) finds that art is a very suitable for both placement and layering. Art has similar characteristics as antiques as a lot of money is spent in the art market, and it lacks transparency. Switzerland has since 2016 taken steps to fight art being used for ML and increase transparency in trade of high value art (Steiner, 2017). Some launderers uses duty-free warehouses, so called freeports to store art indefinitely. The new requirements that came into force from 2016 is that art purchases over 100.000 CHF have to be reported and freeports

now have a time limit of six-months (Steiner, 2017). Freeport managers also have to try find the beneficial owner of the goods stored in the freeports (Steiner, 2017).

2.2.5 Money laundering with jewellery

Teichmann (2020) finds that jewellery is very suitable for both placement and layering. Jewellery is similar to art and antiques in that jewellery can be purchased in Switzerland with cash payments without identification as long as the payment is under 100.000 CHF. It is also similar in that jewellery has no fixed market price, which makes it difficult to accurately assess its worth. The process is the same for jewellery as for art and antiques. The launderer can open a store and sell jewellery and report fictitious private sellers.

2.3 Different information exchange agreements over time

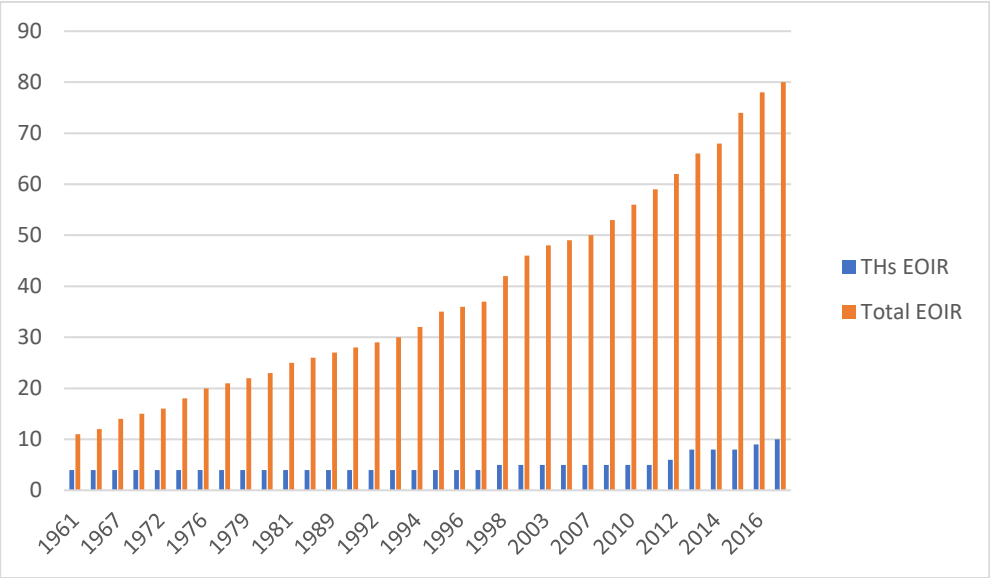
The OECD has made three forms of exchange of information agreements (EIA) (1) exchange of information on request (EOIR), (2) Automatic exchange of information (AEOI), (3) and spontaneous exchange of information (SEOI). In this section I outline the main characteristics of these agreements and how they are used to combat tax evasion and money laundering is outlined.

2.3.1 Exchange of information on request

The exchange of information on request (EOIR) agreement is a form of agreement where a jurisdiction enquires about specific information (OECD, 2016), normally for one taxpayer with specified years. If the requested authority does not already possess that information, it must obtain it by its own means (OECD, 2016). Therefore, the EOIR can be seen as "passive" exchange of information, as the requesting tax jurisdiction has no control or jurisdiction over the requested tax jurisdiction (Seer & Kargitta, 2020). This makes the requestor dependent on the requested jurisdiction to be effective.

The EOIR standard states that the information gathered can be used for other purposes then taxes, such as anti-money laundering, the only restrictions are that that use is permitted in both the contracting and the supplying country, and that the supplying country permits such use (OECD, 2016). That the use is on the goodwill of the supplying country can make it so countries that are already non-transparent will not be forced to help contracting countries.

Figure 1: EOIR agreements over time



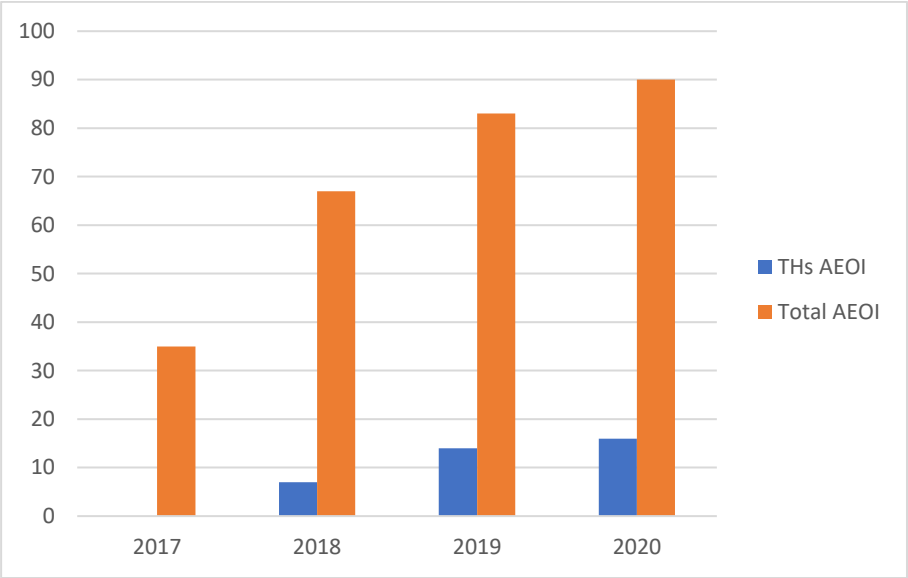
2.3.2 Automatic exchange of information

As an advancement of the EOIR, the Automatic exchange of information (AEOI) was established. AEOI is the exchange of information without having to request it. There have been ongoing discussions about having automatic exchange between tax jurisdictions, but the first global initiative was started by OECD in 2013 and 44 "early adopters" signed it in 2014, it has since grown to have 94 jurisdictions at the time of writing this thesis.

To implement the AEOI standard, the tax jurisdiction has to collect all the financial information from all financial institutions and automatically share it with the tax jurisdiction where the account holder is a resident (OECD, 2021a). This makes the AEOI an "active" exchange agreement. Financial institutions also must report who are the beneficial owners, the "controlling persons", of active and passive entities.

This gives insight into the real owners of companies, and it makes the information flow more effective as the requesting jurisdiction can get all the information without having to wait for the requested jurisdiction to send the information. This makes the AEOI an effective way to share tax information on a global scale, and it makes it a lot more difficult for tax evaders to operate, as information is shared between tax jurisdictions.

Figure 2: AEOI agreements over time



2.3.3 Spontaneaous exchange of information

At the same time as the AEOI, the OECD came up with spontaneous exchange of information (SEOI) which is another framework for how information can be shared across borders. The SEOI is an exchange of information where a tax jurisdiction shares information it believes can be relevant to a specific case without it having been requested (OECD, 2015). This relies heavily on active participation and cooperation from local tax authorities. The SEOI is a very suitable tool when used right as it creates an uncertainty for money launders as the information can be shared at any time without there being a request as the EOIR demands. How often this tool has been used is uncertain, as there is no public record that gives any overview of how often authorities exchange information spontaneously.

2.4 Switzerland

Switzerland has taken multiple steps in the fight against money laundering and terrorist financing. This has been primarily through its involvement with the Financial Action Task Force (FATF). Switzerland participated in the drafting of the FATF 40 Recommendations in 1990, which have been recognized as an important global standard. They have also been part of several conventions such as:

- Terrorist Financing Convention, 1999
- Vienna Convention, 1988

- United Nations Convention against transnational Organized Crime (Palermo Convention), 2000
- United Nations Convention Against Corruption (UNCAC), 2003
- Council of Europe Convention on Cybercrime, 2001

2.4.1 Bank secrecy in Switzerland

Switzerland is well known for its strict bank secrecy laws. The modern bank secrecy laws in Switzerland stem from the 1934 Federal Banking Law, Article 4 which made client privacy stricter and criminalized anyone who broke that trust (Poddar et al., 2009).

There has been a lot of pressure on Switzerland after the 1934 Federal Banking Law to lessen the secrecy laws, and Switzerland has taken steps to accommodate the requests. In 1967 Swiss Bankers' Association directed their members to not accept any money before tracing its origins. They also urged banks to not advertise Swiss Banks as a "Financial Safe Haven". In 1973, Switzerland signed a treaty with the US for mutual judicial assistance in criminal cases.

Switzerland passed an anti-money laundering law in 1997 that makes an exception in the Federal Banking Act (State Secretariat for International Finance SIF, 2021a). This law requires Swiss banks to report all suspicious transactions to the Money Laundering Office. This law was passed because there was strong evidence that Swiss banks were used for money laundering (Blum et al., 1999).

Section 3 - Literature review

3.1 Determinents of Money Laundering

Money laundering is a part of the process of a criminal business, and economic theory assumes that businesses will take all necessary steps to ensure that they get the maximum profit possible with the risk-level they find tolerable (Becker, 2017). Thus, it can be expected that a business, even if that business is engaged in illegal activities, will engage in money laundering if it can help increase the maximum profit within the tolerable risk-level of the business.

That leads into the most common assumption when dealing with money laundering: “crime demands crime”. This assumption comes from the fact that money laundering is part of the process of a criminal business. Studies have found that this assumption is based on reality, and that fighting money laundering can help reduce crime (Ferwerda, 2009).

3.2 Information exchange impact on tax evasion and money laundering

In this section I will look at the impact information exchange agreements have on tax evaders. The reason for that is that the countries that most ML flows also tend to serve as TH.

Johannesen and Zucman (2014) find that EIA had an impact on the deposits in tax havens. They found that the tax evaders moved their bank deposits from countries that signed tax exchange agreements to tax havens that did not have such agreements with their home countries. In my framework this implies that flows of ML would increase for countries that have not signed the EIA. I contribute by checking whether this intuition holds for ML objects.

Menkhoff and Miethe (2019) built on the findings of Johannesen and Zucman (2014) and find that there was a decline of 27,5% in bank deposits in the tax havens in the period of 2003 to 2017. They find the shift to be something that only happened for a brief period in an anticipation for the treaty signature. Menkhoff and Miethe (2019) speculate that tax evaders have adapted and found new ways to circumvent regulations. If that is the case, then one way to circumvent regulation would be to convert money into value preserving objects. In my thesis I will identify exactly this flow of objects to determine whether this regulation avoidance strategy has been used.

Casi et al. (2020) had similar findings as Menkhoff and Miethe (2019) when looking at the AEOI agreement. They looked at the period between 2014 to 2017 and found a decline in offshore deposits of up to 14%. They also saw that there was an increase in deposits flowing to the US. The reason for this seems to come from the adoption of the AEOI and the introduction of the CRS. The reason why US might be a favorable destination for tax evaders is due to US being one of the few major economies not committing to CRS. This is consistent with the findings of (Menkhoff & Miethe) and seems to be a way for tax evaders to circumvent the AEOI agreement.

3.3 Gap in reported trade

In this thesis I will identify the flows of money laundering by applying the method proposed by Fisman and Wei (2004) and used in Fisman and Wei (2009). Fisman and Wei study the gap between import to the US and export from partner countries. In this thesis I will look at the import to Switzerland and countries reporting export to Switzerland.

Fisman and Wei (2004) proposed a method to study trade gap or "evasion gap". They studied the trade between China and Hong Kong and found that the gap increased by 3% per 1% increase in tax rates. This implies that the trade gap will be larger for tax havens due to that they typically have a low tax rate.

Similar to Fisman and Wei (2009) there are very low tariff rates when importing to Switzerland, hence very low incentive for importers to lie to Swiss customs. There is also the strong incentive to report as not reporting can impose large fines or be prosecuted, and it can be pursued not only when crossing the borders, but also subsequently (FCA, 2021).

