



FACULTY OF LAW,
ECONOMICS AND FINANCE

Applied Master Thesis

Pressure policies and offshore
financial centers

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1 Executive Summary

The Applied Master Thesis will be divided into two main parts:

The first section contains the Internship Report, presenting the receiving Institution, which is the 'Service de Police Judiciaire' of the 'Police Lëtzebuerg', and explaining in detail the internship setting, i.e. my main responsibilities, tasks, interactions with other people and challenges encountered. In addition, the Internship Report exhibits my main achievements and it establishes a link to my Finance and Economics studies accomplished at the University of Luxembourg. The first part of the Thesis then ends with some recommendations to the employer.

The second part of the Thesis, namely the Research Section called 'Pressure policies and offshore financial centers', consists of a critical literature review of the paper 'Bank secrecy, illicit money and offshore financial centers', written by P. Picard and P. Pieretti [1]. More precisely, this paper analyses the impact of pressure policies on offshore financial centers, along with their capability to make these centers comply with anti-money laundering rules. The authors show that, if pressure policies induce an adequately high risk of reputational damage to investors, offshore banks are motivated to scrupulously monitor their investors' origins of funds. Moreover, these pressure policies can be harmful to both offshore and onshore investors and can be beneficial to both banks and tax administrations.

2 Internship Report

2.1 Abbreviations

During my internship, I encountered many abbreviations; I therefore hereinafter include a list of the most relevant ones:

AB	Anti-blanchiment
ACD	Administration des Contributions Directes
ADA	Administration des Douanes et Accises
AED	Administration de l'Enregistrement, des Domaines et de la TVA
APJ	Agent de Police Judiciaire
COMDIV	Commissaire divisionnaire
CRI	Commission Rogatoire Internationale
CTIE	Centre des Technologies de l'Information de l'Etat
ECOFIN	(Criminalité) économique et financière
EJIN	Entraide judiciaire internationale
FAME	Formation, appui et méthodologie
IEF	Infractions économiques et financières
JDA	Journal des affaires (en cours)
KYC	Know your customer
LBR	Luxembourg Business Registers
NT	Nouvelles technologies
OFC	Offshore Financial Center
OPJ	Officier de Police Judiciaire
PESAPI	Personne étant susceptible d'avoir participé à une infraction
RBE	Registre des bénéficiaires effectifs
RCS	Registre de commerce et des sociétés
SALT	Service d'appui logistique et technique
SPJ	Service de Police Judiciaire
SUPA	Support aérien
UGAO	Unité de garde et d'appui opérationnel

2.2 Internship Setting

My internship took place at the 'Police Lëtzebuerg', more precisely at the 'Service de Police Judiciaire' (SPJ), in the department of economic and financial (ECOFIN) crime, from the 1st April 2021 to the 31st July 2021.

The ECOFIN department of the SPJ is mainly based in Luxembourg-Hamm, with a small detachment for the North region located in Diekirch.

Hereinafter, I will mostly refer to information taken from [5] and [6].

2.2.1 The Institution

The 'Police Lëtzebuerg' in its current form exists since the 1st January 2000, when it has been consolidated with the 'Gendarmerie Grand-Ducale'.

The Police is under the control of the Minister for the Interior of Luxembourg, which at the moment is Mr Henri KOX.

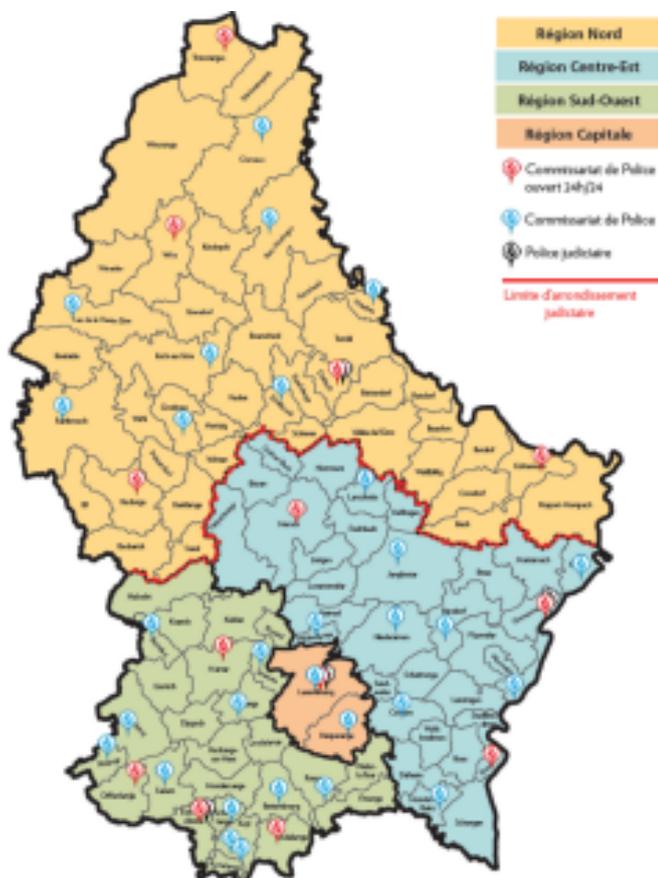
Since 2015, the head of the Police is Director-General Philippe SCHRANTZ, while Donat DONVEN is the Assistant Director-General.

The key missions of the administrative police are to ensure the country's internal security, to maintain law and order, to do border control, and to enforce all the laws. In addition, the 'Police Judiciaire' becomes active and starts its investigations when a crime has taken place. The director of the SPJ is 1er commissaire divisionnaire Steve SCHMITZ.

After a reform in 2018, the Police has been divided into the four regions of Diekirch, Esch-sur-Alzette, Grevenmacher and Luxembourg, to cover the areas of the North, South-West, Center-East and Capital, respectively.

In each of these regions, there are commissariats with three working shifts (being reachable at all times) and local commissariats with two working shifts (open from 7h to 21h). Moreover, each region disposes of a traffic police service, as well as of a special unit.

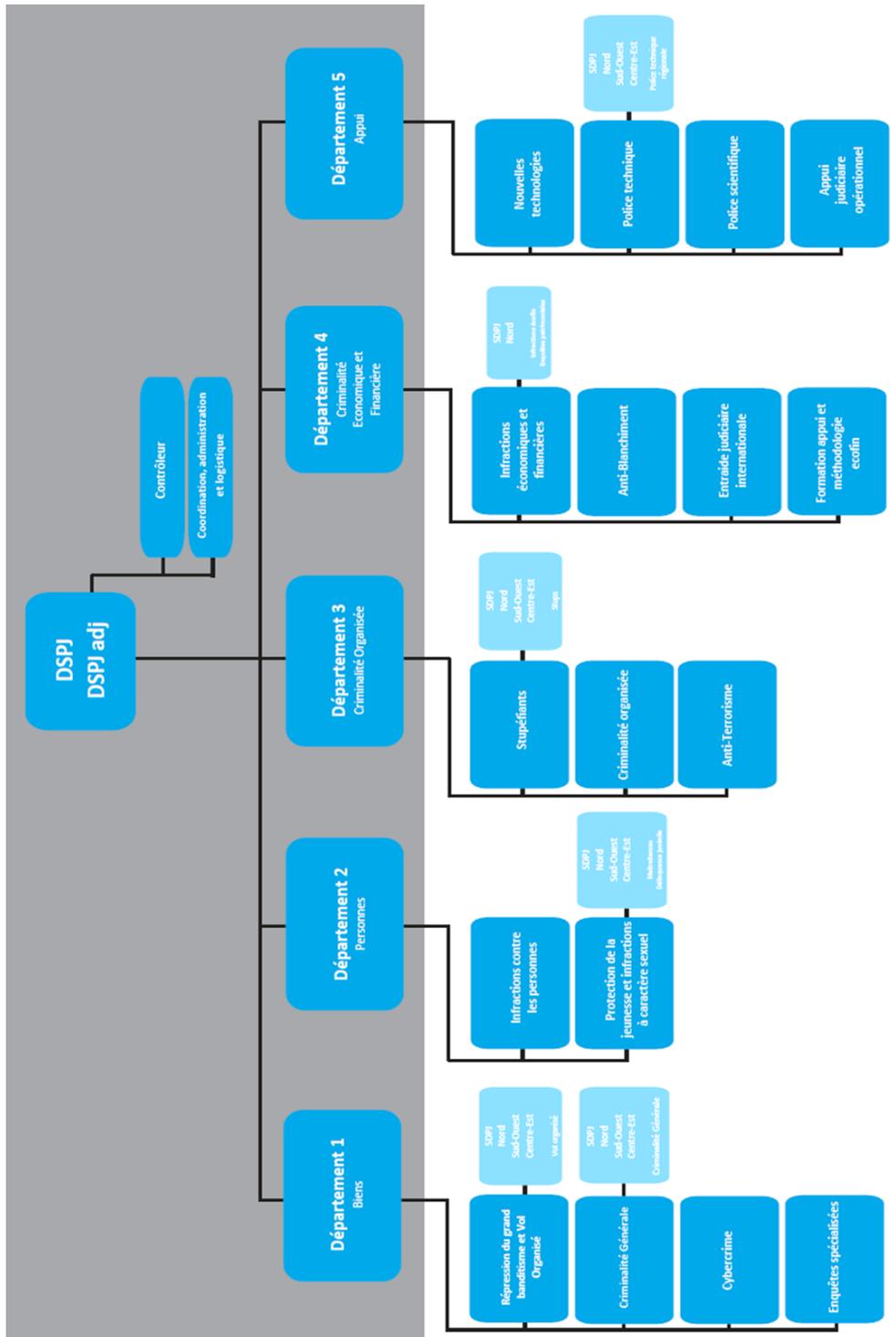
Below is a graph that visualizes the geographical organization of the Police. The red line marks the division of the country into the two 'Tribunaux d'arrondissement', namely the ones of Luxembourg and Diekirch.



