A multidisciplinary analysis of tax reform: from politics to human behavior

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A multidisciplinary analysis of tax reform: from politics to human behavior

Een multidisciplinaire analyse van belastinghervorming: van politiek tot menselijk gedrag

(met een samenvatting in het Nederlands)

Proefschrift

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door

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te La Paz, Bolivia

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Soon after starting, a senior researcher told me something that has increasingly resonated with me over the course of my PhD experience. She said that getting a PhD degree is like getting a driver's license for academic life, the PhD years, similar to the driving lessons, are meant to teach you how to drive, but it is only when you get the license that you are allowed to do it by yourself. Following this analogy, I would like to thank those who taught me how to drive first. To my main "driving" instructor, my promotor prof. dr. Brigitte Unger. We met while I was writing my master thesis, I still remember when you asked me what I wanted to do with my future. When I said I wanted to do a PhD, you without any hesitations helped me secure funding for this position. Throughout the years you have encouraged me both to find my own voice and to explore skills that are not always found or exploited throughout the PhD. For the COFFERS project you encouraged me to take the lead of a small legal research group, and although it was not easy, mainly because I am not a lawyer, it allowed me to discover how much I like to lead a team and cooperate with others. For five years we also co-taught a course in the Economic Policy master, and as the years passed by you let me have a bigger say on the way the course ran. We even included a mock EU parliament session which was my way of including my own background as a political scientist. I would like to think that the last year of my PhD really solidified our relationship. I am especially grateful for the months I spent in Vienna working both at the University of Vienna and at the Wirschaftsuniversität Wien. This was an extraordinary academic experience but also a personal one, since I got to see you in the comfort zone of your own country and your little oasis in Burgenland. It seems like perfect timing that we are saying goodbye at a time when we are both starting a new chapter in our lives, almost as big of a coincidence as the fact that we were both born the same day.

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My journey at Utrecht School of Economics started as a master student and it would not have been the same without the interactions with great teachers who later became colleagues and friends. A big shout-out to those who through their classes pushed me to become or at least come close to becoming "an economist". From you, I learned everything from public to labor and development economics, as a well as math and econometrics. Courses without which my academic road would not be complete. Thanks also to the colleagues and members of the Applied Economics section especially to: Elena, Chantal, Thomas and Loek, who were always there to offer some words of wisdom or encouragement. But USE, is more than its academic staff, just like our department functions thanks to the constant support of our administrative staff. My PhD journey has ran smoothly thanks to their support. A special shout out goes to Marianne, who is always willing to help us PhDs solve any doubts about the many bureaucratic procedures needed, and to Mariska, who was always open to help me organize events and workshops for the PhDs at our department.

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List of Abbreviations

AML	**A**nti **M**oney **L**aundering
AMLD	**A**nti **M**oney **L**aundering **D**irective
CIT	**C**orporate **I**ncome **T**ax
DPI	**D**ataset of **P**olitical **I**nstitutions
ECU	**E**xperimental **C**urrency **U**nit
FATF	**F**inancial **A**ction **T**ask **F**orce
FDI	**F**oreign **D**irect **I**nvestment
HMRC	**H**er **M**ajesty's **R**evenue & **C**ustoms
IMF	**I**nternational **M**onetary **F**und
IRS	**I**ntenal **R**evenue **S**ervice
PIT	**P**ersonal **I**ncome **T**ax
PBC	**P**olitical **B**usiness **C**ycle
TPRD	**T**ax **P**olicy **R**eform **D**atabase
VAT	**V**alue **A**dded **T**ax
WB	**W**orld **B**ank

Chapter I

Introduction
Taxation: a multidisciplinary field

> *"Taxation, in reality, is life. If you know the position a person takes on taxes, you can tell their whole philosophy. The tax code, once you get to know it, embodies all the essence of life: greed, politics, power, goodness, charity."*
> *Sheldon S. Cohen*[1]

I.1 Why taxes?

There are not many customs from ancient times that are still part of our daily lives. Of the few that remain, the most relevant is probably taxation. Although the exact point in time when taxes were instituted is unknown, archaeological evidence can trace taxation all the way back to King Scorpion I in ancient Egypt around 3000 bc (Samson, 2002). Similar records exist of taxes being levied in Mesopotamia and Babylonia, and even on the other side of the world by the Inca and Aztec empires (Webber and Wildavsky, 1986). The reason *why* governments tax is relatively straightforward, governments levy taxes in order to fund their expenses. From the onset of history, taxes have served to fund anything from wars and armies to schools and hospitals. As a result, they do not only play a key role in public finance but in our daily lives.

Other questions, such as how taxes should be levied, have also been subject of debate. In Book V of his canonical work "The Wealth of Nations", Adam Smith (1776) set out four pillars of good taxation. Taxes should be **fair** when it comes to their incidence, **certain** such that a tax payer knows

[1] Sheldon S. Cohen served as Commissioner of Internal Revenue from 1965 to 1969. This quote similar to other in this dissertation have been taken from Yablon (2010).

them beforehand and can determine their impact before they make an economic decision, **convenient** as in easy to pay and simple to understand, and **efficient** in that they are easy and cheap to administer. However, 245 years later, taxes are still the subject of reform, partially in order to adapt to an ever-changing world and partly because tax reform is complex. After all, tax reform is not only the result of optimal tax theory designed by economic operators[2] rather the result of a political process. In the words of Radaelli (2004) "taxation is politics" because taxation is both at the core of the social contract and because tax reform only happens in light of political agreement. As Holcombe (1998) argues "tax policy is the result of politics". Given that tax reform is the result of both economic and political considerations it is not surprising that the question of how tax reform comes to be has not been settled and is still being researched (see for e.g. Alesina and Paradisi, 2017 and Chang et al., 2020).