Kellenberg and Levinson (2019) find similar findings as Fisman and Wei (2009). They find that underreporting of exports increases with the exporters' tax rates, and that corruption is significant explaining motivations for underreporting of exports. In this thesis I will use secrecy instead of corruption.

Collin (2020) found that money launderers used trade-based money laundering to launder money across borders. He found that this is being done by obscuring the true price or quantity of the goods that is being exported or imported. In my thesis I will test these findings by looking for signs of ML in trade statistics.

This has been seen with that the evasion gap shifts depending on tariffs, and that there is a positive correlation with tax rates (Collin, 2020). Similar findings where found by Chalendard (2017) who saw that evasion increased with tax rates. We therefore have to consider in this thesis whether the evasion comes from high tariffs.

Section 4 - Methodology

In this section I will present the method for data collection, and the methods for analysis. Lastly, I present the hypotheses related to the research questions.

4.1 Data

4.1.1 Trade data

The trade data are retrieved from the World Integrated Trade Solution (WITS) database. The period used in this analysis is from 1988 to 2020. The product codes extracted can be found in the appendix. There were two nomenclatures used, one from the SITC3 and another from SITC4. The different product descriptions are shown side by side in the complete list in the appendix.

When extracting the data, I aggregated them down to sub-groups (4-digit product groups), as that was the most suitable. In a 3-digit group, one would classify all antiques and art into one category. It also gives the flexibility to study the sub-groups as groups by just using the first 3 digits. For example, the digits 896 – represent art and collectibles on a group level, but in the sub-group level it is split into 6 sub-groups with 4 digits (8961, 8962 …). That means that on a 4-digit level one can look at 8966 – antiques, but also aggregate all into 896 to look at art as a group. Table 1 show the description of the products used in the analyses and robustness checks.

Table 1: Overview SITC 4 and SITC 3 with description

SITC revision 4[1]	**SITC revision 3[2]**
2771 -- Industrial diamonds, sorted, whether or not worked	2771 -- Indust diamonds,sorted
2772 -- Natural abrasives, n.e.s.	2772 -- Natural abrasives n.e.s.
2891 -- Precious metal ores and concentrates	2891 -- Precious metal ore/conc
2892 -- Waste and scrap of precious metal (other than gold) or of metals clad with precious metal (other than gold)	2892 -- Prec.metal waste/scrap

6671 -- Pearls (natural or cultured), whether or not worked or graded but not strung, mounted or set; ungraded pearls (natural or cultured), temporarily strung for convenience of transport	6671 -- Pearls not strung/set
6672 -- Diamonds (other than sorted industrial diamonds), whether or not worked, but not mounted or set	6672 -- Diamonds unset
6673 -- Precious stones (other than diamonds) and semiprecious stones, whether or not worked or graded but not strung, mounted or set; ungraded precious stones (other than diamonds) and semiprecious stones, temporarily strung for convenience of transport	6673 -- Prec/semi-p stones unset
894 – Baby carriages, toys, games, and sporting goods	894 - Baby carriages, toys, games, and sporting goods
8961 -- Paintings, drawings and pastels, executed entirely by hand, other than drawings of heading 892.82 and other than hand-painted or hand-decorated manufactured articles; collages and similar decorative plaques	8961 -- Paintings/drawings/etc
8962 -- Original engravings, prints & lithographs	8962 -- Original prints etc
8963 -- Original sculptures & statuary, in any material	8963 -- Original sculpture etc
8964 -- Postage/revenue stamps, stamp-postmarks, first-day covers, postal stationery (stamped paper) & the like, used,/if unused not of current/new issue in the country to which they are destined	8964 -- Stamps for philately
8965 -- Collections & collectors pieces of zoological, botanical, mineralogical, anatomical, historical, archaeological, palaeontological, ethnographic/numismatic interest	8965 -- Coins/nature collections
8966 -- Antiques of an age exceeding one hundred years	8966 -- Antiques over 100 years
8972 -- Imitation jewellery	8972 -- Imitation jewellery

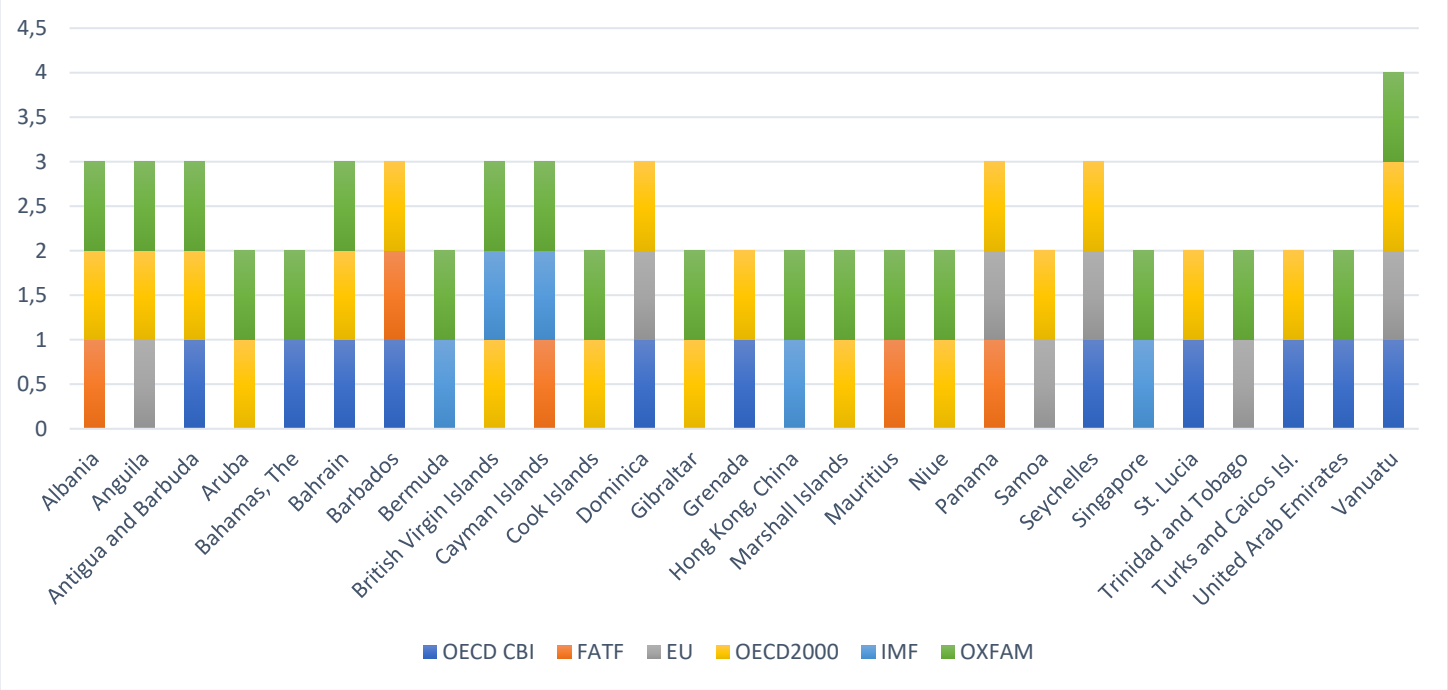
8973 -- Jewellery of gold, silver or platinum group metals (except watches and watch-cases) and goldsmiths or silversmiths wares (including set gems)	8973 -- Precious metal jewellery
8974 -- Other articles of precious metal or of metal clad with precious metal	8974 -- Artics nes prec mtl/clad
9710 -- Gold, non-monetary (excluding gold ores and concentrates)	9710 -- Gold non-monetary ex ore
1.UN Trade Statistics (2021b) *2.UN Trade Statistics (2021a)*	

4.1.2 Tax Havens

As mentioned, there are no single definition of what a tax haven is, and there are many lists over what different organizations consider to be a tax haven. Some of these lists can have biases based on political beliefs or other interests, and therefore I consider a country to be a tax haven if it appears on two or more of the tax haven lists used in this thesis.

I use the OECD, Oxfam, IFM, EU and FATF blacklists. I use the criteria of at least two mentions to mitigate the bias of these lists being colored by political or some other reasons. Figure 3 shows countries that are in at least two of the lists mentioned. There are 28 countries in total that are in at least two of these lists. Oxfam and OECD2000 are the two lists that are the most represented. They are also the two largest lists, so it might be expected to see some overlap.

Figure 3: Histogram over Tax Havens in at least two lists

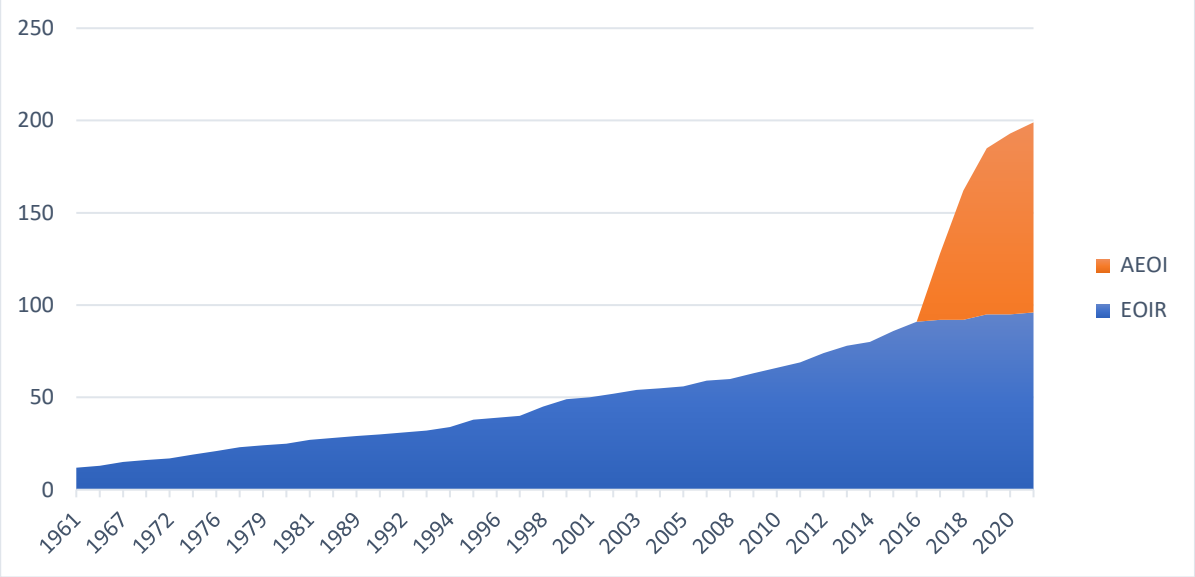


4.1.3 Exchange of information agreements with Switzerland

For this thesis I based the exchange on the EIA, AEOI and EOIR. There is no complete official list of all the agreements from OECD as OECD stopped maintaining that database. I therefore use the Swiss government website from the from the Staatssekretariat für internationale Finanzfragen (SIF) to retrieve the list (State Secretariat for International Finance SIF, 2021b). Their lists were also crosschecked with the IBFD (2021) tax treaties database, which is a third party that maintains databases on tax treaties for research purposes.

Switzerland started signing AEOI agreements from 2016 and has had a steady increase of AEOI in the last years. For EOIR it has been a steady increase. Figure 4 below shows agreements that are still in force over time, split into agreements where information is shared on request (blue) and where it is shared automatically (orange).