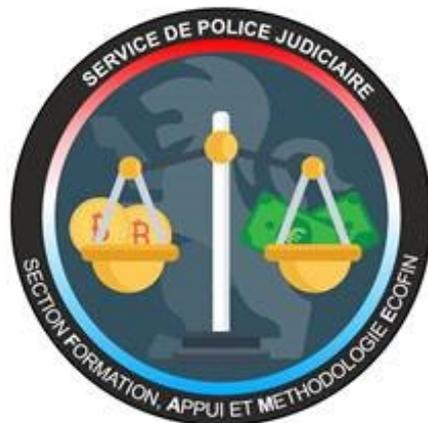
The SPJ consists of several departments:

One department is responsible for the crime against goods ('criminalité contre les biens') like cybercrime, another one is responsible for the crime against people ('criminalité contre les personnes') like juvenile delinquency, a third department is dealing with organized crime ('criminalité organisée') like drug trafficking, a fourth department is dealing with economic and financial crime ('criminalité économique et financière'), and finally there is a department for assistance, called 'appui', consisting amongst others of the new technologies section and the scientific police.

The structure of the SPJ can be illustrated by the following organisation chart:



2.2.2 The Internship



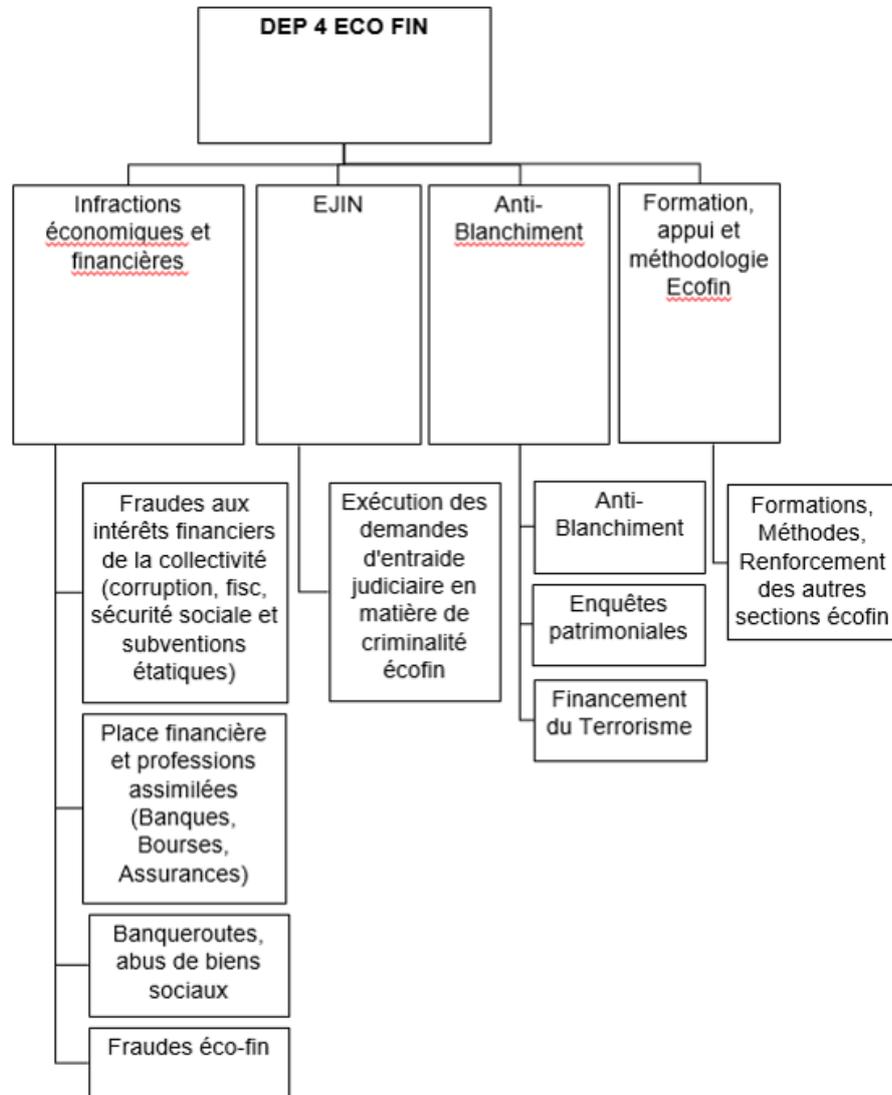
Consistent with my studies, I passed my internship in the ECOFIN department, more precisely in the section called 'Formation, appui et méthodologie' (FAME). I completed my internship together with five other students from the University of Luxembourg. The above picture shows the self-designed logo of the FAME section.

The key mission of the FAME unit is to assist the other sections of ECOFIN, by treating some of their cases and by writing the corresponding reports ('Appui'), and it is also the section receiving and training all the newly recruited personnel of the ECOFIN department ('Formation').

More generally, the role of the ECOFIN department is to detect economic and financial violations of the law and to combat money laundering and terrorist financing. The ECOFIN department is also responsible for international judicial assistance.

For these reasons, the other sections of ECOFIN are called 'anti-blanchiment' (AB), 'infractions économiques et financières' (IEF) and 'entraide judiciaire internationale' (EJIN). They were all presented to us during the first days of the internship.

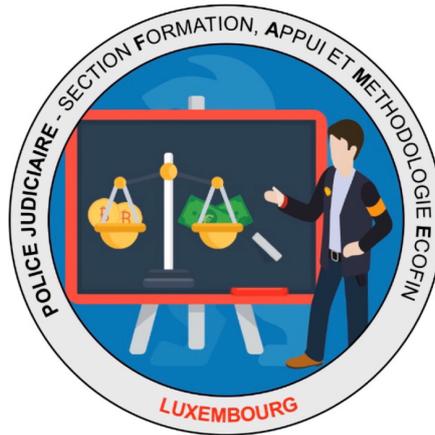
Here is an illustration of the ECOFIN department, showing each section's responsibilities:



In the first two weeks, all of us interns worked at the FAME section. Then two of us were sent to AB and IEF, respectively, while the others, myself included, stayed at FAME. We got our own compartment with four offices and a common area, where most of the presentations took place and where we enjoyed many lunchtimes together.

In what follows, I will give an overview of the training and information sessions we attended during the internship.

Training sessions



Me and the other interns had a training session about different engines, like for example the 'Centre des Technologies de l'Information de l'Etat' (CTIE), to do some research about (suspect) people. We were not given full access to these engines, but to work on the ongoing cases, other members of the department provided the necessary extracts to us.

We were also introduced to some open source intelligence tools, namely the site 'offshoreleaks' to get information about companies, 'geoportail' to check Luxembourgish addresses, or 'google reverse image search' to trace back the origins of a published picture.

Moreover, we were shown the program 'Cellebrite', which is used to extract data from a confiscated phone or computer. This program is able to restore all types of messages, phone calls, pictures, documents or locations, in order to retrace a PESAPI's activities.

After all these training sessions, I was astonished how many details the Police can find out about a specific person or company.

Presentations

The presentation of the 'Anti-laundering' (AB) section was very interesting, because this section gets assigned many diverse tasks such as house searches or interrogations. The members of the AB described it as a sort of 'front office', while the other sections of the ECOFIN department could rather be imagined as back offices. I also realized that there exist other forms of 'laundering' apart from money laundering. As an example, stealing objects and reselling them is also a way of concealing the origins of illegally obtained money, respectively objects.

We also attended a presentation about Europol and Interpol: we were explained that in many cases, it is better and easier to send a request via the Secure Information Exchange Network Application (SIENA) to Europol instead of Interpol. Indeed, the members of Europol are 'forced' to answer the request and they have more employees and a higher capital than Interpol, which in contrast is represented by almost three times more countries.

Finally, we also learned a lot from the presentation of the EJIN section. This section is responsible for nearly all of the 'Commissions Rogatoires Internationales' addressed to Luxembourg. Moreover, this section is faced most of the time with very large amounts of (illegal) money and it quite often has to deal with politicians involved in corruption.