How tax reforms come to be, however, is but one of the crucial elements of taxation. If taxes have been part of governmental structures for centuries, so have those who collect taxes on behalf of government. For example, when Hammurabi ruled the Babylonians, taxes were paid locally to elders and were later collected by the *maskim* or tax directors (Webber and Wildavsky, 1986). Yet, from ancient times tax collection proved to be a contentious topic. The poem to the left dating back to the Chou Dynasty (1046-771 BC)[3] portrays tax collectors as rats, and thousands of years later the famous Beatles song to the right portrays the tax authority as greedy. Both examples clearly represent the vilification of the tax authority across history.

"Big rat big rat
Do not gobble our millet
Three years we have slaved for you
Yet you take no notice of us"

Chou Dinasty poem

"Should 5% appear too small
Be thankful I don't take it all
'Cause I'm the taxman
Yeah, I'm the taxman"

Taxman by *The Beatles*

Considering the above and given that collecting taxes is necessary to provide adequate public services, it seems crucial to better understand the behavior of those who are in charge of collecting and administrating taxes. As for

[2]Optimal tax theory is the study of how to *optimally* design and implement taxes in order to maximize social welfare while taking into account the economic constraints that exist.

[3]Poem translated by Arthur Waley cited by Webber and Wildavsky, 1986

what is the response of the tax payer when asked for their contributions, this is called tax compliance, and this flip side of the coin is equally relevant. The need to understand human reactions to taxation has given rise to research that uses insights from psychology in order to understand how individuals respond to tax changes (see: Alm and Malézieux, 2020 for an overview of the literature and Kirchler and Wahl, 2010 for more on the psychology of tax compliance). Understanding how individuals react to taxes becomes especially relevant when taking into consideration that a habitual reaction seems to be that of not paying them.

Tax non-complience [4] has been a challenge for governments probably for as long as taxes have been levied. For example, in Roman times the wealthy buried jewellery and gold stocks to avoid paying taxes[5]. More complex forms of evasion were developed in the Ottoman Empire when local nobles created a form of "trusts" by donating their lands to *vakifs* (religious foundations) in order to avoid taxation imposed by the sultan (Burg, 2004). A similar pattern emerged in Florence during the mid XIIIth century when wealthy men would donate local real estate to monasteries in order to not pay land taxes. Real estate is actually an area that is to some extent determined by taxation, an example is the narrowness of the houses in Amsterdam, designed this way to minimize the taxes that were levied based on the broadness of a house. More recently, the European Union has estimated that in 2016 alone they lost 46 billion euros in tax revenue (Vellutini et al., 2019). According to the IRS, tax cheats in the United States might be costing the government up to 3 trillion USD a year [6]. On a global scale, Tørsløv et al. (2018) estimate that 40% of corporate profits are shifted to tax havens. Given the size and impact of the revenues lost due to tax non-payment, it comes as no surprise that governments are constantly looking for policies that allow them to minimize the losses by encouraging tax compliance and punishing those who do not comply.

[4] I use the word tax non-commpliance in order to avoid the legal discussion that tax avoidance and tax evasion inevitably raise, this term is used by the literature (see for e.gHanlon et al., 2005; Saad, 2012) to group all activities that reduce tax revenues and damage the tax system.

[5] It is even said that tax evasion largely contributed to the crisis of the Roman empire in 5BC (Williams Friell, 1999) as the revenues needed in order to support military offenses when the Huns attacked were not available.

[6] This estimate was given by Internal Revenue Service Commissioner Chuck Rettig to a Senate panel in April 2021

The historical anecdotes and contemporary data above sought to illustrate the relevance of furthering the understanding of taxation. Particularly when it comes to analyzing how tax reforms come to be, how they are implemented and how are they used by those in charge, and in what way they affect tax payers. This thesis has the overarching aim to answer these questions by analyzing tax policy in four different stages and through a multidisciplinary lens. The first stage pertains to tax reforms coming to existence. Are they defined by economic forces or rather electoral interests? A second stage analyzes what follows reform has become politically possible and is being enforced as law. Do different countries with different legal cultures and traditions write their laws differently? The third stage incorporates the human issue by analyzing how governments and civil servants enforce these laws. Finally, the fourth stage tackles that of the individual and how they respond to tax authorities. This introduction is organized as follows: Section I.2 briefly explains why taxation needs to be analyzed through the lens of many fields, Section I.3 summarizes the main motivations for this research, and finally Section I.4 explains the methods and approach used throughout the thesis and outlines the chapters that will follow.