Figure 4: Exchange of information agreement Switzerland by year

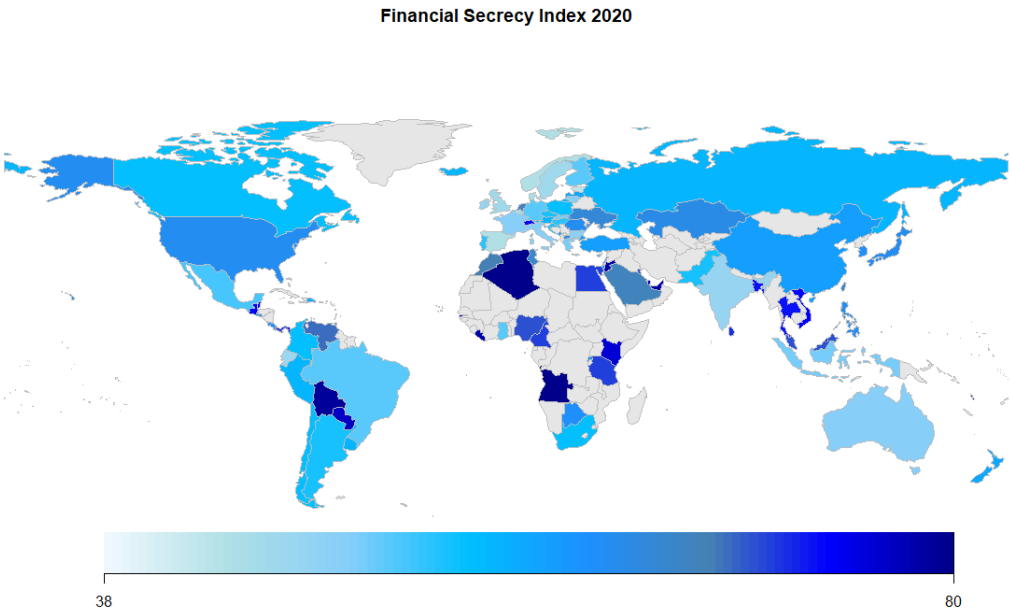


4.1.4 Financial Secrecy Index

For this thesis, the Financial Secrecy Index (FSI) is used to show the relationship between FSI and gap in trade. The FSI data is retrieved from the Tax Justice Network. The FSI data is from the most current list, which is from 18th of February 2020 (Tax Justice Network, 2021b). The FSI list covers 133 countries, and the score goes from 80 (highest) to 38 (lowest).

Figure 5 shows a chart that displays the FSI score and its specific concentration worldwide. Light blue implies a low score, while dark blue implies a high score. The grey indicates a lack of data for a particular country, as the FSI for 2020 only consists of 133 countries. Looking at the map shows for the most part that developed countries score lower with some exceptions.

Figure 5: Financial Secrecy Index 2020 - Concentration around the world



4.1.5 Issues with data

The data comes from the trade data the countries report themselves, and because of that is hard to say if there is a gap in export, of if the data is underreported/missing from the partner countries. Barbieri et al. (2009) found that some of the datasets can have missing data, and this will of course impact the results and the findings. It can be that countries with higher secrecy have troubles with reporting or vice versa. This risk has been tried to be omitted through testing three other product groups in the robustness check. If the trade gaps come from problems in reporting, I expect to see similar findings in the robustness check.

Another issue is custom unions, and changes over time. Some countries have different custom unions or join/leave custom unions over time. This can cause issues with reports. For example, Liechtenstein and Switzerland are in a custom union, which makes it impossible to retrieve trade data for a specific country.

The gap analysis is restricted to only countries that are on the FSI index, so countries that are not listed there will naturally get excluded from the analysis. This is something that could of course impact the conclusion, but the FSI index for 2020 covers 133 countries so therefore does not seem to pose a great risk. Table 12 shows that there is significant relationship between

trade gap and the tax haven dummy, which shows that there is a relation between trade gap and tax haven similar to trade gap and FSI.

4.1.6 Limitations

There are many reasons for trade gap, ranging from tax avoidance, trade mispricing, trade misinvoicing and illicit financial flows. It is, therefore, hard to tell what the reasons are for a trade gap. Thus, it will be a mere guess that it is connected to ML. The trade gap could come from tax evasion (or some other reason), and it is not possible to quantify how much is or is not from ML. This thesis however will be able to give indicative evidence of whether or not there exists a trade gap, and if that trade gap gets affected by exchange of information agreements.

4.2 Methodology

4.2.1 Trade gap analysis

In the trade gap analysis I am looking to test Hypothesis 1:

> *There is a trade gap in the flow of valuables between Switzerland and countries with strong secrecy.*

I hypothesize there will be a trade gap between what Switzerland reports as import and what countries with strong secrecy laws report as exports. My intuition is that countries that score high on the Financial Secrecy Index normally do not share information with other countries which makes them suitable for both tax evasion and money laundering.

The methodology used in testing the hypothesis closely follows Fisman and Wei (2009). I am interested in the relationship between the Financial Secrecy Index and the gap in import and export between Switzerland and its partners. I define the gap in the following way:

$$Value\_Gap_{cy} = \log(1 + CHE\_Imports_{cy}) - \log(1 + Exports\_to\_CHE_{cy})$$

Where c indexes country, y indexes year, $CHE\_Imports_{cy}$ is the imports reported by Switzerland from country *c*, and $Exports\_to\_CHE_{cy}$ is the exports reported by country *c* destined to Switzerland. I also show this relation using the following regression equation:

$$Value\_Gap_{cy} = FSI_c + \delta_y + \varepsilon_{cy}$$

Where FSI_c is the FSI secrecy score per country c and δ_y are year fixed effects.

4.2.2 Regression techniques

The goal of this regression is to explore the changes in $Value\_Gap_{cy}$ over time as a response to the exchange of information agreements. This is to test hypothesis 2:

> *There is a decrease in the flow of valuables shortly before, and after the EIAs are signed.*

This hypothesis will show if the trade gap gets affected by information agreements. The background for this hypothesis comes from the fact that valuables are known to be used for ML purposes and exchange of information agreements have had an effect on tax evasion and ML through capital shifts. I therefore expect to see the same trends for valuables when countries sign agreements. I will test this hypothesis using difference-in-differences (DID) regressions and run the following regression equation:

$$Value\_Gap_{cy} = \beta I(EIA)_{cy} + \delta_y + \gamma_c + \varepsilon_{cy}$$

Where I(EIA) is an indicator variable taking value 1 for the year y and country c with which Switzerland signs an agreement. δ_y are year fixed effects. γ_c are country fixed effects. I then estimate an event study DID. I limit the effect window to [-5. +3] and bin the endpoints of the effect window (Schmidheiny & Siegloch, 2020). Following common trend assumption, I assume that in absence of treatment, the difference between the control and treated group will be constant over time. Robust and clustered standard errors are used to account for potential problems with heteroscedasticity and autocorrelation.

A coefficient of $\beta \neq 0$ will indicate that there is indeed a trade gap in the flow between countries. A coefficient of $\beta > 0$ would mean that money launderers have not responded to the EIA. A coefficient of $\beta < 0$ would mean the opposite; that the flow of valuables has decreased.

Section 5 - Results

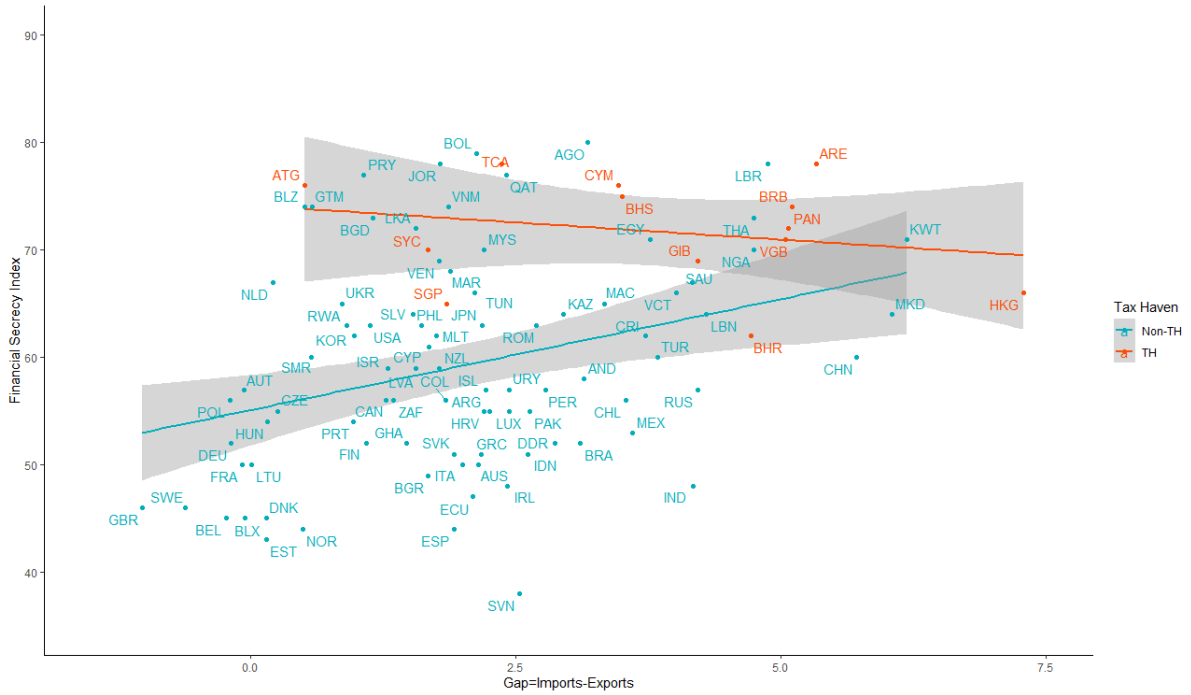
5.1 Trade gap analyses

In this section I test Hypothesis 1 to see what effect secrecy has on the gap between import and export of valuables.

5.1.1 Trade gap analysis of art, collectibles and antiques

In Figure 6 the country codes are shown with their ISO3 country code number, to show the relationship between FSI_c and $Value\_Gap_{c.}$ where $Value\_Gap_c$ will be the mean gap of antiques per country *c*. It shows there is a clear positive relationship (with a coefficient of 0.107 at the 1% significance level). An increased secrecy in a country gives more underreports of exports to Switzerland. It is interesting to see countries known for tax evasion (Hong Kong, Barbados, British Virgin Islands, Panama) have a large underreporting of art. The reason for this is intuitive. It seems unlikely that this gap is fueled by a large local supply of artifacts, as some of these countries are not known for their art or ancient history.

Figure 6: Trade gap vs Financial Secrecy Index, antiques



In Table 2, below, I expand with two more products, the gap for the art and collectibles group (896), paintings (8961) and antiques (8966), and compare them side by side. In the appendix there is a gap analysis covering all traded goods in the 896-product group. The reason for these three is due to that these products are closest art described by Teichmann (2017).

Table 2: Trade gap vs FSI, Regression results - Art and Collectibles

	Dependent variable:		
	Trade gap		
	Art & Coll.	**Paintings**	**Antiques**
	(1)	**(2)**	**(3)**
FSI	0.073***	0.079***	0.107***
	(0.016)	(0.020)	(0.020)
Fixed effects	Year	Year	Year
Observations	28,594	2,849	1,640
R^2	0.053	0.108	0.154
Adjusted R^2	0.052	0.098	0.136
Residual Std. Error	2.789 (df = 28560)	2.465 (df = 2815)	2.561 (df = 1606)

Note: Robust standard errors clustered by partner countries in parentheses. *significant at the 10 % level; **significant at the 5 % level; ***significant at the 1 % level

In column 1 in Table 2, the FSI is significant at the 1% level with a coefficient of 0.073, leading to a one-unit increase in the FSI score, increasing the Gap by 7,3%. This shows that there is a significant positive relation between secrecy and gap in trade of art. The spread in the gap of art is narrower than it is for antiques and paintings, which comes from that the other products in the 896 series have a smaller gap.

In column 2, the FSI is significant at the 1% level with a coefficient of 0.079. This is a slightly higher than the one in column 2. This shows that paintings increase more than the group. The spread of the gap is the largest for paintings. The countries with the largest gap are the same as those for antiques.