Since there are many incoming files that need to be treated, it is important to know which cases should be handled with priority. As an example, cases where it has to be decided if someone stays imprisoned or not should be treated as soon as possible. The same goes for cases where one has to seize recorded material from video surveillance, which is often only stored for a few days, or for cases where large fraudulent bank transactions should be stopped immediately.

In the next subsections, I will explain in detail the tasks I received and accomplished during the four months of internship. Moreover, I will give information about the different house searches and questionings I participated in.

Work performed

At the start of the internship, we received a bunch of documents we could read in order to get introduced to the internal and judicial vocabulary. As already mentioned, many abbreviations are used inside the police departments. I particularly enjoyed browsing the 'homemade' Wikipedia-like internet site of the ECOFIN department, containing a lot of useful information, like for example a guide for beginner investigators or documentation about specific financial crimes.

The first 'own' task I received from a FAME member was to review and summarize the payroll accountings of a suspect person in an Excel table. I easily achieved this mission by using my previously at University acquired Excel knowledge.

Another time, I was allowed to accompany another FAME member to a bank to get seized documents, emails and bank account statements. We therefore met with a lady responsible for the seizure demands coming from the Court of Justice. I was then asked by my colleague to do a financial analysis of the different bank accounts and related credit cards in a case of bankruptcy. I did my best to establish tables and nice graphs, which were then included in the report of my FAME colleague. An extract of my contribution can be found in **annex 1**. I was proud to see that the latter seemed very satisfied with my work.

I was also asked to do a similar bank account analysis by a member of the IEF, who needed assistance with a large case with many different people, companies and bank accounts involved. For the same case, I also got the chance to analyse data extracted from a cell phone. Using the Cellebrite program, I exported data about phone calls, emails and text messages into Excel sheets in order to inspect it in detail and write a report of the findings. A part of this work can be consulted in **annex 2**. This was surely one of the most interesting tasks I received at the SPJ. Again, my colleague from the IEF seemed very pleased with the output.

Throughout the internship, I learned how to write reports, step by step, by using the same uniform template of the department. Every case gets assigned its own JDA number and we interns had access to all the ongoing cases, so that I could read through many interesting reports and get inspired to write or improve my own.

To do this, I first made some research on websites like the Luxembourg Business Registers (LBR), containing the 'Registre de commerce et des sociétés' (RCS) and the 'Registre des bénéficiaires effectifs' (RBE), or the Wayback Machine, a tool that captures ancient screenshots of websites that might have changed their content or that are not accessible anymore. I also visited dedicated websites for getting details about the origins of specific phone numbers.

In addition, we did some on-site research to verify addresses of suspect firms: we were accompanied by a police officer, checked letter boxes and talked to receptionists of large buildings to get some useful information about the targeted companies.

All in all, we could do more or less the same work as the 'real' police agents at ECOFIN, so that we got many insights into their daily work and a good impression of how it would be like to permanently work at the 'Police Judiciaire'.

During my mission in Diekirch, I collaborated on an ongoing case about a gas station owner suspected of having made 'disappear' a substantial amount of money from the cash register. I therefore searched through many seized folders to find relevant documents and to do an inventory in an Excel sheet. I also analysed some bank accounts and transactions from one account to another, in order to retrieve the 'lost' money.

For the same case, I assisted to two hearings of two accountants, who gave us explanations about the seized documents. My new supervisor then wrote a report in which the gas station owner is accused, amongst others, of money laundering and fraudulent bankruptcy. Indeed, during our research, we found out that the PESAPI probably handed over falsified cash reports to her accountants.

House searches and questionings

The first house search I could participate in was very exciting. I joined some colleagues to a lawyer's office in a case of 'banqueroute frauduleuse'. We received a pile of documents and searched for suspect bank statements, payroll accountings and other incriminating (and exculpatory) material. When our search was finished, we needed to fill out and sign a report, named 'procès-verbal de perquisition', which explains the process of the house search and which is listing all the documents that had been seized.

In fact, for each house search, one of the police agents is assigned the task of being the 'timekeeper', which means that he has to precisely write down what happened at what point in time and which people were involved. These notes are then included in the 'procès-verbal de perquisition'. Sometimes, before a house search takes place, police agents do a 'reconnaissance des lieux', where they check a specific address in advance and take pictures of the buildings or letter boxes.

During another house search, at the office of a Luxembourgish party, I was given the task to examine the target person's laptop for relevant emails and to copy them onto a USB stick, which could later on be used as evidence against some suspects.

A bit later, I could also listen to an interrogation linked to this political party investigation. Another time, I assisted to a questioning of someone suspected to be involved in a large tax fraud ('escroquerie fiscale') via offshore financial centers.

We also got the chance to join 'real' house searches, which means that some of us left in the early morning to search for expensive watches or other pieces of evidence related to a financial crime. Another time, I joined a house search for working utensils, which we were looking for in a dirty and chaotic garage.

Me and another intern were also asked by one of our supervisors to help organizing a house search. Hence, we established a Powerpoint presentation in order to share with our colleagues the most important information concerning the house search: people and companies involved, targeted locations and the material needed. We also prepared the 'procès-verbal de perquisition'. In my opinion, we did a good job as a team, since we managed to fulfill this task quickly and smoothly.

I will now present the numerous visits and interactions we had.

Visits

On the first day of the internship, we were taken for a visit of the whole police building. Amongst others, we were shown the police cars disguised as normal cars, which are used for house searches and other investigations, and which are equipped with a portable siren. However, what impressed me most during our tour were the three little drunk tanks located in the underground parking.

Another time, we went to the judicial vehicle impoundment on the Warehouse Service Agency (WSA) site, owned by the U.S. military and based in Sanem. We were bringing them some confiscated televisions, and we got a little guided tour around the car park. It was impressing to see the amount of cars, motorcycles and many other objects stored at this site. They were all seized because of their relation to a criminal action, like drug dealing, illegal importation of fake products (e.g. a truck full of cigarettes) or car crashes.

Also based in Hamm is the 'Service d'appui logistique et technique' (SALT), consisting of a petrol station shared by the Police and the customs, and next to it is located the 'armurerie', which we were also given the opportunity to visit. The Police receive, store and repair all kinds of firearms there, including some kalashnikovs that had once been seized by the customs. We were allowed to have a closer look at a revolver, a pistol and an assault rifle, which surely was an experience I will keep in mind. I was also impressed by some car doors I saw there; they contained some little holes induced by bullets.

We were also shown the laboratories of the scientific police, which is located right next to the ECOFIN building: they explained to us how they do the securing of evidence from fingerprints, shoes, from different engines used to break into buildings, and how they inspect different liquids such as blood or sperm. What I found a little frightening is that they even once took off the hands from dead bodies of unknown identity, in order to reproduce the people's fingerprints and to find out who they were.

What I also enjoyed a lot was the little excursion to the 'Lëtzebuerg City museum', where we did a guided tour of the exhibition called 'Gleef dat net...!' about different conspiracy theories. I was most impressed by the huge amount of false beliefs that exist nowadays, such as about the Coronavirus and its related vaccines.

The whole FAME department also went for a visit of the Center-East police region in Grevenmacher. We were first received by the regional director commissaire divisionnaire Arno MUNHOWEN, who first gave us a presentation about the Center-East police station, followed by a visit of the police building. It was interesting to see that this police region has its own speedboat, since they are located next to the Moselle river. Moreover, we saw again a few prison cells and some equipment used to take pictures of an arrested person. On the same day, we also went to Schengen for a brief visitation of the 'Place des Accords de Schengen'.

Me and the other interns also had the chance to attend a public hearing at the Court of Justice in Luxembourg City, more precisely at the '9e chambre criminelle du Tribunal d'arrondissement'. The case was about a robbery with violence, dating back to 2018, and the victim was an elderly woman living alone in her house. We could listen to her answering questions to the judge at the witness stand.

Afterwards, also the main suspect, who had been transported directly from prison to the dock, was asked some questions about the burglary. Moreover, the prosecutor repeated and explained in-depth the established facts related to the robbery and the findings of the investigators. Fortunately, the scientific police had managed to secure DNA traces on a Coca-Cola can the suspect had been drinking from during the burglary. In **annex 3** can be found an article about this process, published by 'Le Quotidien'.

In addition, Mr MARSON also organized a visit of the police helicopter of the 'Unité de garde et d'appui opérationnel', 'Service de support aérien' (UGAO-SUPA), located next to the airport. We were first given a Powerpoint presentation about the missions of this unit by a police agent, followed by more practical details about the helicopter itself (see picture below), given by one of their pilots.



Furthermore, we could join the canine group, which is also a part of the UGAO, to one of their weekly trainings in Kayl. Some of my colleagues volunteered to put on big protective clothing and run straight ahead for a few meters, before being caught and thrown to the floor by one of the police dogs. One of my colleagues also hid a coin with a drop of fuel in the lawn, which the police dog successfully sniffed out after a short period of time.