I.2 Taxation as a multidisciplinary field

Taxation is by nature a field that cannot be defined by an academic discipline in and of itself, and is rather a topic of interest of many disciplines (Lamb et al., 2004). Even a discipline such as archaeology is connected to taxes as the writings in King Scorpion I's tomb were actually tax records(Samson, 2002). Taxes are studied differently by different disciplines and thus using different methodologies. While a lawyer might try to puzzle out the application, intent, and interpretation of tax law, an economist is interested in evaluating the revenue generated by a tax reform. A political scientist on the other hand can study the alliances made by parties in order to achieve said reform, and the psychologist in understanding how individuals' trust and morale are affected. We can even think of fusions amongst these disciplines, a political economist for example, would analyze the politics of tax reform with the use of economic methods and a behavioral economist might apply the insights from psychology through a tax experiment.

The question that remains is: how can these diverse disciplines work together and apart to study tax? The first step is to do multidisciplinary research which by definition means to analyze the same topic from different disciplines. The second step is to do interdisciplinary research, by allowing these disciplines speak to each other. In this dissertation I intend to do justice to both the multidisciplinary and interdisciplinary approach, thus, in the following subsection I will elaborate on the main disciplines used in the thesis. This overview is not meant to be extensive and rather aims to serve as a stepping stone for the literature reviewed across the rest of the chapters.

I.2.1 Tax research in the eyes of Economics, Political Science, and Law

Economics

At its core economics is concerned mainly with the production and distribution of wealth. Given that taxation affects "almost every aspect of production and distribution" (James, 2005), it has been thoroughly studied by economists from a wide array of perspectives. The body of literature in economics is large and could be a topic of thesis in itself, as it ranges from work on public finance (Atkinson and Stiglitz, 1976) to the impact on human development (Heckman et al., 1998). More recently economics has been focusing on field experiments on the compliance of VAT by firms (Pomeranz, 2015), taxation evasion and its connection to money laundering (Unger, 2013), tax evasion and inequality (Alstadsæter et al., 2019), and the impact of tax benefits on labor (Kostøl and Myhre, 2020). Given the extensive amount of literature on the aforementioned economic topics, I will only highlight the work that has influenced this thesis the most, i.e. the work that has focused on the political business cycle and behavioral economics.

Macroeconomic research of taxation has mainly focused on the study of fiscal policy as a way to promote economic growth, employment, and price level stability (James, 2005). This stream of research gave rise to a strand of literature called public choice concerned with the possibility that governments actually use macroeconomic policy in order to gain political benefits. An example of this work is that of the political business cycle and the use of macroeconomic policy in order to win elections (Nordhaus, 1975). Recently, and partially thanks to newer data, the work on political business cycles has expanded(e.g., Alesina and Paradisi, 2017; Hallerberg and Scartascini, 2017;

Chang et al., 2020).

Experimental economics is the second strand of literature that this thesis draws from the most. Although this literature dates back decades and has its foundation on the Beckerian economics of crime model and its application to taxes by Allingham and Sandmo (1972), it has recently evolved into a lively branch of economics. Initially this line of work relied on laboratory experiments that sought to disentangle the effects of tax parameters on tax compliance (for an overview see: Alm and Malézieux, 2020). However, it has recently incorporated the use of field experiments and other methods (see Mascagni, 2018). In conclusion research on taxation in economics is growing adn there is still space for innovative work.

Political Science

Although taxation is for a great part the result of politics, it surprisingly did not stir as much interest as a topic within the field as it did in law and economics (Radaelli, 2004). In the words of Steven Steinmo "It is only recently that political scientists have turned their attention to tax policy or more broadly, how governments raise the monies needed to pay the costs of governing" (1998). The lines of research in political science are rather broad and range from the connection between taxes and social upheaval (Peters, 1991) to the dynamics of tax policy and the role of tax reforms in the power dynamics of a country (Pollack, 1995)[7]

This thesis draws mainly from the literature connected to economics. Mainly the political business cycle literature and the research related to the global governance of taxation. The literature on political business cycles in general (Schultz, 1995), as well as in particular relative to taxation (Golden and Poterba, 1980), shows the importance of taking into account aspects of the political process and situation in country when analyzing how reforms come to be. On the other hand, the literature on the international governance (see: **rixen_tax_2011; rixen_why_2013; rixen_taxation_2021**) of taxation has showed the importance of taking into account the limitations of the nation-state when it comes to defining tax policy, especially given that due to globalization taxation is increasingly affected by international policy.

[7]For a recent overview of the research of taxation from a political science perspective see: Hakelberg and Seelkopf, 2021.

Law

The most common role of the legal researcher when analyzing taxes, is that of assessing the nature and interpretation of the law. It seems natural that legal research is one of the core disciplines of taxation given that taxation rests in the law in order to further governmental objectives (Lamb et al., 2004). Traditionally legal research has focused on the "careful study, classification and theorizing" of the law, and has rarely relied on empirical work. (Freedman, 2005). The lack of empirical work can be partially explained by the fact that finding reliable up to date material on several countries' legal tax systems is a challenge in itself.

However, legal scholars have increasingly highlighted the importance of going beyond this approach and have incorporated methods from other social sciences, for example through the the use of software in legal and policy research (Schebesta, 2018). This empirical turn in legal scholarship aims to stand further away from a theoretical debate and rather focuses on the conditions under which law is formed and what its effects are, this is especially evident in international legal scholarship (Shaffer and Ginsburg, 2012). Tax law has not been exempt of this trend, examples are the work of Alarie et al. (2016) and Strąk and Tuszyński (2020) that rely on artificial intelligence to analyze legal tax texts. The incorporation of alternative methodologies to law is also a result of interdisciplinary work.