The largest of these three is column 3, at the 1% level of significance with a coefficient of 0.107. Antiques have the largest coefficient of any product in the 896-series. The higher coefficient and the countries reporting the gap indicates that antiques are more vulnerable for

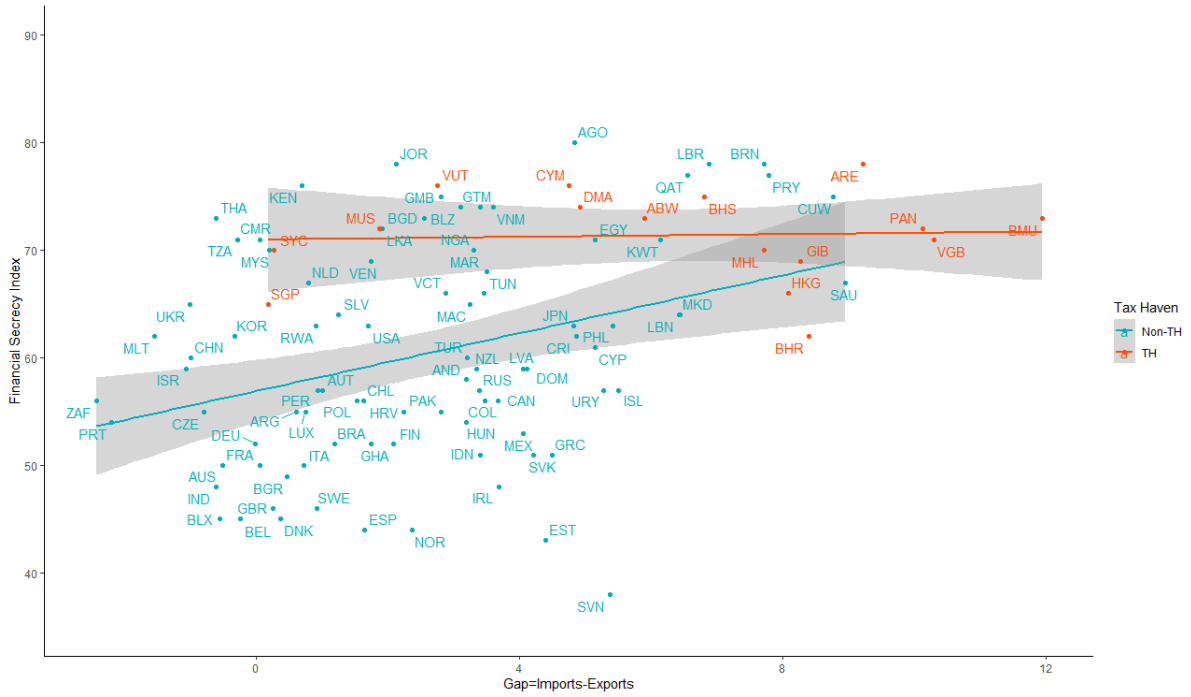
use for ML purposes. This supports Teichmann (2019) and Steiner (2017), showing that antiques is more susceptible to be used in the ML process.

5.1.2 Trade gap analysis of diamonds, pearls and precious stones

As with art and antiques, diamonds (product code 6672) are a suitable way to launder money (Teichmann & Falker, 2020b). Diamonds are very easy to hide, and it can be difficult to track the origin of diamonds, this makes diamonds suitable for smuggling by both tax evaders and money launderers. Figure 7 shows that there is a clear positive relationship (with a coefficient of 0.107 at the 1% significance level), between the reported gap and secrecy index.

When looking at the gap one can see that there are known tax havens (Panama, British Virgin Islands, Bermuda) similar to arts that has the largest gap. The gap is also less centered towards null as it was with arts.

Figure 7: Trade gap vs FSI, Diamonds



In Table 3, I expand and take in the group, diamonds, pearls, and precious stones, (667), pearls (6671), diamonds (6672) and precious stones (excl. diamonds) (6673). The group naturally has similar spread as diamonds but is more centred. This comes from that the spread in pearls and precious stones are not as large as the one for diamonds.

Table 3: Trade gap vs FSI, Regression results – Diamonds, Pearls & Precious Stones

	Dependent variable:			
	Trade gap			
	Diamonds, Pearls & Precious Stones	**Pearls**	**Diamonds**	**Precious Stones**
	(1)	**(2)**	**(3)**	**(4)**
FSI	0.144***	0.136***	0.172***	0.114***
	(0.035)	(0.026)	(0.037)	(0.029)
Fixed effects	Year	Year	Year	Year
Observations	8,387	1,071	1,593	2,005
R^2	0.120	0.250	0.150	0.154
Adjusted R^2	0.117	0.226	0.132	0.140
Residual Std. Error	3.812 (df = 8353)	2.586 (df = 1037)	4.290 (df = 1559)	2.855 (df = 1971)

Note: Robust standard errors clustered by partner countries in parentheses. *significant at the 10 % level; **significant at the 5 % level; ***significant at the 1 % level

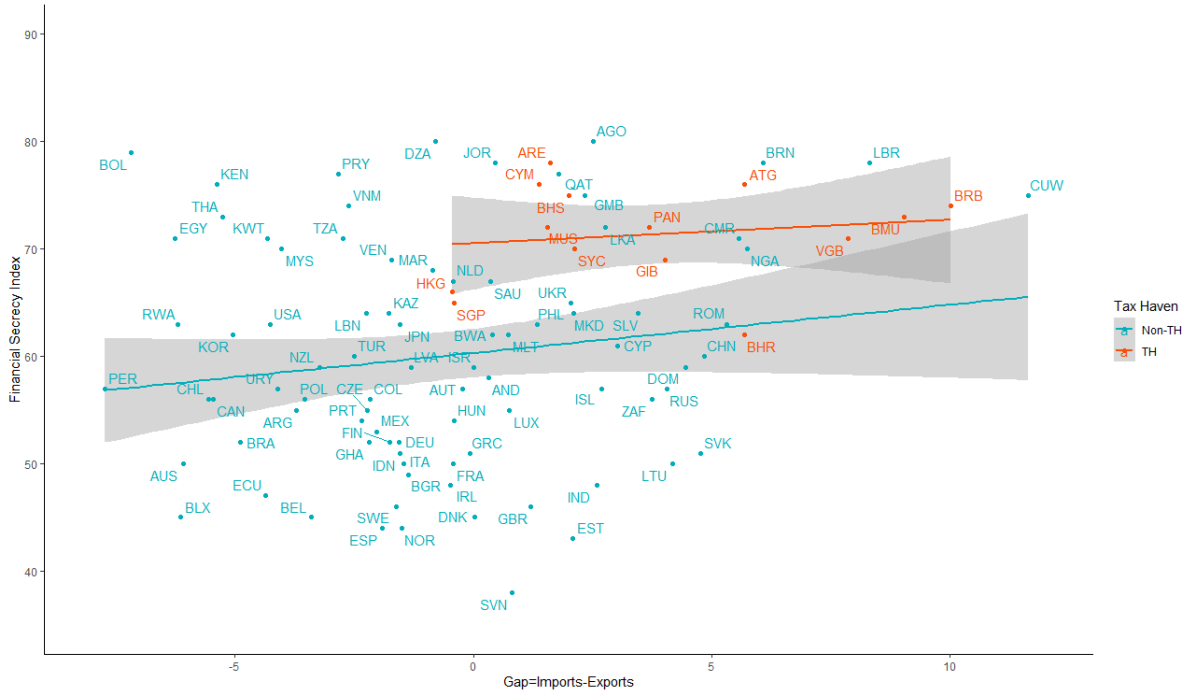
In column 1 in Table 3, the FSI is significant at the 1% level with a coefficient of 0.144, leading to a one-unit increase in the FSI score, increasing the gap by 14,4%. This is almost double the increase in coefficient from column 1 in Table 2. This gives indications for that diamonds, pearls and precious stones are more used for money laundering then art and collectibles. The spread is wider for diamonds, pearls, and precious stones then it is for art and collectibles.

Column 2 and 4 show a slightly smaller coefficient than column 1. That shows that in the group 667, the product group with the highest coefficient is diamonds. In column 3 the FSI is significant at the 1% level with a coefficient of 0.172. The gap on diamonds is affected the most per increase in secrecy. This finding supports Teichmann and Falker (2020b). It is intuitive that diamonds are more suited for ML then pearls and precious stones, so it is natural to see it having the highest score.

5.1.3 Trade gap analysis of gold

As with art and diamonds, gold is a suitable way to launder money (Teichmann & Falker, 2020a). Gold is easy to amalgamate, and it can be difficult to track the origin of gold, this makes gold suitable for smuggling by both tax evaders and money launderers. Table 5 does show a positive, but not significant relation with FSI, with a coefficient of 0.041. This is visualized in Figure 8.

Figure 8: Trade gap vs FSI, Gold



The spread of the gap is very wide, and it is not significant against FSI. This can be seen in Figure 8, where the gap is spread in both over- and underreporting of export. The spread does not show any significance against FSI, as countries with high and low secrecy report both over- and underreporting. The spread do not follow any geographic region or income group. This gives indications for that gold is not used for trade-based ML with countries with higher secrecy. Teichmann and Falker (2020a) finds that gold was used for ML, but that the gold was smuggled across the border, due to strong documentation requirements. This might make gold not as suitable for ML purposes as the other products, and why the findings are not as significant. One can see that tax havens are among the countries with the highest positive trade gap, but the data is too scattered to see any clear relationship with secrecy.

Table 4: Trade gap vs FSI, Regression results – Gold

	Dependent variable:
	Trade gap
	Gold
FSI	0.041
	(0.033)
Fixed effects	Year
Observations	1,946
R^2	0.277
Adjusted R^2	0.265
Residual Std. Error	5.106 (df = 1912)
Note:	Robust standard errors clustered by partner countries in parentheses. $*$significant at the 10 % level; $**$significant at the 5 % level; $***$significant at the 1 % level

5.2 Difference-in-differences

In the trade gap analysis, one could see that there was for most products a positive relationship existed between trade gap and secrecy. The goal of this section is to see if the exchange of information agreements have had an impact on that relation. This is to test to test hypothesis 2. This will be done through a difference-in-differences analysis and an event study.

5.2.1 Difference-in-differences

In the gap analysis we saw that there was for most products a positive relation between trade gap and secrecy. In this part I will use difference-in-differences to see if the exchange of information agreements has had an impact on the trade gap.

Table 5: Trade gap vs I(EIA), Difference-in-differences results

	Dependent variable:							
	Trade gap							
	Art & Coll.	**Paintings**	**Antiques**	**Diamonds, Pearls & Precious stones**	**Pearls**	**Diamonds**	**Precious Stones**	**Gold**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
I(EIA)	0.323**	0.378*	0.102	-0.646**	-0.087	-2.167***	-0.914	-3.258***
	(0.151)	(0.216)	(0.309)	(0.308)	(0.412)	(0.679)	(0.556)	(0.912)
Fixed effects	Year × Country	Year × Country	Year × Country	Year × Country	Year × Country	Year × Country	Year × Country	Year × Country
Observations	28,594	2,849	1,640	8,387	1,071	1,593	2,005	1,946
R^2	0.149	0.478	0.482	0.366	0.595	0.597	0.553	0.528
Adjusted R^2	0.144	0.448	0.437	0.355	0.546	0.560	0.521	0.494
Residual Std. Error	2.650 (df = 28435)	1.928 (df = 2691)	2.068 (df = 1507)	3.257 (df = 8241)	1.980 (df = 956)	3.056 (df = 1456)	2.131 (df = 1870)	4.237 (df = 1814)

Note: The exchange of information agreement dummy is set to check first for AEOI, then EOIR. I set 1 for the signing year, and after for AEOI first, if the country does not have AEOI agreement, it checks for EOIR. Robust standard errors clustered by partner countries in parentheses. *significant at the 10 % level; **significant at the 5 % level; ***significant at the 1 % level

In column 1 in Table 5, *I(EIA)* is significant at the 5% level with a coefficient of 0.323. This shows that the gap increased by 32,3% after signing the EIA. This gives indications for that information exchange has not had an impact on the trade gap in art and collectibles. As we saw in Table 2, this product group had a significant positive relation on the FSI, this gives indications for that art and collectibles are used for ML purposes, and that information exchange has not impacted that.

In column 2, the *I(EIA)* is significant at the 10% level with a coefficient of 0.378. The coefficient for paintings is higher than it was for art and collectibles as a group, but its significance is lower. In column 3, there is no significance, and the coefficient dropped to 0.102. This shows that for antiques there was no effect from the EIA.

In column 4, the significance is at the 5% level with a coefficient of -0.646. This shows that the gap is reduced by 64,6%. This shows that the group diamonds, pearls, and precious stones are affected negatively by signing an EIA. The subgroups pearls and precious stones in column 5 and 7 shows no significance. It is diamonds which are affected the most, with a coefficient of -2.167 at the 1% level of significance.