Finally, we also had a guided tour through the 'Policemusee' based in Verlorenkost. We could inspect old police vehicles, uniforms, documents, and many other ancient objects used by the Police and the 'Gendarmerie'.

Interactions

As far as other members of the Police are concerned, I made the acquaintance of 1er comdiv Marc KELTESCH, head of the IEF Nord in Diekirch. On that same occasion, I took part in the hearings of the accountants, together with a member of the AB section.

What I found particularly interesting in Diekirch, is that all kinds of police departments and services are located in the same building. In this way, I could also hear some interesting stories from the 'crime against people' department. Moreover, my office neighbor had a police radio, so that we could listen all day to the messages shared by the traffic police. I could therefore memorize a few words from the NATO phonetic alphabet, since the police officers use it all the time to identify cars and their respective owners.

At the end of the internship, we also had a meeting with comdiv Caroline MOULIN, director of the ECOFIN department. A responsible of the FAME department shortly presented our main achievements and we also gave her some (positive) feedback on our internship.

I was also in contact with people from outside the Police. For instance, I had my own hearings with a responsible from the 'Administration de l'Enregistrement, des Domaines et de la TVA' (AED). Another time, I questioned a member of the 'Administration des Contributions Directes' (ACD). Both were witnesses of tax fraud.

Furthermore, I got to know a few lawyers, since they accompanied some PESAPIs to their interrogations. I could also observe the work of a (Greek) translator during such an interrogation. In addition, during one of the house searches, we were accompanied by a magistrate and her clerk, and by a member of the Chamber of Lawyers.

During our tour around the Court of Justice buildings, namely the 'Tribunal d'arrondissement' and the 'Parquet d'arrondissement', we also got some interesting explanations from Mr Henri EIPPERS, spokesman of the judicial administration since 2009. He gave us some general information about the tasks of the different members of the Court and the amount of cases they have to evacuate in one year.

He also informed us that public hearings take place every day at 9h and at 15h, and that nearly all hearings are accessible to the public, except cases with children or sexual abuses involved. Moreover, we got to know that most processes in Luxembourg are related to infractions of the 'Code de la route'.

Finally, I had some conversations by email with two 'Substituts principaux' of the 'Parquet'. One of them informed me that the illicit banking activity cases I had been working on had been put 'ad acta', i.e. closed, due to a lack of evidence (and resources) to go on with the investigation. I also asked the other 'Substitut' for the permission to question an additional suspect person for one of my cases.

In the following subsections, I will elaborate on the recognition I received by different people, before enumerating some challenges encountered and some other observations made.

Recognition

Me and my intern colleagues received some recognition by email from comdiv Caroline MOULIN, after having written our first reports, which was quite motivating. In the end of the internship, during our meeting, she complimented us again in person.

As already mentioned previously, I was thanked by a few of my FAME and IEF colleagues for my contribution in their ongoing cases.

I was also praised by some of our supervisors for my reports and questions prepared for the related hearings. They also complimented me for my Luxembourgish and French writing skills.

In addition, also Mr KELTESCH seemed satisfied with my support at the IEF Nord, and he acknowledged that I am a fast learner. Hence, after a first week in Diekirch, I was asked to assist them a second time for a few days, which I gladly accepted.

Challenges

In general, I did not encounter many problems during the internship. Nevertheless, especially in the beginning, it was a little challenging to immediately do similar work as the other members of the Police. I approached this challenge by trying to 'inspire' myself from reports that already existed, in order to get an idea how to start with my own assignments.

I also often discussed little issues with the other intern working in my office, or I asked one of our supervisors for advice.

Sometimes, it was also a bit difficult to keep a good overview when I was asked to support another person with his case, since there had already been written a few reports previously and I could not know all the details about the people or companies involved.

Other observations

What I observed during the house searches, is that the reactions of the people involved were quite differing: some PESAPIs were very friendly, welcoming and willing to cooperate, whereas others, even those who were not considered as suspects, were quite impolite, and some even refused to wear a mask.

After having participated in a few questionings, I noticed that many PESAPIs turned out to be far less 'guilty' than one could have expected by simply reading the reports we received from the tax administration, for example. This was rather surprising to me. In this way, I also noticed that as a police agent, one should try to be as objective as possible, since one has a certain responsibility concerning the accused people's convictions.

I must also admit that previously, I had a different image in mind concerning lawyers and members of the Court. I was surprised to meet so many young jurists. I also learned that, since the members of the Court of Justice have a lot of work to do, they need to analyse and select very carefully which cases should be treated and which ones should rather be put 'ad acta'.

Finally, it was nice to meet many new people, to work together and exchange ideas with the other Master students and to enlarge my professional network.

2.3 Achievements and contribution

The key achievements during my internship were to write four reports by myself, whereof two about illicit banking activities, where dubious internet sites were offering investment services and pretended to be established in Luxembourg. One of these reports is joined in **annex 4**.

Another report I wrote was about value-added tax fraud, where a person tried to escape from paying a large amount of taxes, by not correctly declaring all of his sales and by falsifying statements of account. In addition, a client of this person used these fake invoices to withdraw cash from the bank.

I also worked on another similar case, where a restaurant owner was suspected of having committed a tax fraud of about half a million euros. However, in the end, it turned out that it was rather a problem related to the electronic cash register. Indeed, with each mistaken entry, a number was skipped, so that altogether it appeared as if someone had deleted many entries to avoid paying taxes on these sales.

In addition, as already mentioned previously, I collaborated with some of my colleagues on their ongoing cases.

In the beginning of the internship, I took the initiative to ask my supervisor if I could take part in an interrogation of a PESAPI, in the presence of his lawyer, since I was very curious to know how the process of such a questioning looks like.

Later on, I also sent convocations for hearings to witnesses of financial crimes and summonings to suspects for interrogations, for the cases I was working on myself. Moreover, I prepared the questions we intended to ask to the invited people.

What I would consider as a more extraordinary initiative, is that, as already mentioned previously, I voluntarily moved to the IEF/AB section of the SPJ Nord in Diekirch for about three weeks, which was a nice experience for me as well.

I believe that I could also contribute with my mathematical background, as most of the FAME members have a legal education and hence not so much experience with dealing with numbers or graphs in Excel.

In addition, especially during the house searches and the hearings, I took advantage of my language and grammar skills to rigorously correct typos in the reports written by my colleagues. During a hearing of a witness from the ACD, I was even allowed to type the answers by myself.

2.4 Learning and link to the MSc in Finance and Economics

I surely learned a lot on the activity of the Police, and I also gained some insights on the wider world of banking and finance during the four months of internship.

As an example, we had an instructive lesson about cryptocurrencies. Indeed, crime involving cryptocurrency has increased a lot since 2019. Nowadays, there exist already more than 9000 different cryptocurrencies, the most famous ones being Bitcoin, Ethereum and Litecoin. We were also explained the notions of Distributed Ledger Technology and Blockchain Technology. We learned that there is a unique private key associated with a public address of a cryptocurrency account.

Astonishingly, there are ATM's which allow to withdraw cash from a Bitcoin account, or vice versa, to deposit (dirty) cash on a Bitcoin account. As of today, no such machine exists in Luxembourg, but the ECOFIN members are closely keeping an eye on it, because this seems to be a new and easy way for criminals to launder their money. There even exist so-called 'cryptomixers', allowing the customers to make their transactions untraceable, which also makes the financial crime investigators' lives harder.

We also had a workshop where we were explained how to seize emails when doing a house search. We learned that it is possible to extract a lot of useful information from one single email, like for example the IP address, to locate where a fraudulent message had been sent from.

It is however more complicated when the suspect person does not use an application like Outlook or Thunderbird, but rather checks his mailbox directly on the internet (e.g. gmail.com). In this case, the Luxembourgish Police is not really allowed to retrieve those emails, as they do not physically belong to the address where the house search takes place. There have already been some ongoing discussions about cross-border access to electronic evidence to resolve this problem.

Towards the end of the internship, we also had an insightful presentation called 'Is Truth Becoming a Casualty of Technology?', as a link-up to our visit of the conspiracy theories exhibition.

Some of my chosen courses of the Master of Science in Finance and Economics were particularly relevant to the internship, namely (Advanced) Microeconomics of Banking and Public Economics. Indeed, in Public Economics, I had already written an essay about the impact of police and terrorism on crime. On the other hand, the courses of Microeconomics of Banking helped me to get a deeper insight into the functioning of banks and other financial institutions.

In addition, skills like manipulating pivot tables or creating nice graphs and tables, acquired during Master courses like Portfolio Theory, were brought to bear during the internship. I also learned some new 'tricks' in Excel during my work experience, like adding filters, which made some tasks easier and faster.

Moreover, I did not have much accounting experience beforehand, but I could gain some knowledge in that field, mostly by verifying cash books or tax declarations of PESAPIs.

Furthermore, I learned some new shortcuts on the keyboard and I could also improve my writing and presentation skills (using Word and Powerpoint). I believe that I also improved my language skills, since most documents and reports were written in French and I encountered quite a lot of new terms. I could also enrich my English vocabulary, since I had to translate everything from French to English to write this Thesis.