I.3 Motivation for this thesis

> *"The spirit of a people, its cultural level, its social structure, the deeds its policy may prepare - all this and more is written in its fiscal history, stripped of all phrases. He who knows how to listen to its message here discerns the thunder of world history more clearly than anywhere else."*
> *Joseph Schumpeter*

Although it is clear why taxes exist, there are still questions left to answer when it comes to better understanding tax reform. With this thesis I seek to answer some of these questions, especially those related to how tax reforms come to be, how they are implemented, and what reactions they trigger. Given the nature of the discipline itself, it seemed evident to attempt to pursue this research from a multidisciplinary approach. The need to take such an approach was confirmed while researching more on taxation both

"in the books" while going through academic research and also "in practice" when I spoke to researchers of all disciplines through the Horizon 2020 project COFFERS [8] and with actual tax practitioners as part of the project [9]. These experiences also highlighted the importance of adding and analyzing legal resources. In addition to the three core disciplines of this dissertation: economics, political science, and law, I have also found inspiration in sources and resources from other social sciences such as psychology, history, and sociology. However, since multidisciplinary work alone rarely leads to changes in existing disciplines (Lamb et al., 2004) both practically and theoretically, the different chapters of the thesis are meant to be read together such that different disciplines talk to each other.

I.4 Methodological approach

I analyze tax reform as a process consisting of four different stages and through a multidisciplinary lens. A first stage of analysis pertains to how tax reforms come to be: are they defined and pushed by economic forces or rather electoral interests? A second stage analyzes what follows once a reform has become politically feasible or has "passed". Therefore it studies what happens when reform is implemented into law. Do different countries with different legal cultures and traditions write their laws differently? The third stage incorporates the human factor by analyzing how these laws are applied by the different countries, and especially how they are used by the public authorities in charge. The fourth and final stage is that of the individual. Once reform has happened, the law has been made, and those responsible for said policy have applied it, how does it affect an individual's / taxpayer's willingness to pay taxes?

Analyzing the tax reform process in stages is necessary for a better understanding of the process of tax reform, and all the different factors that need to align in order to make tax reform successful. At the same time, it poses a methodological challenge. Taxation is a topic that is not defined by any academic discipline in itself, and therefore it is necessary to rely on multiple disciplines and their methods in order to understand it. For each stage of

[8] The projects website is: coffers.eu. An overview of the research done is compiled in the book: Unger, B., Rossel, L., Ferwerda, J. (2021). *Combating Fiscal Fraud and Empowering Regulators: Bringing tax money back into the COFFERS*. Oxford University Press

[9] These interviews also were used as data for Chapter IV

analysis, I use valuable insights and methods from economics, political science, law, psychology, and the social sciences in general.

Chapter II, uses the most common tool used in economic research: econometrics, applied to data on tax reform, elections and macroeconomic indicators. Chapter III is the result of qualitative and quantitative analysis of the law, the main source being a proprietary legal dataset on the tax and money laundering law in Europe. The analysis of said data is done using a common software from the social sciences called Nvivo. Chapter IV complements the data from Chapter III with survey data and in-depth interviews, therefore achieving what in the social sciences is called data-triangulation. Furthermore it relies on correlation analysis in order to interpret and make sense of the three sources of data. Finally the method for Chapter V is an online experiment, in which the participants were a representative sample of the UK population. Experiments have also become a popular method in economics and psychology.

I.4.1 Thesis outline

Chapter II —My kingdom for a vote

Tax Policy Reforms and the Electoral Cycle

This chapter seeks to contribute towards better understanding the first stage of reform, i.e. under which circumstances (how) reforms come to be. Based on the notion that tax reform is a byproduct of economic considerations and political motivations this chapter tests three lines of theoretical expectations. The first is whether tax decreases are more likely before elections, the main explanation for this being that tax cuts act as signals of competence to the electorate. The second is whether there is a post-electoral rush where reforms are more likely to be implemented right after an election. Third, whether politically more visible taxes are more likely to be changed prior to an election. Theoretically, a rational politician would choose to use salient taxes such as VAT (Value Added Tax) or PIT (Personal Income Tax) to garner more electoral support. We test these theories by analyzing actual tax policy reform announcements, using the Tax Policy Reform Database (Amaglobeli et al., 2018), a novel dataset from the IMF and IBFD that tracks tax reforms across twenty-three developed and developing countries between 1975-2012. We focus particularly on reform announcements, hence unlike

previous research we do not use a proxy for tax policy but rather the policy itself. An additional empirical contribution is the use of monthly instead of yearly data, this is especially relevant since in reality an "electoral year" is composed of pre-electoral months, an election month, and post-electoral months. Using monthly data allows for a more detailed picture of the true dynamics of elections and reform proposals and also gives insight as to the length of the political cycle.

Chapter III —One reform to rule them all?