In column 8, the *I(EIA)* is significant at the 1% level with a coefficient of -3.258. Gold was the product who's trade gap was without a significant relation to secrecy. It is therefore surprising to see that gold was most impacted by the signing of an EIA.

The changes from signing the EIA can be different between Tax Havens and Non-Tax Havens. Therefore, I use the multiplication method in Table 6 below to capture the effect of Tax Haven.

Table 6: Trade gap vs I(EIA) and TH, Difference-in-differences results

	Dependent variable:							
	Trade gap							
	Art & Coll.	**Paintings**	**Antiques**	**Diamonds, Pearls & Precious stones**	**Pearls**	**Diamonds**	**Precious Stones**	**Gold**
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**
I(EIA)	0.412**	0.511**	0.193	-0.491	0.154	-2.051***	-0.937*	-3.193***
	(0.184)	(0.225)	(0.312)	(0.304)	(0.435)	(0.685)	(0.564)	(0.930)
I(EIA):TH	-2.593**	-1.753**	-2.236	-2.507	-2.996*	-1.513	0.362	-0.906
	(1.133)	(0.795)	(2.563)	(1.898)	(1.579)	(2.125)	(1.282)	(1.130)
Fixed effects	Year × Country	Year × Country	Year × Country	Year × Country	Year × Country	Year × Country	Year × Country	Year × Country
Observations	28,594	2,849	1,640	8,387	1,071	1,593	2,005	1,946
R^2	0.152	0.481	0.486	0.369	0.603	0.598	0.553	0.528
Adjusted R^2	0.148	0.451	0.440	0.358	0.555	0.560	0.521	0.494
Residual Std. Error	2.645 (df = 28434)	1.923 (df = 2690)	2.062 (df = 1506)	3.250 (df = 8240)	1.960 (df = 955)	3.054 (df = 1455)	2.131 (df = 1869)	4.237 (df = 1813)

Note: The exchange of information agreement dummy is set to check first for AEOI, then EOIR. I set 1 for the signing year, and after for AEOI first, if the country does not have AEOI agreement, it checks for EOIR. Robust standard errors clustered by partner countries in parentheses. *significant at the 10 % level; **significant at the 5 % level; ***significant at the 1 % level

In column 1 in Table 6, the *I(EIA)* is significant at the 5% level with a coefficient of 0.412. When adjusting *I(EIA)* against the TH dummy, it shows a significant at the 5% level with a coefficient of -2.593. This shows that countries that are not classified as Tax Havens have an increase in the art and collectibles trade gap after signing the EIA, but the Tax Havens have a significant decrease in the gap.

This is also showed in column 2, where the decrease in trade gap for Tax Havens are at 175.3% after signing the agreement. In column 3, there are no significant results, showing that for antiques the exchange agreements have had no significant impact. There are also no significant results in column 4 and 5, showing that for group diamonds, pearls and precious stones and

pearls has had no effect. In column 5 however the *I(EIA):TH* is significant at the 10% level with a coefficient of -2.996.

In column 6, the *I(EIA)* is significant at the 1% level with a coefficient of -2.051, while the *I(EIA):TH* is not significant. This shows that for countries that are not tax havens, the agreement has had a negative effect. In column 7, the *I(EIA)* is significant at the 10% level, with a coefficient of -0.937. The *I(EIA)* is not significant when adjusting for *TH* and also shows a positive coefficient of 0.362.

In column 8, the *I(EIA)* is significant at the 1% level with a coefficient of -3.193. The *I(EIA)* is not significant when adjusting for *TH*. This shows that the agreement has had a strong negative effect for countries that are not tax havens for gold.

5.2.2 Event study

In this section I will visualize the change in the trade gap before and after signing the exchange agreement. I split the trade gap into two groups using the Tax Haven dummy. The event window is from -5 to 3, where 0 is 1 year prior to signing the agreement.

Figure 9: Event study, all product groups

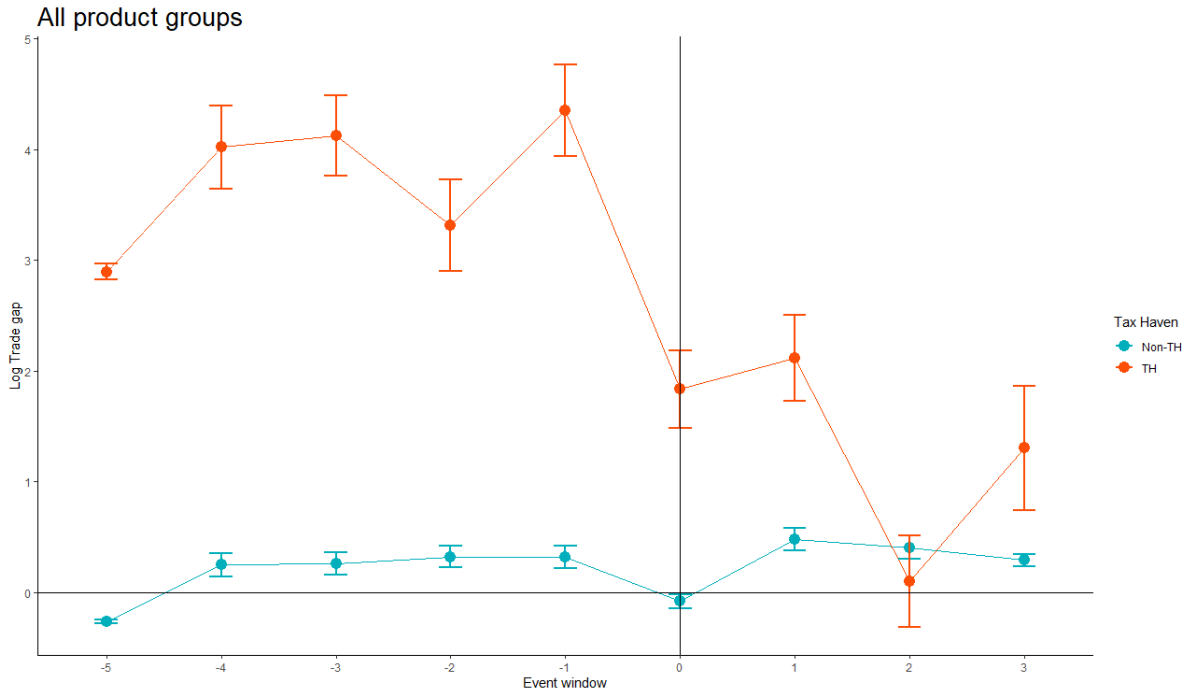


Figure 9 visualizes all the product groups used in Table 5 and Table 6 (667, 896 and 971). The graph shows countries not classified as tax havens have on average almost no trade gap, so it is not expected to change a lot after signing the agreement. Countries that are classified as tax havens however have on average a higher trade gap, and it seems to diminish from around event window 0 (1 year prior to signing the agreement), and afterwards. This is supporting the findings from Table 6. For some products, the error bar is too big to say anything conclusively, but it gives indicative evidence that the EIA has had an impact on the trade gap on countries classified as tax havens. A full list of event studies per product can be found in the appendix.

5.3 Robustness checks

5.3.1 Gap analysis robustness check

In the robustness check I control against products that are not known to be used for money laundering purposes and share similar tariff rates as the other products in this thesis. I have chosen three product groups; industrial diamonds (277), mineral ores/scraps (289) and toys (894). The reason for checking these products is to show that the correlation and trade gap found on valuables is not a coincidence. I will further control the regressions done in 5.1 by omitting 2.5% of the top and bottom observations and controlling against GDP.

Table 7: Trade gap vs FSI, robustness check

	Dependent variable:		
	Trade gap		
	Industrial Diamonds	**Mineral Ores / Scraps**	**Toys**
	(1)	**(2)**	**(3)**
FSI	0.007	0.001	0.076***
	(0.024)	(0.036)	(0.012)
Fixed effects	Year	Year	Year
Observations	1,847	1,440	2,335
R^2	0.020	0.062	0.669
Adjusted R^2	0.002	0.040	0.665
Residual Std. Error	2.592 (df = 1813)	4.345 (df = 1406)	2.345 (df = 2301)

Note: Robust standard errors clustered by partner countries in parentheses. *significant at the 10 % level; **significant at the 5 % level; ***significant at the 1 % level

In column 2 and 3, in Table 6, the FSI is not significant. This shows that trade gap in neither industrial diamonds or mineral ores is affected by secrecy. In column 3, the FSI is significant at the 1% level with a coefficient of 0.076. The gap for toys however does not show signs of underreporting in exports, but rather an overreporting from countries that scores low on the Financial Secrecy Index. Countries that score high in secrecy show a null gap. So, the reason for overreporting in this product group is most likely not linked illicit flows.

In Table 13 I omit the top and bottom 2.5 percent of the observations, and rerun the regressions done in section 5.1. The table shows that there are no changes in the significance of the FSI, and the coefficients are just slightly smaller. This shows that the findings are not caused by any large outliers. In Table 14 the trade gap is controlled against the exporter's income level. The income level comes from the log value of the GDP per capita in 2000 US dollars for the year 2007 (LogGDP). LogGDP is for the most part significant with a negative coefficient. Which means that an increase in GDP per capita decreases the trade gap.

When running both FSI and LogGDP, in Table 15 the significance of the FSI was for the most part unchanged, while the significance dropped for LogGDP. Showing that the trade gap is not driven on exporter's income, but rather the secrecy rating.

Table 16 shows the quantity gap vs FSI and LogGDP, where quantity gap is defined as the difference between reported quantity of import and export. This will show whether the trade gap comes from a difference in price or quantity. It shows that the FSI is only significant on the 5% level for art objects and not for the other product groups. This indicates that the difference in trade comes mostly from a difference in price and not quantity.

5.3.2 Difference-in-differences robustness check

In this section I run the DID analysis on the three product groups industrial diamonds (277), mineral ores/scraps (289) and toys (894). This is to see if there have been any changes on these products. I will control the DID from section 5.2 by omitting the top and bottom 2.5% of observations.

Table 8: Difference-in-differences, robustness check

	Dependent variable:		
	Trade gap		
	Industrial Diamonds	**Mineral Ores / Scraps**	**Toys**

	(1)	(2)	(3)
I(EIA)	-0.409	-0.462	-1.105***
	(0.277)	(0.842)	(0.362)
I(EIA):TH	-2.355	-0.136	-1.639
	(1.767)	(1.645)	(2.172)
Fixed effects	Year × Country	Year × Country	Year × Country
Observations	1,847	1,440	2,335
R^2	0.261	0.314	0.782
Adjusted R^2	0.216	0.256	0.768
Residual Std. Error	2.297 (df = 1740)	3.826 (df = 1327)	1.951 (df = 2187)

Note: The exchange of information agreement dummy is set to check first for AEOI, then EOIR. I set 1 for the signing year, and after for AEOI first, if the country does not have AEOI agreement, it checks for EOIR. Robust standard errors clustered by partner countries in parentheses. *significant at the 10 % level; **significant at the 5 % level; ***significant at the 1 % level

In column 1 and 2 in Table 8 the *I(EIA)* is not significant. This is to be expected as these products did not show any significant relationship with the FSI in Table 7. In column 3, the *I(EIA)* is significant at the 1% level with a coefficient of -1.105, and the *I(EIA):TH* is not significant. This indicates that the exchange agreements have had an effect on countries not classified as a tax haven. This shows that there has been a reduction in the overreporting, which further supports that this overreporting is tax driven.

In Table 17 I omit the top and bottom 2.5% of observations and rerun the DID analysis done in section 5.2. The table shows some drop in significance, but for mostly unchanged. The coefficients are slightly smaller. This shows that the DID is not affected by large outliers.

Section 6 - Discussion

In this section I will discuss the findings to answer the main question: *Have exchange of information agreements impacted the flow of valuables (for example: art, gold, diamonds, etc.) between countries implicated in Money Laundering?* I will do this by discussing my two hypotheses:

Hypothesis 1: There is a trade gap in the flow of valuables between Switzerland and countries with strong secrecy.

Hypothesis 2: There is a decrease in the flow of valuables shortly before, and after the EIAs are signed.