I should also mention that it was very instructive to be able to work on an ongoing case from the beginning until the end, i.e. doing research, writing reports, listen to interrogations, and participate in house searches.

Furthermore, I gained many insights on how questionings work in practice and how police agents should fulfill the task of asking questions and writing down the suspect's answers. Indeed, this task is a little challenging, since most of the times, the answers are given in Luxembourgish, while the 'procès-verbal d'interrogatoire' needs to be filled out in French.

Before the internship, I did not have any knowledge at all about justice, but at the Police I gained a few insights, learned some new vocabulary, read some articles of the 'Code pénal' and the 'Code de procédure pénale', and I got to know the different entities of the Court of Justice of Luxembourg.

I also learned that in order to be punished for a crime, there always needs to be an 'élément légal', an 'élément moral' and an 'élément matériel', which means that the offence has to be forbidden by law, the PESAPI needs to have been aware of the crime he was committing and there must be visible evidence for that offence, respectively. Moreover, there is also a difference between a crime, a 'délit' and a 'contravention'.

Finally, I got to know the different grades a police officer can get and I learned the difference between an 'Officier de Police Judiciaire' (OPJ) and an 'Agent de Police Judiciaire' (APJ). Indeed, one can only become an OPJ after two years of working at the Police and one needs to pass a few exams. In the beginning, every new member is named as APJ. For house searches and questionings, there always needs to be at least one OPJ present to comply with the police regulations.

2.5 Recommendations to the Employer

First, it should be mentioned that the start of the internship was easy and smooth. For instance, our badges, email addresses and computers were functioning well from the beginning, which facilitated our acclimatization in the working environment.

Second, Mr MARSON, as well as many other members of the department, were always available for our questions and willing to help us, so that little problems could quickly be resolved. We also had a 'Signal' group chat to make communication easier.

Moreover, the atmosphere was always very positive, among us interns, but also with the other ECOFIN colleagues. In addition, our supervisors did not put us under too much pressure and they took with humor the little mistakes we did concerning our work. I also liked to join the weekly social afterwork meetings of the FAME section.

From the first day on, I enjoyed my internship experience a lot, especially because we could always work on-site despite the Covid pandemic. I also appreciated that Mr MARSON organized many different visits and presentations, for us interns and for the whole FAME department.

Moreover, it was great to be allowed to participate in house searches and questionings. It should also be mentioned that our security and well-being were always assured, and it was never boring because we were given many diverse tasks.

Nevertheless, I must say that since we interns were working in our own compartment, my colleagues sometimes got quite noisy, so that I felt distracted and could not focus well on my own work.

To conclude, I believe that there is not really anything that needs to be improved from the side of the employer. The whole internship ran very smoothly, and I would absolutely recommend to other interested students to do an internship in the ECOFIN department of the Police Judiciaire.

The main reason why I wanted to do the internship at the SPJ was to see if I enjoy this job as much as I had always imagined. And indeed, it was a great experience, and I am now definitely interested to permanently work in the ECOFIN department.

3 Pressure policies and offshore financial centers

In this section, I will do a short literature review of the paper 'Bank secrecy, illicit money and offshore financial centers' [1], written by Prof. Picard and Prof. Pieretti. I chose this paper because combatting money laundering and tax fraud is an important topic linked to my internship experience.

In order to better explain this paper, I include some information from [2].

3.1 Introduction

The analysed paper is dealing a lot with 'offshore financial centers' (OFCs). The word 'offshore' indicates something based abroad, outside a country's border. This term is generally used to characterize foreign banks, trusts, corporations, investments and deposits.

OFCs can be described as jurisdictions that provide a large amount of financial services to non-resident clients. Some main characteristics of OFCs are: low taxes on business or investment income, no withholding taxes, a light and flexible incorporation and licensing regime, no need for financial institutions to have a physical presence, a very high level of client confidentiality based on impenetrable secrecy laws, and finally the unavailability of similar incentives to residents.

It should be noticed that many countries, such as Luxembourg, are considered as OFCs. Indeed, it is well-known that Luxembourg has the image of a tax haven, because there is not a lot of financial control and taxes are rather low compared to other countries. Other examples of OFCs are Switzerland, Bermuda and the Cayman Islands, Mauritius, Dublin and Belize. The degree of regulatory standards and transparency however varies a lot among the different OFCs.

On the one hand, offshore countries may attract companies who want to profit from the above mentioned relaxed regulations, all in compliance with the law. On the other hand however, OFCs are also often misused, namely for tax fraud and money laundering. Money laundering is defined by the IMF (2004) [3] as '*a process in which assets obtained or generated by criminal activity are moved or concealed to obscure their link with the crime.*' This is why many criminal investigations are dedicated to offshore jurisdictions.

Another problem is that some offshore jurisdictions grant redundant secrecy for their corporate vehicles, especially for shell companies. Corporate vehicles are defined as legal entities through which many kinds of commercial activities are managed and assets are held. They are fundamental for the global economic system, but may also be misused for money laundering, corruption or tax fraud.

Shell companies are usually formed in a tax haven or secrecy jurisdiction, where they have no physical presence. They have no economic activity and their main purpose is to screen the beneficial owners from taxes. In order to facilitate money laundering, shell companies might also be used to establish false invoices or fictitious commission payments. Criminals often take advantage of a whole network of shell companies to obscure the beneficial ownership of illicit assets, making the investigation of such companies time-consuming and complicated.

Nevertheless, some offshore jurisdictions have established advanced systems to obtain information on beneficial ownership, and they put effort into enforcing their regulatory, supervisory and legal regimes to be able to confine the illegal use of corporate vehicles.

The ability of international entities to address these problems is however restricted by sovereignty and democratic independence of the OFCs, and the bank secrecy of OFCs makes it even more difficult to intervene.

It is indeed commonly acknowledged that money laundering and bank secrecy are closely related and that the only solution to reduce financial crime is to undermine these confidentiality laws. Fitzgerald (2004) [4] believes that compliance with international standards must be enforced especially on financial intermediaries, but there is no direct possibility to sanction actors of the private sector.

The authors of the paper adopt the view that anti-money laundering rules can only be successfully implemented if there are enough incentives to comply with these practices. They examine financial intermediaries' inducement to introduce 'know your customer' (KYC) standards in order to detect suspicious money transfers.

The possible reputational damage for banks that adopt a noncompliant attitude towards anti-money laundering rules is crucial for examining OFCs' decisions in complying with such regulations. The authors want to find out whether a loss of reputation can motivate banks to respond appropriately, and whether compliance can arise despite the existence of bank secrecy.

This is why the authors build a model that endogenizes the strategic decision of an OFC between negligent and rigorous behavior towards tracking the origins of investors' funds. They therefore suppose that bank secrecy does not only enable illegal transactions, but also legal financial services linked with tax benefits. Ordinary investors are expected to pursue the most favorable investment return while feeling some reluctance concerning the OFC. Criminal investors are assumed to misuse the offshore banks' secrecy rules to launder illegally gained money.

One of the main objectives of the paper is to distinguish the winners from the losers under pressure policies. Another goal is to determine the conditions under which OFCs are willing to comply with the rigorous monitoring of their investors. The authors also want to study the impact of financial integration on banks' compliance and on money laundering.

Since the Research Section has to be kept short, I will not analyse the whole paper, but explain in detail the suggested model and show how to determine the equilibrium deposit supplies and interest and tax rates for both the cases where the OFC complies and does not comply with the rigorous control of investors. Finally, I will analyse the pressure threshold above which the OFC accepts to monitor and I will expose some of the main findings of the paper.

3.2 Description of the model

The authors build a model consisting of two countries, two financial centers and with two types of investors. They denote the onshore institutions by H for 'home', and the offshore ones by F for 'foreign'. The set-up is the following: first, national or international institutions are putting pressure on the offshore bank. Then, the OFC chooses whether to control its investors' deposits or not. Moreover, both types of financial centers and governments fix together their interest and tax rates on deposits. After that, investors determine a bank for their cash deposits. Finally, the banks reward the investors, while the latter pay taxes on their earned interests.

Each kind of financial center gathers funds from investors and offers a risk-free interest rate r_i . These funds are invested into risk-free assets, yielding a given rate of return r and hence a profit to the financial centers on the intermediation margin $r - r_i$. Here a sparsely populated OFC faces a domestic financial center to attract investors based in the domestic territory. Indeed, OFCs propose intermediation services mostly to investors in large foreign countries.

As opposed to the onshore jurisdiction, the offshore jurisdiction maintains rigid bank secrecy, implying that it is more exposed to money laundering than other marketplaces. It should be noticed that the authors use a model of imperfect competition, namely an international duopoly competing in offered interest rates.