Implications of Making Tax Crimes a Predicate Crime for Money Laundering

This chapter seeks to shed light on the divergence of tax crimes and money laundering laws across Europe after the implementation of the 4th Anti-Money Laundering Directive (AMLD). We see the 4th AMLD as a shock that places money laundering regulation inside the tax ecosystem, and the way that countries implement this in their regulation is the response to this shock. This response will be key in determining the success of this policy. We use an innovative comparative approach that involves the analysis of tax evasion through an empirical legal lens. We built a dataset with the legislation of all European Union member states regarding tax crimes and money laundering and analyze them in light of other relevant legal variables such as the legal origin of each jurisdiction's legislation and their EU ascension date.

Chapter IV —All bark, but who bites?

Shedding Light Inside the Black Box of Reform Implementation

Even perfect transposition of EU Directives does not necessarily translate into homogeneous rules or application of rules across the European Union. Europeanization literature focused on the formal transposition of EU Directives. Newer studies suggest looking into the black box of how this translates into law in action. The 4th AMLD incorporated taxes as a predicate crime for money laundering. We analyze how and why this Directive has been implemented so differently across EU countries both in the books and in action through a novel dataset. We find that country characteristics can explain formal transposition patterns and influence the domestic adaptation of regulation as well as how practitioners, the second front line of implementation,

use these rules in action. We find that corruption, government effectiveness, regulatory quality, tax morale, and tax administrative capacity are important factors to explain lingering differences in the books and in action among EU Member States.

Chapter V —Be thankful I don't take it all...

Behavioral responses to tax authority in an online experiment

The standard portfolio model assumes that tax audits are always effective in detecting tax noncompliance. However, recent empirical and theoretical work has acknowledged that this is not always the case. We study how an ineffective audit, where income is overestimated by the tax authority, affects tax compliance. Our findings contribute to understanding the behavioral responses of taxpayers to tax authorities who do not manage to perfectly assess taxpayer income. We make use of an online tax experiment with a representative UK sample, where we test the effect of different probabilities and magnitudes of overestimation on taxpayer compliance and post-audit compliance. We reject the predictions made by the traditional portfolio model for the presence of overestimation and provide an alternative model, that also includes non-monetary utility, to explain behavior. Secondly, we find that audit outcomes affect post-audit behavior and that the "type" of audit outcome matters for taxpayer compliance, even when controlling for the height of the fine.

Chapter II

My kingdom for a vote[1]
Tax Policy Reforms and the Electoral Cycle

II.1 Introduction

There is an anonymous adage that states: *"One way to reduce taxes is to hold elections every year because there never seem to be tax increases in an election year."* Taxes are usually one of the most discussed topics before elections,[2] both to boast what the incumbent government has done as well as in the shape of promises for the future. Tax policy is at the heart of the political process due to its (re)distributive nature. In the words of Holcombe (1998) "Tax policy is a product of politics, so a complete understanding of tax policy requires an explicit recognition of the political environment within which tax policy is made". Hence a natural hypothesis is that tax policy is influenced by the timing of elections. Nordhaus (1975) coined the idea of a political business cycle (PBC). Studying the PBC is highly relevant. In a Keynesian economic framework, the government's main role is to smooth out the real business cycle. Hence it seems undesirable for electoral politics to introduce a political business cycle instead by cutting taxes and increasing spending prior to elections.

[1] A version of this chapter is being prepared for submission together with Martijn Huysmans and Joras Ferwerda. I would like to thank my co-authors for their collaboration and dedication to the project.

[2] For the 2000 U.S. presidential election Denton (2002) finds that taxes is amongst the top 3 most discussed topics in all top American T.V. networks coverage of the elections. Guo et al.(2016) find that the most discussed policy issue linked to Mitt Romney in the 2012 election was taxes.

Elections are an important event: voters either punish or reward the incumbent government and decide the country's direction for the next cycle. Therefore, whether it is to promote reforms or to stay in power, politicians need to win elections. As a result, the literature has long proposed that politicians have an incentive to announce reforms that win them elections. (eg. Buchanan and Tullock, 1975; Buchanan, 1989; Downs, 1957). The basic intuition of the PBC is that incumbents stimulate aggregate demand before an election in order to win votes, which results in higher growth and lower unemployment. The stimulus produces inflation, which is then eliminated by post-electoral austerity measures that result in contractions and an increase in unemployment (Alesina et al., 1992). Given the importance of taxation, and the fact that taxes and transfers can be manipulated more quickly and easily than unemployment (Dubois, 2016), the strategic use of tax reform in order to get electoral gains has garnered increased academic attention (see for e.g. Alesina and Paradisi, 2017; Foremny and Riedel, 2014; Hallerberg and Scartascini, 2017; Vegh and Vuletin, 2015).

One main issue in the literature on the PBC is the use of tax revenues as a proxy for tax policy (Prichard, 2014). Since tax revenues also fluctuate based on the state of the economy, they are a noisy proxy for politicians' tax policies. In this paper we test the PBC by analyzing actual tax policy reform announcements, using the Tax Policy Reform Database (Amaglobeli et al., 2018), a novel data-set from the IMF that tracks tax reforms across twenty-three developed and developing countries between 1975-2012. We focus particularly on reform announcements, hence unlike previous research we do not use a proxy for tax policy but rather policy itself. An additional empirical contribution is the use of monthly instead of yearly data. This is especially relevant since in reality an "electoral year" is composed of pre-electoral months, an election month, and post-electoral months. Using monthly data allows for a more detailed picture of the true dynamics of elections and reform proposals and gives insight as to the length of the political cycle.