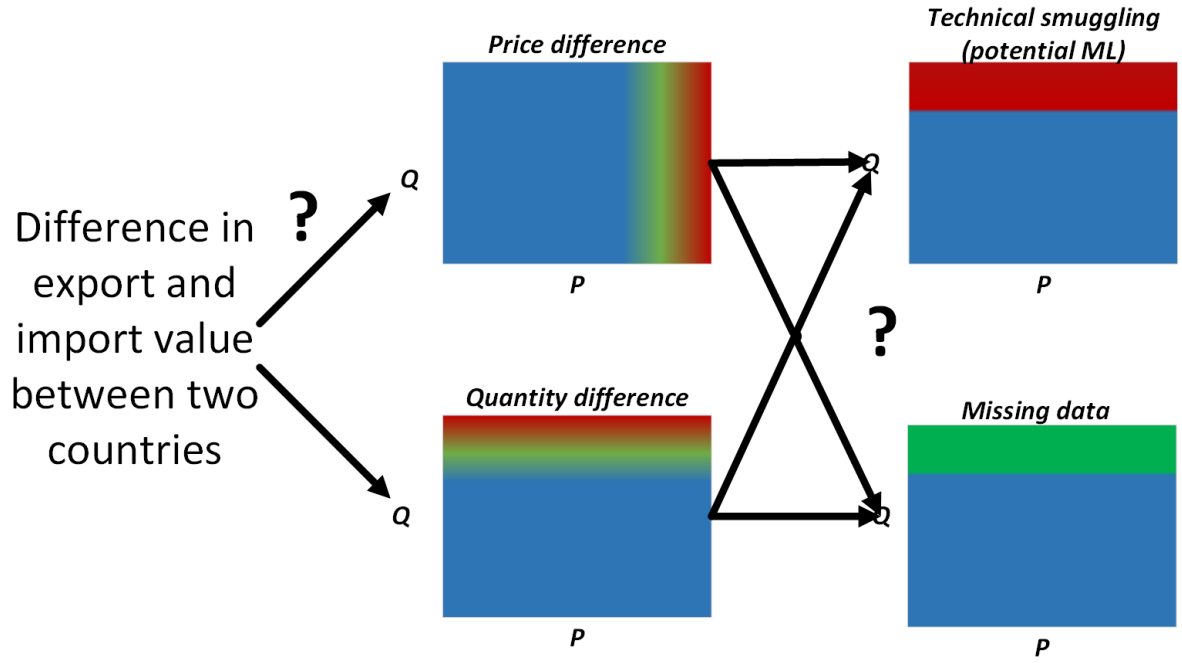
6.1 Evaluating the hypotheses in light of the results

Hypothesis 1: There is a trade gap in the flow of valuables between Switzerland and countries with strong secrecy.

Section 5.1 demonstrated through trade gap analyses that for most valuables there was a trade gap which had a positive relationship with the Financial Secrecy Index. The only valuable that did not show a clear relation with the secrecy index was gold. The other products showed a strong relation with the FSI. These findings support what was found by Teichmann (2017).

Figure 10 shows the two possible explanations for trade gap. One of them is trade gap due to missing data. A possible explanation for missing data is that countries classified as tax havens have poorer infrastructure and therefore do not report everything (Barbieri et al., 2009). This was tested against in the robustness check, and there was no relationship between secrecy and industrial diamonds/scraps. If the reason were a lack of reporting from countries with higher secrecy it would be expected to see the same trend for all product groups, which was not the case. There was however a relationship between secrecy and toys, but the gap did not come from tax havens underreporting exports, but rather an overreport from countries with low secrecy. This gave a negative trade gap from countries with a lower secrecy rating. An incentive for overreporting exports can be to take advantage of export credits. The event study in Figure 15 shows that there is no difference between tax havens and non-tax havens over time for industrial diamonds, mineral ores/scraps or toys.

Figure 10: Explanation for the trade gap



Since the difference between tax havens and non-tax havens was almost nonexistent for these products, and there was a difference when looking at the value preserving objects, this indicates that the differences in trade gap do not come from a lack of reporting / missing data. Since the trade gap most likely does not come from a lack of reporting, the other explanation would be that the trade gap comes from a lack in records / smuggling. Table 16 indicates that the trade gap does for the most part not come from a quantity difference. This means that the trade gap comes from price differences. The only legitimate deviation in price differences should come from shipping costs and insurance costs (Collin, 2020). The trade gap for valuables were also mostly positive, which means it was not intended to avoid tariffs, but rather from a desire to move money secretly or illicitly.

Overall, the trade gap seems to come from a lack of recordings, and it cannot be explained by shipping and insurance costs alone. The trade gap for valuables does for the most part have a significant and positive relationship with secrecy. The trade gap analyses therefore confirms hypothesis 1. There exists a trade gap of valuables between countries with strong secrecy, and this trade gap cannot be explained by neither lack of reporting nor by shipping/insurance costs.

Hypothesis 2: There is a decrease in the flow of valuables shortly before, and after the EIAs are signed.

Hypothesis 1 confirms that there exists a trade gap, I can therefore proceed to control hypothesis 2 as to whether this trade gap gets affected by EIAs. In Figure 9 it shows a trend where the trade gap starts to decrease around 1 year prior to signing the agreement and continuously after. This is shown more clearly for the countries that are classified as tax havens as they had a much larger gap to begin with before the agreements were signed and show a steep decline after signing. There are fewer observations in some years for some products, so the error bars overlap such that it is not possible to say that the EIA has had an effect conclusively for those years, but it gives indicative evidence that the agreements have had an effect.

The event study also shows some interesting trends. For example, for art and collectibles the trend shows that the trade gap decreases for tax havens, but it increases for non-tax havens. A reason for this could be that there has been a shift from tax havens to other countries that are not classified as tax havens. For gold it has the opposite effect. The trade gap for gold shows an increase for tax havens after signing the agreement and decrease for non-tax havens. This could be because that gold is now more used for ML or tax evasion then before the agreement. Diamonds, pearls, and precious stones have a clear trend, and it shows a very clear decrease after signing the agreement for both tax havens and non-tax havens. This suggests that these products are now not used as much for ML or tax evasion.

That the agreements have had a negative effect indicates that the trade gap comes from illicit financial flows. Previous research showed that there was a shift in capital moving when EIAs were signed, which could be because tax evaders no longer wanted to store their capital in those tax shelters as they would send tax information to their home country. In this case it shows the same trend, which points to that these value preserving objects are used as means for tax evasion or ML.

Section 7 - Conclusion

The question this thesis hoped to answer was whether the exchange of information agreements had an impact of the flow of valuables between countries implicated in ML. In this thesis this has been answered through testing two hypotheses. The first to see whether or not there exists a flow of valuables to begin with, and the second to test if that flow has been impacted by exchange of information agreement.

The results show that there exists a positive relationship between trade gap and secrecy. This means that countries that score higher on the FSI rating have a larger trade gap. Countries that score high on the FSI rating are countries that are also typically on tax haven lists. These countries also are linked to tax evasion and ML.

The difference-in-differences analyses, and event studies show that there is evidence that the exchange agreements have had an effect on the trade gap. They show that after signing the agreements the trade gap has been reduced. The event study shows that for most valuables the decline starts 1 year prior to signing the agreement. This is in line with previous research in that for capital, there have been shifts after signing the agreement. This further indicates that the flow of valuables is connected to tax evasion and ML, since it has had an effect. There is only indicative evidence though, due to a large spread in the data.

The implications of these results are that there should be more efforts put into looking into how value preserving objects are used for ML and/or tax evasion, and how exchange of information agreements can be used to combat ML and tax evasion.

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Section 8 - Appendices

8.1 Appendix A Lists of pre-defined tax havens

Table 9: Overview over blacklists

OECD (CBI)[1]	**FATF[2]**	**EU[3]**	**Oxfam[4]**	**IMF[5]**
Antigua and Barbuda	Iran	American Samoa	Albania	Bermuda
Bahamas	North Korea (DPRK)	Anguilla	Anguilla	British Virgin Islands
Bahrain	Albania	Dominica (new)	Antigua and Barbuda	Cayman Islands
Barbados	Barbados	Fiji	Aruba	Hong Kong
Cyprus	Botswana	Guam	Bahamas	Ireland
Dominica	Burkina Faso	Palau	Bahrain	Luxembourg
Grenada	Cambodia	Panama	Bermuda	Netherlands
Malta	Cayman Islands	Samoa	Bosnia and Herzegovina	Singapore
Saint Kitts and Nevis	Ghana	Seychelles	British Virgin Islands	
Saint Lucia	Jamaica	Trinidad and Tobago	Cayman Islands	
Seychelles	Mauritius	US Virgin Islands	Cook Islands	
Turks and Caicos Islands	Morocco	Vanuatu	Curacao	
United Arab Emirates	Myanmar		Faroe Islands	
Vanuatu	Nicaragua		Gibraltar	
	Pakistan		Greenland	
	Panama		Guam	
	Senegal		Hong Kong	
	Syria		Jersey	
	Uganda		Macedonia	
	Yemen		Marshall Islands	
	Zimbabwe		Mauritius	
			Montenegro	
			Nauru	
			New Caledonia	
			Niue	
			Oman	
			Palau	
			Serbia	
			Singapore	
			Switzerland	
			Taiwan	

			Trinidad and Tobago		
			United Arab Emirates		
			US Virgin Islands		
			Vanuatu		

1. Retrieved from OECD (2021b)
2. Countries from 'graylist' in gray. Retrieved from FATF (2021)
3. Retrieved from European Council (2021)
4. Retrieved from Chardonnet and Langerock (2017)
5. Retrieved from International Monetary Fund (2021)

Table 10: OECD original blacklist

Andorra	
	Maldives
Anguilla	Marshall Islands
Antigua and Barbuda	Monaco
Aruba	Nauru
Bahrain	Netherlands Antilles
Barbados	Niue - New Zealand
Belize	Panama
British Virgin Islands	Samoa
Cook Islands - New Zealand	Seychelles
Dominica	St. Lucia
Gibraltar	The Federation of St. Christopher & Nevis
Grenada	St. Vincent and the Grenadines
Guernsey/Sark/Alderney	Tonga
Isle of Man	Turks & Caicos
Jersey	US Virgin Islands
Liberia	Vanuatu
Lichtenstein	

Retrieved from OECD (2001)

Appendix B Additional trade gap analysis

Table 11 shows the summary statistics of the trade gap and quantity gap.

Table 11: Summary statistics

	Mean	SD	Min	Max	Observations
Panel A: Trade gap					
Art & Coll.	0.565	2.865	-9.909	12.789	28,594
Paintings	1.409	2.595	-7.068	12.789	2,849
Antiques	2.088	2.756	-8.731	10.607	1,640

Diamonds, Pearls & Precious stones	1.426	4.056	-12.822	13.385	8,387
Pearls	1.363	2.940	-7.728	9.758	1,071
Diamonds	2.678	4.605	-12.822	13.432	1,593
Precious Stones	2.281	3.078	-7.457	11.348	2,005
Gold	-1.139	5.955	-15.570	15.895	1,946
Panel B: Quantity gap[1]					
Art & Coll.	0.818	3.170	-11.900	11.600	28,594
Paintings	1.370	2.940	-9.460	11.300	2,849
Antiques	1.330	2.750	-8.530	10.600	1,640
Diamonds, Pearls & Precious stones	0.466	2.960	-13.400	10.900	8,387
Pearls	0.490	1.670	-6.980	9.330	1,071
Diamonds	-0.257	1.680	-10.500	4.810	1,593
Precious Stones	1.260	2.580	-7.930	10.200	2,005
Gold	-1.070	4.780	-22.700	12.500	1,946

Note: Quantity gap is the log gap of the difference between reported quantity of imports and exports.

The graphs below visualize the raw relationship between trade gap and Financial Secrecy Index for all products. The visualizations' purpose here is mainly to show the spread in the values.