Since the banks are supposed to meticulously control their investors, they manage to detect the criminal identity and money origin of investors at a cost c that is proportional to the amount of monitored deposits. The onshore financial center is forced to monitor investors, while the OFC can only be encouraged to control investors by onshore governments or international institutions. The OFC therefore has a supplementary decision variable, $s \in \{m, o\}$, where $s = m$ indicates the assiduous monitoring of its funds' origins and $s = o$ denotes a lax attitude on this matter.

All investors live in the home country H and are equipped with one unit of wealth that they deposit in the most profitable financial center. It is supposed that the onshore economy has S investors while the OFC has no local investors. Moreover, investors are divided into ordinary and criminal customers.

On the one side, there are $(1 - \mu)S$ ($4/5 < \mu < 1$) criminal investors, who solely choose the offshore bank when it does not carefully control money transfers. In this case, the social cost of their criminal behavior equals $\beta(1 - \mu)S$, where β denotes the social cost of one dollar invested illegally. This means that the social benefit increases when money laundering in the OFC is eliminated. In other words, the social cost disappears when the OFC controls its investors.

On the other side, μS ordinary customers invest their money legally in the onshore bank, and thus prefer the financial center with the highest net rate of return. They also feel reluctant to move and invest their assets abroad. For this reason, the reluctance of an investor based at $x \in [0, 1]$ equals the distance x to the OFC's characteristics, multiplied by a constant unit cost k , where k measures the degree of international financial integration. Indeed, technological progress that supports global integration and makes the access to foreign financial centers easier tends to reduce transaction and information costs.

As opposed to investing in the home country, offshoring money forces investors to pay a premium that increases with the loss of reputation of the destination jurisdiction in which they deposit.

Furthermore, the parameter a denotes the disadvantage that an 'innocent' investor gets by offshoring his money in a financial center that does not carefully monitor the origins of funds. This is why a is called the 'investor's reputational harm'.

The authors define the following utility function of an investor based at x who pays into the jurisdiction $i = H, F$:

$$U_i^s(x) = \begin{cases} r_H - t_H & \text{if } i = H \text{ and } s \in \{m, o\} \\ r_F - t_F - k \cdot x & \text{if } i = F \text{ and } s = m \\ r_F - t_F - k \cdot x - a & \text{if } i = F \text{ and } s = o. \end{cases}$$

The investor's first possibility is to invest in the domestic bank, get the return r_H and pay the tax t_H per unit of deposit. As an alternative, he can deposit in the OFC, get the return r_F and pay the tax t_F , but incur a utility loss $k \cdot x$ that depends on the investor's reluctance to deposit in the OFC. Third, when the OFC has a lax attitude, it is put under pressure by international entities, so that its investors are stigmatized and incur a reputational damage a .

In this paper, a is an endogenous parameter that depends on the pressure exerted by (inter)national institutions. While OFCs can be put under pressure by being blacklisted, ordinary investors can be pressurized by being informed about the risks of investing offshore and by pursuing offshore investors.

3.3 Equilibrium solutions

3.3.1 Compliant offshore financial center

In this case, each financial center complies with the rigorous control of investments, so that $s = m$. Only non-criminal clients, who do not incur any disadvantage from being related to an offshore bank, are providing deposits.

By considering the marginal (ordinary) investor x_F who is indifferent between both kinds of institutions, one can derive the portion of ordinary investors depositing their money in the OFC.

In mathematical terms, this writes as follows :

$$\begin{aligned} r_H - t_H &= r_F - t_F - k \cdot x_F \\ \Rightarrow x_F &= \frac{1}{k}(r_F - r_H - t_F + t_H) \end{aligned}$$

and

$$x_H = 1 - x_F = 1 - \frac{1}{k}(r_F - r_H - t_F + t_H).$$

Moreover, the deposit supply functions are given by $D_i = \mu x_i S$ for $i = H, F$, since the share of ordinary investors is equal to μS .

Both types of policy-makers choose the interest rates that maximize their profits, by taking as given the tax rates and the other country's interest rate. Hence, $\max_{r_i} \Pi_i = (r - r_i - c)D_i = \mu(r - r_i - c)x_i S$, where c is the monitoring cost.

In addition, each financial center i individually sets its tax rate t_i that maximizes its total tax proceed T_i , taking the rival's tax rate as given. It follows that $\max_{t_i} T_i = t_i D_i = t_i x_i \mu S$.

Taking the first order conditions, one can derive the best responses of financial centers and governments.

Let us first rewrite the profit function :

$$\begin{aligned}\Pi_H &= \mu(r - r_H - c)x_H S \\ &= \mu(r - r_H - c)(1 - x_F)S \\ &= \mu(r - r_H - c) \left[1 - \frac{1}{k}(r_F - r_H - t_F + t_H) \right] S.\end{aligned}$$

Taking the first partial derivative with respect to r_H and setting it to 0 :

$$\begin{aligned}\frac{\partial \Pi_H}{\partial r_H} = 0 &\Rightarrow \frac{\partial}{\partial r_H}(r - r_H - c) \left[1 - \frac{1}{k}(r_F - r_H - t_F + t_H) \right] = 0 \\ &\Rightarrow - \left[1 - \frac{1}{k}(r_F - r_H - t_F + t_H) \right] + (r - r_H - c) \frac{1}{k} = 0 \\ &\Rightarrow -k + r_F - r_H - t_F + t_H + r - r_H - c = 0 \\ &\Rightarrow \tilde{r}_H = \frac{1}{2}(r - c - k + t_H + r_F - t_F).\end{aligned}$$

In a similar way :

$$\begin{aligned}\Pi_F &= \mu(r - r_F - c)x_F S \\ &= \mu(r - r_F - c) \frac{1}{k}(r_F - r_H - t_F + t_H)S\end{aligned}$$

and

$$\begin{aligned}\frac{\partial \Pi_F}{\partial r_F} = 0 &\Rightarrow \frac{\partial}{\partial r_F}(r - r_F - c)(r_F - r_H - t_F + t_H) = 0 \\ &\Rightarrow -(r_F - r_H - t_F + t_H) + (r - r_F - c) = 0 \\ &\Rightarrow -2r_F + r_H + t_F - t_H + r - c = 0 \\ &\Rightarrow \tilde{r}_F = \frac{1}{2}(r - c + r_H - t_H + t_F).\end{aligned}$$

Rewriting the total tax proceed yields :

$$\begin{aligned} T_H &= t_H x_H \mu S \\ &= t_H \left[1 - \frac{1}{k}(r_F - r_H - t_F + t_H) \right] \mu S. \end{aligned}$$

Taking the first partial derivative with respect to t_H and setting it to 0 :

$$\begin{aligned} \frac{\partial T_H}{\partial t_H} = 0 &\Rightarrow \frac{\partial}{\partial t_H} t_H \left[1 - \frac{1}{k}(r_F - r_H - t_F + t_H) \right] = 0 \\ &\Rightarrow 1 - \frac{1}{k}(r_F - r_H - t_F + t_H) + t_H \left(-\frac{1}{k}\right) = 0 \\ &\Rightarrow k - (r_F - r_H - t_F + t_H) - t_H = 0 \\ &\Rightarrow k - r_F + r_H + t_F - 2t_H = 0 \\ &\Rightarrow \tilde{t}_H = \frac{1}{2}(k + r_H - r_F + t_F). \end{aligned}$$

Similarly :

$$\begin{aligned} T_F &= t_F x_F \mu S \\ &= t_F \frac{1}{k}(r_F - r_H - t_F + t_H) \mu S \end{aligned}$$

and

$$\begin{aligned} \frac{\partial T_F}{\partial t_F} = 0 &\Rightarrow \frac{\partial}{\partial t_F} t_F (r_F - r_H - t_F + t_H) = 0 \\ &\Rightarrow (r_F - r_H - t_F + t_H) - t_F = 0 \\ &\Rightarrow -2t_F + r_F - r_H + t_H = 0 \\ &\Rightarrow \tilde{t}_F = \frac{1}{2}(t_H - r_H + r_F). \end{aligned}$$

Solving the system formed by the four equations in the four unknowns r_H, r_F, t_H, t_F :

$$\begin{cases} r_H = \frac{1}{2}(r - c - k + t_H + r_F - t_F) \\ r_F = \frac{1}{2}(r - c + r_H - t_H + t_F) \\ t_H = \frac{1}{2}(k + r_H - r_F + t_F) \\ t_F = \frac{1}{2}(t_H - r_H + r_F), \end{cases}$$

for example by using an advanced calculator, yields the equilibrium interest and tax rates :

$$\Rightarrow \begin{cases} r_H^m = r - c - \frac{3}{5}k \\ r_F^m = r - c - \frac{2}{5}k \\ t_H^m = \frac{3}{5}k \\ t_F^m = \frac{2}{5}k. \end{cases}$$

One can see that the onshore financial center always selects higher tax rates than the OFC ($t_H^m > t_F^m$). Moreover, the fact that $r_H^m < r_F^m$ shows that the onshore country profits from the investors' reluctance to make deposits out of the country and therefore fixes a lower interest rate than the OFC.