We test two lines of theoretical expectations: the traditional PBC hypothesis and another related to capacity constraints. First, we test whether strategic tax decreases of salient taxes are more likely before elections since tax cuts act as signals of competence to the electorate (Hallerberg and von Hagen, 2017; Rogoff and Sibert, 1988). We also test the inverse, whether strategic increases of salient taxes are more likely after an election. Second, we evaluate a set of

alternative hypotheses that are related to governments having the capacity to actually push reforms. Then reforms would be less likely before an election and more likely after, independent of their salience.

Our findings are in line with prior research. We confirm that tax reform is less likely in the time preceding an election. However, surprisingly, we do not find evidence for politicians using tax reform to garner electoral support. Tax reforms are less likely during pre-electoral times independent of the type or direction of the reform. Also, being a right or left-leaning incumbent does not influence the likelihood of Value Added Taxes (VAT), Personal Income Taxes (PIT), or Corporate Income Taxes (CIT) reforms prior to an election. The pattern of pre-electoral tax reform seems to suggest a decrease in executive and legislative productivity or an overall halt in reforms regarding tax matters. These results are robust when controlling for political factors such as control of cabinets and economic variables such as a crisis or a reduction in tax revenue in the previous year. In addition, we find that in the first 6 to 12 months after an election, the likelihood of tax reforms is significantly higher. This suggests either that newly elected governments use their electoral mandate to push for quick reform and fulfill campaign promises, or that alternatively, given the polarizing nature of tax reform, politicians rather push for tax reform at the beginning of their mandates to give the electorate time to forget about this. Our results are robust to alternative definitions or measurements of tax reform (our dependent variable), and several political systems' and electoral tests.

This paper contributes to the ongoing quest for a better understanding of what determines tax policy by providing empirical evidence on the length and nature of the political business cycle. We find that tax reforms are less likely prior to an election, however, there is no distinction between salient taxes or not, which would be the expectation if reforms are used to attract votes. We find that reforms are less likely prior to an election, suggesting that natural fluctuations of legislative labor productivity might explain a lack of policy reform.

This paper is organized as follows: Section II.2 presents an overview of the literature on the political business cycle. Section II.3 outlines our theoretical predictions and hypotheses. Section II.4 describes the data and the methodology. Section II.5 shows both descriptive and regression results as

well as robustness checks. Finally, Section V.8 has our findings and conclusions.

II.2 The political business cycle

In a seminal work for the field of public choice, Downs (1957) postulated that parties choose policies to maximize votes and win elections. About twenty years later, influenced by B. Frey and Lau (1968), William D. Nordhaus (1975) hypothesized the existence of a "political business cycle". If politicians opportunistically try to maximize votes, they have an incentive to boost the economy before elections through loose monetary policy and increased deficit spending. As a result, pre-electoral years are expansion years, characterized by high employment. Yet by the time elections happen, inflation has gone up, and as a result austerity measures need to be enacted, resulting in higher unemployment (Nordhaus, 1975; Dubois; Alesina et al., 1992). Hence post-electoral years become recession years. Thus actions of politicians result in economic cycles that are dependent on the electoral cycle (Blankart and Koester, 2005).

In 1977 Hibbs added to the nascent political business cycle literature by adding partisanship in connection to the Phillips curve. He proposed the existence of "partisan cycles", where politicians and their parties try to maximize votes specifically from their intended voters or "clientele". As a result the left is "unemployment averse" -as they cater to low class voters who favor low unemployment and high inflation-, and the right is "inflation averse"- as their clientele of upper-middle class suffer more from inflation- (Hibbs, 1977; Blankart and Koester, 2005). The electoral and partisan connection was made by B. S. Frey and Schneider in 1978 by proposing that parties follow partisan lines as long as approval is high. If approval is low before elections, parties will fall back into the expansionary pre-electoral cycle.

Although Nordhaus's seminal work garnered much interest, empirical research based on his model yielded mixed results. The main criticism of the idea of a PBC was its focus on macroeconomic outcome variables over which politicians do not have much control, instead of focusing on policy instruments (Tufte, 1980). Alesina et al. (1992), concludes that the outcome version of the political business cycle can be rejected. By the mid-90s and early 2000s, the quest to find evidence for a PBC in macroeconomic outcome variables

had mostly faded out. What remained was an interest in finding a PBC in fiscal outcomes such as government spending, deficit, and debt (*for e.g. see:* Prichard, 2018; J. Alt et al., 2008; Rogoff and Sibert, 1988; Bohn and Sturm, 2021). Given that one of the most evident and important policy instruments are taxes, initial models such as Roubini and Sachs(1989) and Alesina et al. (1992) focused on fiscal and budget deficits. For example, Alesina et al. estimate the impact of elections and government fragmentation on deficits measured by the change in the debt to GDP ratio. They find that after controlling for economic determinants, government fragmentation and elections have a statistically significant effect on budget deficits in selected OECD countries. However, one of the main limitations of their work is the lack of data. Yearly budget deficit data was available for only a small sample period. Given that elections do not happen every year, there were no more than four elections per country.