Figure 11: Trade gap vs FSI, art, collectibles and antiques

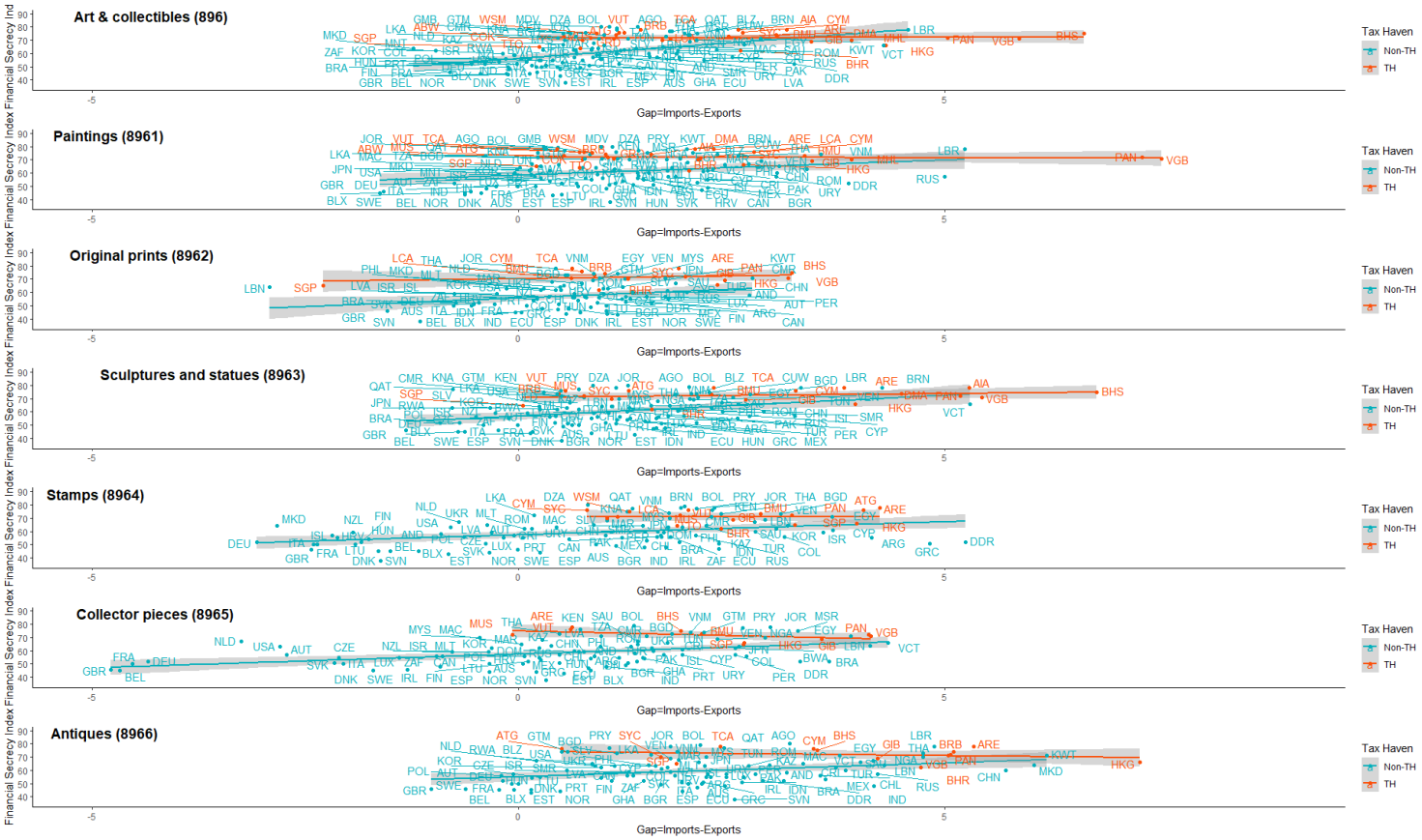


Figure 12: Trade gap vs FSI, Diamonds, pearls, and precious stones

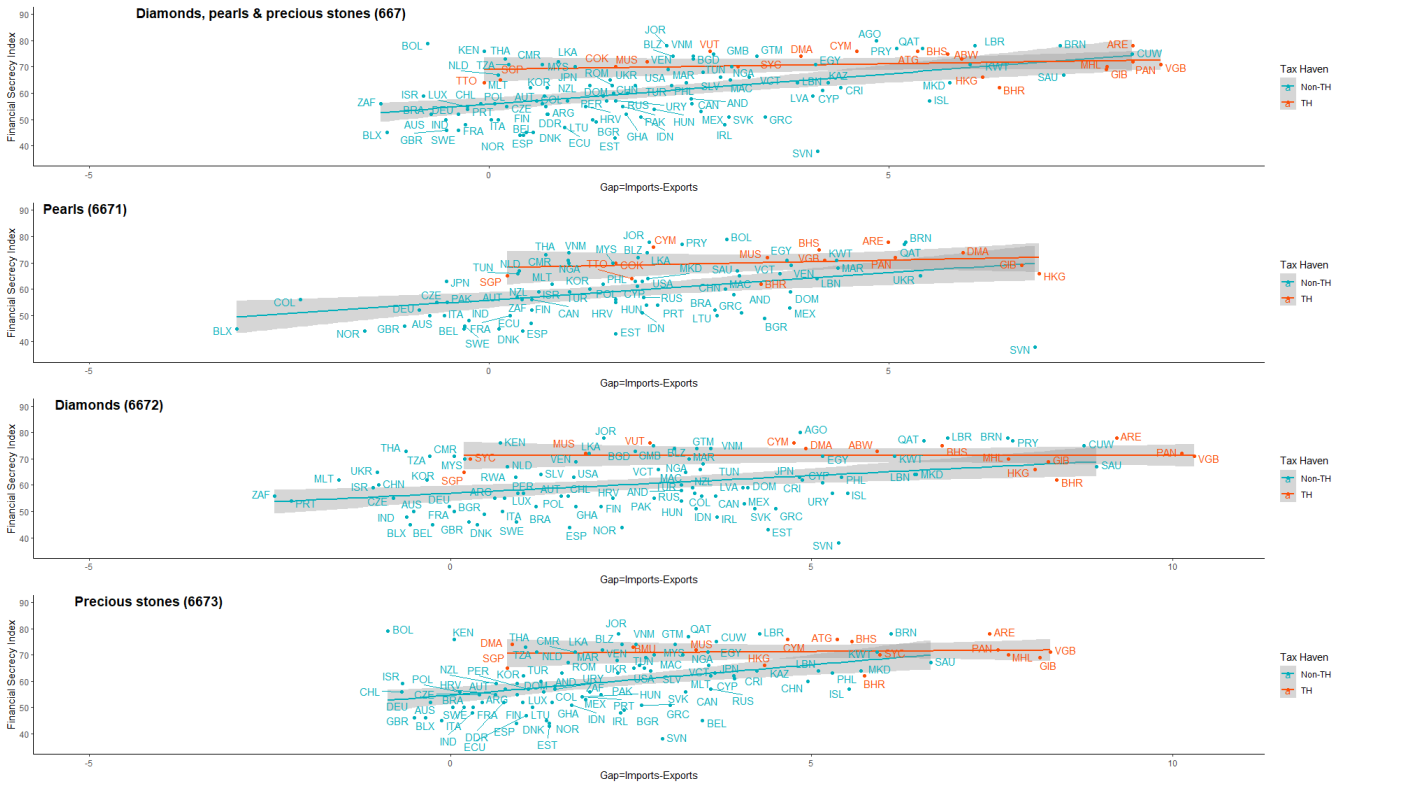
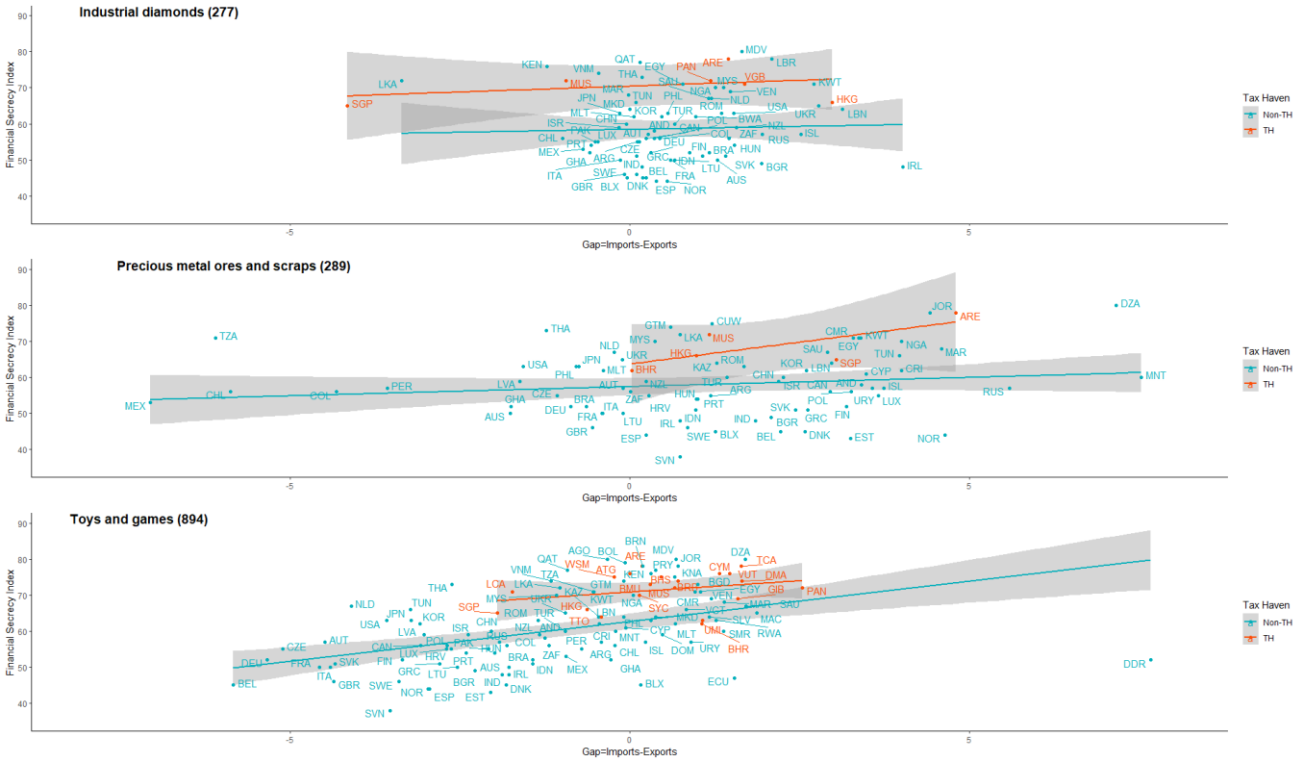


Figure 13: Trade gap vs FSI, robustness check



Appendix C Additional regression results

Table 12 shows the relationship between trade gap and the Tax Haven indicator. It shows that there is a strong positive relationship between trade gap and tax haven.

Table 12: Trade gap vs Tax Haven Indicator, regression results

	Dependent variable:							
	Trade gap							
	Art & Coll.	**Paintings**	**Antiques**	**Diamonds, Pearls & Precious stones**	**Pearls**	**Diamonds**	**Precious Stones**	**Gold**
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**
TH_c	2.587***	2.474***	2.926***	4.225***	3.420***	5.053***	3.604***	2.471***
	(0.891)	(0.902)	(0.793)	(1.400)	(1.051)	(1.280)	(0.913)	(0.592)

Fixed effects	Year	Year	Year	Year	Year	Year	Year	Year
Observations	28,594	2,849	1,640	8,387	1,071	1,593	2,005	1,946
R^2	0.059	0.118	0.139	0.138	0.239	0.186	0.187	0.286
Adjusted R^2	0.057	0.108	0.121	0.135	0.215	0.169	0.173	0.274
Residual Std. Error	2.781 (df = 28560)	2.451 (df = 2815)	2.584 (df = 1606)	3.773 (df = 8353)	2.604 (df = 1037)	4.198 (df = 1559)	2.799 (df = 1971)	5.076 (df = 1912)

Note: Robust standard errors clustered by partner countries in parentheses. $*$significant at the 10 % level; $**$significant at the 5 % level; $***$significant at the 1 % level

Table 13 shows the relation between trade gap and the Financial Secrecy Index with the top and bottom 2.5 percent of the observations removed.