As the marginal offshore investor is given by :

$$\begin{aligned} x_F^m &= \frac{1}{k}(r_F^m - r_H^m - t_F^m + t_H^m) \\ &= \frac{1}{k} \left[r - c - \frac{2}{5}k - \left(r - c - \frac{3}{5}k \right) - \frac{2}{5}k + \frac{3}{5}k \right] \\ &= \frac{1}{k} \left(\frac{2}{5}k \right) = \frac{2}{5}, \end{aligned}$$

the equilibrium supplies write as :

$$D_H^m = \mu x_H^m S = \mu(1 - x_F^m)S = \frac{3}{5}\mu S \text{ and } D_F^m = \mu x_F^m S = \frac{2}{5}\mu S.$$

Finally, the banks' profits and tax proceeds are equal to :

$$\Pi_i^m = (r - r_i^m - c)D_i^m = t_i^m D_i^m = T_i^m,$$

since $r - r_i^m - c = t_i^m$ for $i = H, T$.

Moreover, we have the following result :

$$\begin{aligned} \frac{t_i^m}{k} &= \frac{D_i^m}{\mu S} \text{ for } i = H, T \\ \Leftrightarrow t_i^m D_i^m &= \frac{k}{\mu S} (D_i^m)^2, \end{aligned}$$

so that :

$$\Pi_i^m = T_i^m = \frac{k}{\mu S} (D_i^m)^2 \text{ for } i = H, T.$$

3.3.2 Noncompliant offshore financial center

In this case, the OFC shows a lax behavior towards monitoring investments, so that $s = o$. Since investors are pressurized, they incur a reputational loss a . When the OFC behaves in a negligent way, criminal clients take advantage of this fact to launder their money in the OFC.

By considering the marginal (ordinary) investor x_F who is indifferent between both types of institutions, one can derive the portions of legal money invested in each financial center.

Mathematically, this can be written as :

$$\begin{aligned} r_H - t_H &= r_F - t_F - k \cdot x_F - a \\ \Rightarrow x_F &= \frac{1}{k}(r_F - r_H - t_F + t_H - a) \end{aligned}$$

and

$$x_H = 1 - x_F = 1 - \frac{1}{k}(r_F - r_H - t_F + t_H - a).$$

In addition, the deposit supply functions are equal to $D_H = \mu x_H S$ and $D_F = \mu x_F S + (1 - \mu)S = (\mu x_F + 1 - \mu)S$, as there are $(1 - \mu)S$ criminal investors.

Each policy-maker determines the interest rate that maximize his own profit, by taking as given the other country's rate. When the OFC is negligent, it is not able to distinguish criminal from ordinary clients, because it does not check the investors' identity and the origin of their funds.

It follows that $\max_{r_H} \Pi_H = (r - r_H - c)D_H = \mu(r - r_H - c)x_H S$ and $\max_{r_F} \Pi_F = (r - r_F)D_F = (r - r_F)(\mu x_F + 1 - \mu)S$. Again, each financial center i selects its tax rate t_i by maximizing its total tax proceed $T_i = t_i D_i$ ($i = H, F$) and by taking the rival's tax rate as given.

Taking the first order conditions, one can derive the best responses of financial centers and governments :

$$\begin{aligned}
\Pi_H &= \mu(r - r_H - c)x_H S \\
&= \mu(r - r_H - c)(1 - x_F)S \\
&= \mu(r - r_H - c) \left[1 - \frac{1}{k}(r_F - r_H - t_F + t_H - a) \right] S.
\end{aligned}$$

Taking the first partial derivative with respect to r_H and setting it to 0 :

$$\begin{aligned}
\frac{\partial \Pi_H}{\partial r_H} = 0 &\Rightarrow \frac{\partial}{\partial r_H}(r - r_H - c) \left[1 - \frac{1}{k}(r_F - r_H - t_F + t_H - a) \right] = 0 \\
&\Rightarrow - \left[1 - \frac{1}{k}(r_F - r_H - t_F + t_H - a) \right] + (r - r_H - c) \frac{1}{k} = 0 \\
&\Rightarrow -k + r_F - r_H - t_F + t_H - a + r - r_H - c = 0 \\
&\Rightarrow \tilde{r}_H = \frac{1}{2}(r - c - k - a + t_H + r_F - t_F).
\end{aligned}$$

Similarly :

$$\begin{aligned}
\Pi_F &= (r - r_F)(\mu x_F + 1 - \mu)S \\
&= (r - r_F) \left[\mu \frac{1}{k}(r_F - r_H - t_F + t_H - a) + 1 - \mu \right] S
\end{aligned}$$

and

$$\begin{aligned}
\frac{\partial \Pi_F}{\partial r_F} = 0 &\Rightarrow \frac{\partial}{\partial r_F}(r - r_F) \left[\mu \frac{1}{k}(r_F - r_H - t_F + t_H - a) + 1 - \mu \right] = 0 \\
&\Rightarrow - \left[\mu \frac{1}{k}(r_F - r_H - t_F + t_H - a) + 1 - \mu \right] + (r - r_F) \frac{\mu}{k} = 0 \\
&\Rightarrow - \left(r_F - r_H - t_F + t_H - a + \frac{1 - \mu}{\mu} k \right) + r - r_F = 0 \\
&\Rightarrow -2r_F + r_H + t_F - t_H + a - k\nu + r = 0 \\
&\Rightarrow \tilde{r}_F = \frac{1}{2}(r + a - k\nu + r_H - t_H + t_F).
\end{aligned}$$

Rewriting the total tax proceed yields :

$$\begin{aligned} T_H &= t_H x_H \mu S \\ &= t_H \left[1 - \frac{1}{k}(r_F - r_H - t_F + t_H - a) \right] \mu S. \end{aligned}$$

Taking the first partial derivative with respect to t_H and setting it to 0 :

$$\begin{aligned} \frac{\partial T_H}{\partial t_H} = 0 &\Rightarrow \frac{\partial}{\partial t_H} t_H \left[1 - \frac{1}{k}(r_F - r_H - t_F + t_H - a) \right] = 0 \\ &\Rightarrow 1 - \frac{1}{k}(r_F - r_H - t_F + t_H - a) + t_H \left(-\frac{1}{k}\right) = 0 \\ &\Rightarrow k - (r_F - r_H - t_F + t_H - a) - t_H = 0 \\ &\Rightarrow -2t_H + k - r_F + r_H + t_F + a = 0 \\ &\Rightarrow \tilde{t}_H = \frac{1}{2}(k + a + r_H - r_F + t_F). \end{aligned}$$

In a similar way :

$$\begin{aligned} T_F &= t_F(\mu x_F + 1 - \mu)S \\ &= t_F \left[\mu \frac{1}{k}(r_F - r_H - t_F + t_H - a) + 1 - \mu \right] S. \end{aligned}$$

and

$$\begin{aligned} \frac{\partial T_F}{\partial t_F} = 0 &\Rightarrow \frac{\partial}{\partial t_F} t_F \left[\mu \frac{1}{k}(r_F - r_H - t_F + t_H - a) + 1 - \mu \right] = 0 \\ &\Rightarrow \left[\mu \frac{1}{k}(r_F - r_H - t_F + t_H - a) + 1 - \mu \right] + t_F \left(-\frac{\mu}{k}\right) = 0 \\ &\Rightarrow r_F - r_H - t_F + t_H - a + \frac{1 - \mu}{\mu} k - t_F = 0 \\ &\Rightarrow -2t_F + r_F - r_H + t_H - a + k\nu = 0 \\ &\Rightarrow \tilde{t}_F = \frac{1}{2}(-a + k\nu + t_H - r_H + r_F). \end{aligned}$$

The interest and tax rates in this Nash equilibrium are derived by solving the system formed by the four equations in the four unknowns r_H, r_F, t_H and t_F :

$$\begin{cases} r_H = \frac{1}{2}(r - c - k - a + t_H + r_F - t_F) \\ r_F = \frac{1}{2}(r + a - k\nu + r_H - t_H + t_F) \\ t_H = \frac{1}{2}(k + a + r_H - r_F + t_F) \\ t_F = \frac{1}{2}(-a + k\nu + t_H - r_H + r_F) \end{cases}$$

$$\Rightarrow \begin{cases} r_H^o = r - c - \frac{1}{5}(3k + 2k\nu + a - c) \\ r_F^o = r - \frac{1}{5}(2k + 3k\nu + c - a) \\ t_H^o = \frac{1}{5}(3k + 2k\nu + a - c) \\ t_F^o = \frac{1}{5}(2k + 3k\nu + c - a). \end{cases}$$

Since it is assumed that $4/5 < \mu < 1$, we have $0 < \nu \equiv \frac{1-\mu}{\mu} = \frac{1}{\mu} - 1 < \frac{1}{4}$. Indeed, ν denotes the relative share of criminal investors (versus ordinary ones).