One of the main challenges faced by the literature on the PBC regarding policy in general (Strobl et al., 2021), and tax policy specifically, has indeed been a lack of data. Policymakers have control over two main policy instruments: the statutory tax rate and the tax base, but they have less control over actual tax revenues. Due to this lack of data, research on tax policy has mostly relied on aggregate quantities such as tax revenues and fiscal balance (see e.g. J. E. Alt and Lassen, 2006; Shi and Svensson, 2006). Considering that these outcomes are also affected by the economic cycle, their use as a dependent variable gives rise to endogeneity issues (Alesina and Paradisi, 2017; Vegh and Vuletin, 2015).

Recent work has been tackling the lack of data in multiple ways. For example, by looking into local elections and tax policy, rather than on a national or cross-country level. Drazen and Eslava (2010) find pre-electoral spending increases in Colombian municipalities. Foremny and Riedel (2014) find that German municipalities reduced local business taxes during the election year and the year prior, while they increased these taxes the year after elections. Similarly, Alesina and Paradisi (2017) study real-estate taxes in Italian municipalities and find evidence of political cycles on a municipal level. Chang et al. (2020) analyze the behavior of state politicians in the U.S. regarding gas tax laws and corporate income tax laws. They find evidence that politicians are most likely to enact tax increases right after an election.

Recently, new data sources have led to cross-country research. Katsimi and Sarantides (2012) find lower fiscal revenues prior to elections in OECD countries 1972-1999. Focusing on Latin America between 1990 and 2004, Hallerberg and von Hagen (2017) find that the likelihood of tax increases is significantly lower prior to an election. Exploring the economic and political causes for tax policy changes in OECD countries between 1990 and 2001, Hallerberg and Scartascini (2017) surprisingly find no partisan effects in tax policy reform and find electoral effects only for CIT increases post-elections.

This paper contributes to the political business cycle literature in three main ways: First, we tackle the issue of endogeneity by using actual tax policy reform data instead of macroeconomic or fiscal outcomes. Second, we contribute to the issue of data scarcity by analyzing tax policy reform in a more granular manner (distinguishing types of taxes and directions of change) for over 30 years for 23 countries. On average we cover 8.7 elections per country, with a maximum of 14 and a minimum of 5 elections per country. Third, we contribute to prior knowledge on the length and extent of the policy cycle by using monthly data.

II.3 Theoretical predictions

Traditionally, the PBC is hypothesized to result from politicians' electoral strategies. Since voters dislike taxes (Berry and Berry, 1994), incumbent politicians will avoid announcing tax increases prior to elections. Not only will they avoid increases, but as elections approach, they have an incentive to announce tax decreases (Hallerberg and von Hagen, 2017; P. D. König and Wenzelburger, 2017; Rogoff and Sibert, 1988). If the incumbent government deems tax increases necessary or desirable, it will plan to announce them shortly after being re-elected, in the hope that the electorate has forgotten about them by the next elections. If a new government is elected, it can credibly claim at the start of its mandate that unpopular tax increases are necessary to correct the wrongdoings of the previous government (Strobl et al., 2021).

Given that voters have limited attention or are rationally uninformed (Downs, 1957), the PBC should be more pronounced for salient taxes like

VAT and PIT (Brys, 2011; Chang et al., 2020; Lami and Imami, 2019). Conversely, taxes such as CIT, which are less salient for the average voter (J. Alt et al., 2008), are less likely to show a pronounced PBC. Based on these traditional arguments for the PBC, we hypothesize the following:

- **H1a: strategic decreases.** Decreases of salient taxes are more likely to be announced prior to an election.
- **H1b: strategic increases.** Increases of salient taxes are more likely to be announced after an election.

In addition to these traditional PBC hypotheses, we also have in mind an alternative PBC related to capacity constraints. In particular, incumbent politicians and bureaucracies may not announce new reforms before an election because they know they lack the capacity to implement them so close to an election. After all, implementing reforms takes time. Conversely, announcing reforms just after an election leaves ample time to implement them. These capacity arguments lead to the following hypotheses:

- **H2a: capacity constraints.** Tax reforms, no matter their type or direction, are less likely to be announced prior to an election.
- **H2b: post-electoral rush.** Tax reforms, no matter their type or direction, are more likely to be announced after an election.

Note that H2a has no alternative explanation in terms of electoral strategies. It is in direct contradiction with H1a for salient taxes. In contrast, H2b is compatible with H2 for salient taxes, although it is not observationally equivalent. Note that H1b may also be derived from an electoral strategy, namely a willingness to be seen as hitting the ground running.

II.4 Data and methodology

We combine data on tax reforms with electoral and political data. The tax reform data comes from Amaglobeli et al.'s (2018) "Tax Policy Reforms in Advanced and Emerging Economies: A Novel Database" (TPRD). The TPRD is a novel dataset of tax reforms across twenty-three advanced and emerging

market economies from 1988 onwards. Previous datasets focused mainly on statutory tax rates. In contrast, the TPRD contains information on the direction of tax reform (decreasing or increasing) and whether it affects the rate or the base of personal (PIT) and corporate (CIT) income taxes, value added and sale taxes (VAT), social security contributions (SSC), excises (EXE), and property taxes (PRO). For our research, we focus on PIT, CIT and VAT measures, as they are the ones covered more comprehensively (Amaglobeli et al., 2018). The date of announcement of measures and implementation is also included; we use this to improve on the current PBC literature by building a monthly rather than a yearly dataset. Given that we study the interaction between tax reforms and the electoral cycle we use the announcement date as a reference. Our main dependent variables are the likelihood of any reform, the likelihood of a PIT, CIT, and VAT reform (analyzed independently), and the likelihood of increasing and decreasing tax reforms.[3]