Table 13: Trade gap vs FSI, regression results - omitting bottom and top 2.5 percent

	Dependent variable:							
	Trade gap							
	Art & Coll.	**Paintings**	**Antiques**	**Diamonds, Pearls & Precious stones**	**Pearls**	**Diamonds**	**Precious Stones**	**Gold**
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**
FSI	0.049***	0.048***	0.087***	0.103***	0.108***	0.134***	0.091***	0.012
	(0.009)	(0.011)	(0.018)	(0.025)	(0.020)	(0.032)	(0.025)	(0.032)
Fixed effects	Year	Year	Year	Year	Year	Year	Year	Year
Observations	27,161	2,706	1,558	7,827	1,004	1,497	1,904	1,848
R^2	0.033	0.071	0.143	0.078	0.223	0.118	0.124	0.201
Adjusted R^2	0.031	0.059	0.124	0.074	0.197	0.098	0.109	0.187
Residual Std. Error	2.452 (df = 27127)	1.977 (df = 2672)	2.265 (df = 1524)	3.433 (df = 7793)	2.271 (df = 970)	3.994 (df = 1463)	2.542 (df = 1870)	4.714 (df = 1814)

Note: Robust standard errors clustered by partner countries in parentheses. $*$significant at the 10 % level; $**$significant at the 5 % level; $***$significant at the 1 % level

Table 14 shows the relation between trade gap and the log values of the exporter's GDP for the year 2007. The GDP is per capita in 2000 US, retrieved from the worldbank (The World Bank, 2021).

Table 14: Trade gap vs GDP, regression results

	Dependent variable:							
	Trade gap							
	Art & Coll.	**Paintings**	**Antiques**	**Diamonds, Pearls & Precious stones**	**Pearls**	**Diamonds**	**Precious Stones**	**Gold**
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**
LogGDP	0.724***	-0.996***	-1.170***	-0.703	-0.978***	-0.878	-0.847**	-0.329
	(0.203)	(0.299)	(0.238)	(0.490)	(0.364)	(0.589)	(0.419)	(0.545)
Fixed effects	Year	Year	Year	Year	Year	Year	Year	Year
Observations	28,071	2,782	1,613	8,273	1,054	1,582	1,985	1,921
R^2	0.024	0.094	0.110	0.019	0.108	0.040	0.076	0.273
Adjusted R^2	0.023	0.083	0.091	0.015	0.079	0.019	0.061	0.260
Residual Std. Error	2.832 (df = 28037)	2.488 (df = 2748)	2.638 (df = 1579)	4.013 (df = 8239)	2.797 (df = 1020)	4.568 (df = 1548)	2.990 (df = 1951)	5.111 (df = 1887)

Note: Robust standard errors clustered by partner countries in parentheses. *significant at the 10 % level; **significant at the 5 % level; ***significant at the 1 % level

Table 15 shows the relation between trade gap and the Financial Secrecy Index with the log values of the exporter's income level. The exporter's income level is represented using the log values of GDP for 2007 per capita in 2000 US dollars.

Table 15: Trade gap vs FSI and GDP, regression results

	Dependent variable:							
	Trade gap							
	Art & Coll.	**Paintings**	**Antiques**	**Diamonds, Pearls & Precious stones**	**Pearls**	**Diamonds**	**Precious Stones**	**Gold**
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**
FSI	0.064***	0.059**	0.086***	0.141***	0.122***	0.166***	0.102***	0.033
	(0.019)	(0.026)	(0.025)	(0.039)	(0.030)	(0.040)	(0.032)	(0.034)
LogGDP	-0.330	-0.669*	-0.756***	-0.064	-0.510	-0.139	-0.331	-0.096
	(0.227)	(0.372)	(0.291)	(0.486)	(0.342)	(0.644)	(0.470)	(0.575)

Fixed effects	Year	Year	Year	Year	Year	Year	Year	Year
Observations	28,071	2,782	1,613	8,273	1,054	1,582	1,985	1,921
R^2	0.055	0.135	0.182	0.118	0.255	0.148	0.158	0.275
Adjusted R^2	0.054	0.124	0.164	0.115	0.231	0.129	0.143	0.262
Residual Std. Error	2.786 (df = 28036)	2.432 (df = 2747)	2.530 (df = 1578)	3.805 (df = 8238)	2.557 (df = 1019)	4.304 (df = 1547)	2.855 (df = 1950)	5.104 (df = 1886)

Note: Robust standard errors clustered by partner countries in parentheses. $*$significant at the 10 % level; $**$significant at the 5 % level; $***$significant at the 1 % level

Table 16 shows the gap in quantity against the FSI and GDP. This is to show if the trade gap comes from a gap in quantity or price.

Table 16: Quantity gap vs FSI and GDP, regression results

	Dependent variable:							
	Quantity gap							
	Art & Coll.	**Paintings**	**Antiques**	**Diamonds, Pearls & Precious stones**	**Pearls**	**Diamonds**	**Precious Stones**	**Gold**
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**
FSI	0.083**	0.042**	0.053***	0.013	0.022	0.005	-0.001	-0.010
	(0.034)	(0.018)	(0.019)	(0.019)	(0.014)	(0.015)	(0.019)	(0.025)
LogGDP2007	-0.054	-0.356	-0.474*	-0.281	-0.128	-0.284**	-0.264	0.031
	(0.533)	(0.272)	(0.260)	(0.221)	(0.182)	(0.132)	(0.247)	(0.431)
Fixed effects								
Observations	28,071	2,782	1,613	8,273	1,054	1,582	1,985	1,921
R^2	0.090	0.133	0.201	0.030	0.108	0.085	0.150	0.260
Adjusted R^2	0.089	0.122	0.184	0.026	0.078	0.065	0.135	0.247
Residual Std. Error	3.042 (df = 28036)	2.755 (df = 2747)	2.499 (df = 1578)	2.943 (df = 8238)	1.618 (df = 1019)	1.629 (df = 1547)	2.406 (df = 1950)	4.153 (df = 1886)

Note: Robust standard errors clustered by partner countries in parentheses. $*$significant at the 10 % level; $**$significant at the 5 % level; $***$significant at the 1 % level

Appendix D Additional difference-in-differences results

Table 17 shows the relation between *I(EIA)* and *I(EIA):TH* and the Financial Secrecy Index with the top and bottom 2.5 percent of the observations removed.

Table 17: Difference-in-differences - omitting bottom and top 2.5 percent

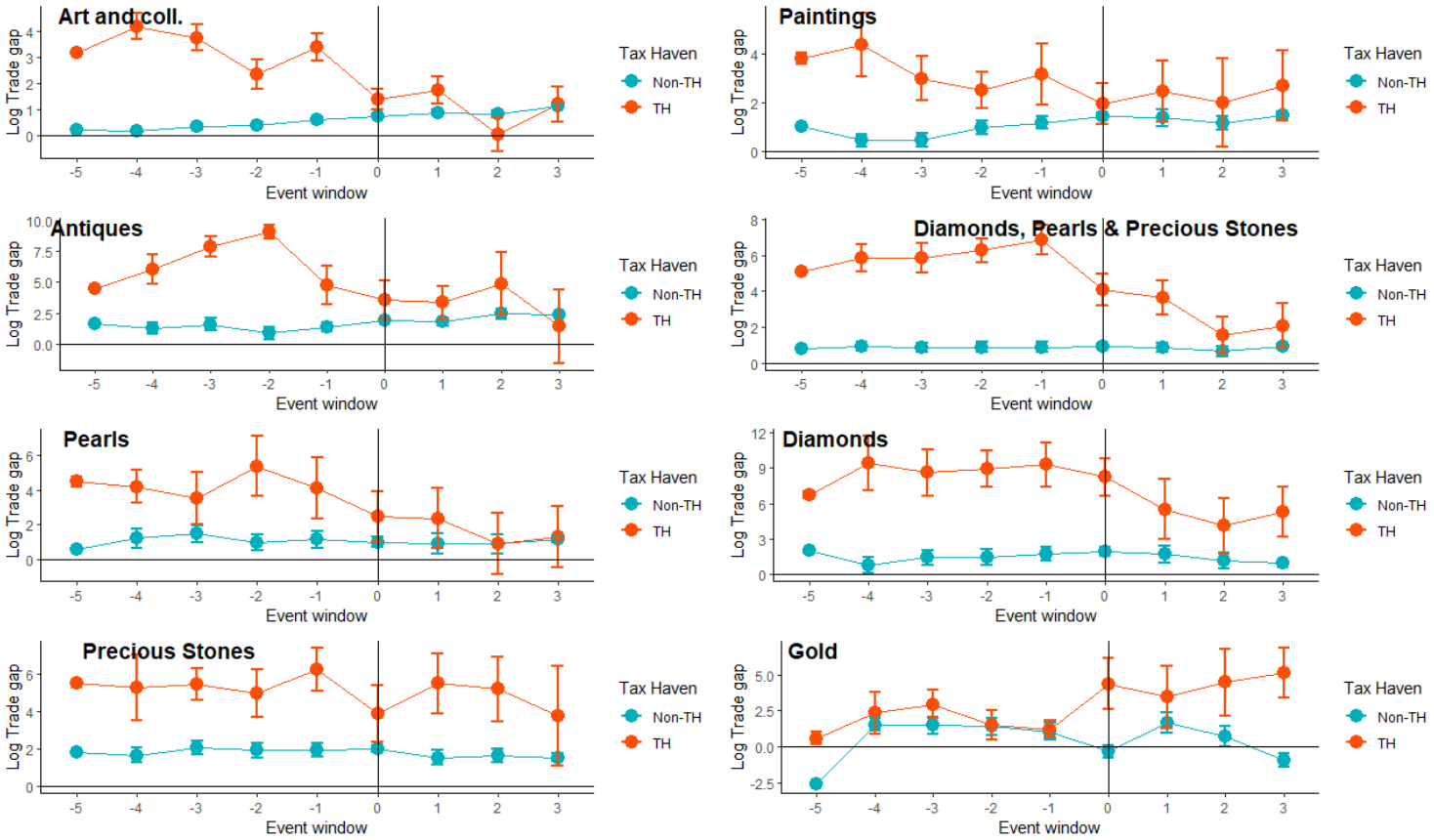
	Dependent variable:							
	Trade gap							
	Art & Coll.	**Paintings**	**Antiques**	**Diamonds, Pearls & Precious stones**	**Pearls**	**Diamonds**	**Precious Stones**	**Gold**
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**
I(EIA)	0.348**	0.290	0.280	-0.356	0.274	-2.085***	-0.431	-2.615***
	(0.133)	(0.201)	(0.341)	(0.286)	(0.342)	(0.733)	(0.535)	(0.879)
I(EIA):TH	-2.166***	-1.543**	-1.853	-1.937	-1.494	-1.097	-0.462	-1.125*
	(0.827)	(0.748)	(1.866)	(1.219)	(0.982)	(1.954)	(1.248)	(0.630)
Fixed effects	Year × Country	Year × Country	Year × Country	Year × Country	Year × Country	Year × Country	Year × Country	Year × Country
Observations	27,161	2,706	1,558	7,967	1,017	1,513	1,904	1,848
R^2	0.087	0.340	0.469	0.281	0.517	0.587	0.523	0.519
Adjusted R^2	0.082	0.299	0.419	0.267	0.456	0.546	0.486	0.483
Residual Std. Error	2.388 (df = 27001)	1.706 (df = 2547)	1.844 (df = 1424)	3.058 (df = 7820)	1.870 (df = 902)	2.842 (df = 1375)	1.930 (df = 1768)	3.760 (df = 1716)

Note: The exchange of information agreement dummy is set to check first for AEOI, then EOIR. I set 1 for the signing year, and after for AEOI first, if the country does not have AEOI agreement, it checks for EOIR. Robust standard errors clustered by partner countries in parentheses. *significant at the 10 % level; **significant at the 5 % level; ***significant at the 1 % level

Appendix E Additional event studies

Event study per product, where the log of trade gap is grouped into TH and non-TH. TH is classified as country being on two or more of the Tax Haven lists used in this thesis.

Figure 14: Event study, all products individually



In Figure 15 I do an event study of the three products used in the robustness check.

Figure 15: Event study, robustness check