At this equilibrium, the marginal offshore investor is given by :

$$\begin{aligned} x_F^o &= \frac{1}{k}(r_F^o - r_H^o - t_F^o + t_H^o - a) \\ &= \frac{1}{k} \left[r - \frac{1}{5}(2k + 3k\nu + c - a) - \left(r - c - \frac{1}{5}(3k + 2k\nu + a - c) \right) \right. \\ &\quad \left. - \frac{1}{5}(2k + 3k\nu + c - a) + \frac{1}{5}(3k + 2k\nu + a - c) - a \right] \\ &= \frac{1}{k} \left(\frac{2}{5}k - \frac{2}{5}k\nu + \frac{1}{5}c - \frac{1}{5}a \right) \\ &= \frac{2}{5}(1 - \nu) + \frac{c - a}{5k}. \end{aligned}$$

Note that :

$$\begin{aligned}
x_F^o \in [0, 1] &\Leftrightarrow 0 \leq \frac{2}{5}(1 - \nu) + \frac{c - a}{5k} \leq 1 \\
&\Leftrightarrow -1 \leq -\frac{2}{5}(1 - \nu) + \frac{a - c}{5k} \leq 0 \\
&\Leftrightarrow -5k \leq -2k(1 - \nu) + a - c \leq 0 \\
&\Leftrightarrow -5k + 2k(1 - \nu) \leq a - c \leq 2k(1 - \nu) \\
&\Leftrightarrow -k(3 + 2\nu) \leq a - c \leq 2k(1 - \nu).
\end{aligned}$$

The equilibrium demands for deposits then write as :

$$\begin{aligned}
D_H^o &= \mu x_H^o S = \mu(1 - x_F^o)S \\
&= \left[1 - \left(\frac{2}{5}(1 - \nu) + \frac{c - a}{5k} \right) \right] \mu S \\
&= \frac{1}{5} \left(3 + 2\nu + \frac{a - c}{k} \right) \mu S
\end{aligned}$$

and

$$\begin{aligned}
D_F^o &= (\mu x_F^o + 1 - \mu)S \\
&= \left[\mu \left(\frac{2}{5}(1 - \nu) + \frac{c - a}{5k} \right) + 1 - \mu \right] S \\
&= \frac{1}{5} \left(2 - 2\nu + \frac{c - a}{k} + 5 \cdot \frac{1 - \mu}{\mu} \right) \mu S \\
&= \frac{1}{5} \left(2 - 2\nu + \frac{c - a}{k} + 5\nu \right) \mu S \\
&= \frac{1}{5} \left(2 + 3\nu + \frac{c - a}{k} \right) \mu S.
\end{aligned}$$

Finally, for the banks' profits and tax proceeds, we get a similar result as for the compliant OFC :

$$\begin{aligned}
\Pi_H^o &= (r - r_H^o - c)D_H^o \\
&= \left[r - \left(r - c - \frac{1}{5}(3k + 2k\nu + a - c) \right) - c \right] D_H^o \\
&= \frac{1}{5}(3k + 2k\nu + a - c)D_H^o \\
&= t_H^o D_H^o = T_H^o
\end{aligned}$$

and

$$\begin{aligned}
\Pi_F^o &= (r - r_F^o)D_F^o \\
&= \left[r - \left(r - \frac{1}{5}(2k + 3k\nu + c - a) \right) \right] D_F^o \\
&= \frac{1}{5}(2k + 3k\nu + c - a)D_F^o \\
&= t_F^o D_F^o = T_F^o.
\end{aligned}$$

Moreover, one can observe that :

$$\begin{aligned}
\frac{t_i^o}{k} &= \frac{D_i^o}{\mu S} \text{ for } i = H, T \\
\Leftrightarrow t_i^o D_i^o &= \frac{k}{\mu S} (D_i^o)^2,
\end{aligned}$$

so that :

$$\Pi_i^o = T_i^o = \frac{k}{\mu S} (D_i^o)^2 \text{ for } i = H, F.$$

Let us now investigate some properties of interest and tax rates for the noncompliant OFC case.

First, taking the difference between the interest rates yields :

$$\begin{aligned} r_H^o - r_F^o &= r - c - \frac{1}{5}(3k + 2k\nu + a - c) - \left(r - \frac{1}{5}(2k + 3k\nu + c - a) \right) \\ &= -\frac{1}{5} [2a + 3c + k(1 - \nu)] < 0. \end{aligned}$$

This shows that the offshore bank must select a higher interest rate than its competitor in order to win over licit but reluctant investors. However, the more financial integration increases (corresponding to a smaller k), the lower this effect. In addition, the OFC also has to raise its interest rate in order to satisfy legal investors who get reputational damage when associated to a lax offshore institution ($a > 0$).

Second, the tax differential between the onshore and offshore countries is given by :

$$\begin{aligned} t_H^o - t_F^o &= \frac{1}{5}(3k + 2k\nu + a - c) - \frac{1}{5}(2k + 3k\nu + c - a) \\ &= \frac{1}{5} [2(a - c) + k(1 - \nu)]. \end{aligned}$$

One can see that the tax differential augments when a increases, i.e. when an investor's reputation is more strongly harmed by institutional pressures like blacklisting policies. The tax differential also augments when the compliance cost c of the onshore financial center diminishes. In this case, the onshore center is able to raise its offered interest rate and to attract more deposits.

Furthermore, the tax differential rises if the relative share of criminal investors diminishes (smaller ν), since this increases the demand for onshore deposits. Finally, the tax differential diminishes when the financial market becomes more integrated, corresponding to a lower k .

It should be mentioned that, as opposed to the compliant OFC case, the (big) onshore financial center does not always choose the highest tax rate. Indeed, by looking at the tax differential, the onshore country selects a smaller tax rate t_H^o than the OFC if and only if :

$$\begin{aligned} \frac{1}{5} [2(a - c) + k(1 - \nu)] < 0 &\Leftrightarrow 2(a - c) < -k(1 - \nu) \\ &\Leftrightarrow a < c - \frac{k}{2}(1 - \nu) \equiv \bar{a}, \end{aligned}$$

hence if the investor's reputational damage a is small enough compared to the monitoring cost c . Indeed, a larger monitoring cost forces the onshore bank to cut the offered interest rate, which in turn diminishes its profit margin and its attractiveness to investors. Consequently, the onshore bank needs to lower its tax rate. In a similar way, a reduction of the investor's reputational damage increases the OFC's attractiveness, so that the onshore bank must decrease its tax rate.

3.4 Pressure threshold

Finally, let us inspect the pressure threshold above which the OFC is willing to comply with the scrupulous monitoring of its investors. Indeed, the OFC is motivated to control its investors' money origins if its profit is larger in that case than without control.

Mathematically, this rewrites as :

$$\begin{aligned}
 \Pi_F^m - \Pi_F^o > 0 &\Leftrightarrow \frac{k}{\mu S} [(D_F^m)^2 - (D_F^o)^2] > 0 \\
 &\Leftrightarrow D_F^m > D_F^o \\
 &\Leftrightarrow \frac{2}{5}\mu S > \frac{1}{5} \left(2 + 3\nu + \frac{c-a}{k} \right) \mu S \\
 &\Leftrightarrow \frac{2}{5} > \frac{2}{5} + \frac{1}{5} \left(3\nu + \frac{c-a}{k} \right) \\
 &\Leftrightarrow 0 > \frac{1}{5} \left(3\nu + \frac{c-a}{k} \right) \\
 &\Leftrightarrow 0 > 3k\nu + (c-a) \\
 &\Leftrightarrow a > c + 3k\nu \equiv a_F.
 \end{aligned}$$

The OFC needs to risk a high demand loss (through larger a) to be willing to monitor its investors.

The above result shows that the investor's reputational damage a has to be larger than the bank's monitoring cost c .

Also, if the share of criminal customers increases, the pressure applied on legal investors should be even stronger, since a_F augments with ν .

Moreover, when the degree of international financial integration is higher (corresponding to a smaller k), the above threshold a_F diminishes and hence the OFC is more likely to control its investors.

3.5 Main conclusions of the paper

From the paper, one can derive that offshore investors, banks and governments are losers under pressure policies.

Interestingly, this result also holds true for (innocent) onshore investors.

In contrast, the authors also demonstrate that onshore financial institutions are gainers under these regulations. Hence, it is very plausible that offshore financial lobbies are opposed to pressure policies while onshore lobbies are advocating them.

It is rather surprising that pressure policies do not only make tax revenues rise, but also aggregate profits. The reason for this is that these regulations weaken interbank and tax competition, so that bank profits and tax revenues augment while offshore and onshore investors' wealth diminishes.

Moreover, OFCs are motivated to monitor their investors' money origins if their profit is larger under compliant than under lax behavior.

The authors conclude that, for a high enough risk of reputational damage to innocent investors, exerted by pressure policies, offshore banks are opting for a rigorous control of their investors' deposits.

More precisely, the authors show the existence of a pressure threshold, above which the OFCs comply with international regulations. This threshold augments with the share of criminal investors and diminishes with the degree of international financial integration.

In order to be effective, a pressure policy should make innocent investors incur a reputational damage that, in monetary equivalent terms, is bigger than the banks' cost of controlling investors.

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