The electoral and political data was extracted from Cruz et al.'s (2020) "Database of Political Institutions" (DPI). The DPI contains institutional and electoral data such as dates of legislative and executive elections and their results, tenure, and stability of the government, and party affiliation and ideology from 1975 onward. We take advantage of the comprehensive nature of the DPI to match it to the monthly tax reform data on electoral cycles rather than chronological years. Originally, DPI data captures the state of the country on January 1. Thus, a ”1” is recorded in the year following the election for our election dummy. However, since information on the actual date of the election is provided, we could match the corresponding ”1” to the actual month of the election. In doing so, we no longer lose the data relevant to the electoral year, as is habitually the case in the PBC literature, where reforms in the election year are dropped because it is unclear whether they happened before or after the actual election. Using our monthly approach, only reforms announced during the electoral month are "lost". Section II.4.1 summarizes the main characteristics of the sample, including the frequency of reform per country and the most common types and directions of change. Section II.4.2

[3]Throughout this article when referring to tax reforms we refer to tax reform announcements, this decision was based on the fact that in TPRD announcements correspond to the day when representatives of the government announced the reform, which is likely more connected to the PBC than implementation, a process that requires intervention from authorities beyond the executive. Moreover not all reforms that are announced are necessarily implemented and the implementation lag varies and can depend on factors like the begining of the fiscal year (Amaglobeli et al., 2018). Nonetheless, the determinants of the implementation of reforms should be studied further.

briefly shows the number of elections covered and some basic electoral and political characteristics of the countries in the sample.

II.4.1 Tax reforms in the sample

As mentioned above, the primary source of data for tax reforms is the TPRD, consisting of an unbalanced panel of 23 countries, 1988-2014, and a total of 8588 months. Although all countries are included in the description of tax reforms, China is excluded from our main analysis since it has an assembly-elected presidential system and hence no elections. Appendix A.1 shows some main characteristics of the reforms and reform years in the sample. In total we analyze 2113 reforms. Brazil is the country with the least tax reforms standing at only 32, whereas countries like Australia, Canada, Germany, Denmark, Ireland and the USA have over 100 reforms. This can only partially explain the lower number of years Brazil is in our dataset. Countries that are in the dataset a similar number of years as Brazil, like India, Greece and Poland, have more than double the number of reforms. The majority of reforms in our sample are reforms of Personal Income Taxes (PIT). All categories of reforms are present in the 22 countries, with the exception of the United States that does not have a federal Value Added Tax (VAT). As shown in Figure II.1, CIT reforms are also very common, while VAT reforms are less common.

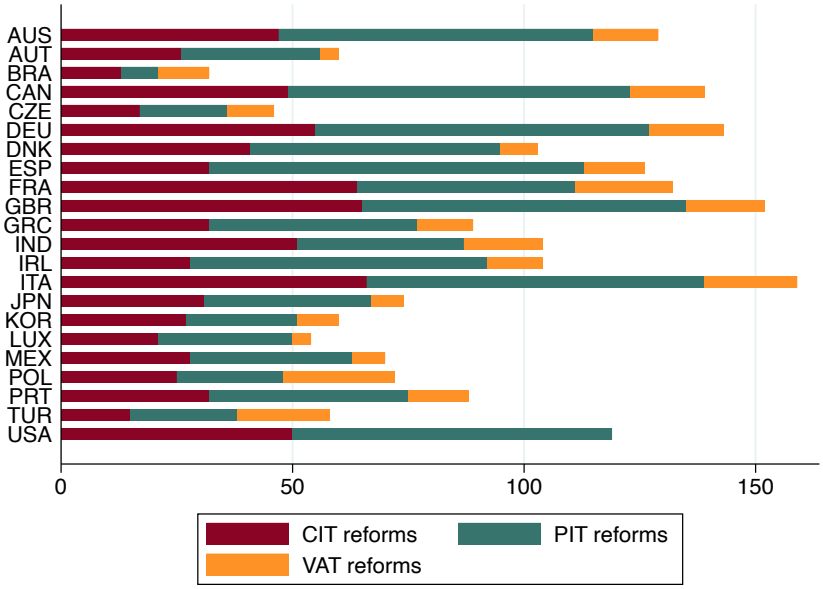


FIGURE II.1: Overview of reforms

Personal Income Taxes

Figure II.2 shows how many PIT reforms were decreasing (red) and how many increasing (blue) either tax rate or tax base. Spain has had the highest number of PIT reforms with slightly above 80 reforms in the 27 years between 1988 and 2014.[4] Few countries are relatively balanced in terms of decreases and increases (Turkey and Poland), in many other countries PIT decreases happen nearly twice as often as increases.

Increases and decreases are not a complete picture of tax reform since an increase in the tax rate can be balanced out with a shrinkage of the tax base. Figure II.2 also shows a more nuanced approach by illustrating the total number of reforms, affecting the tax rate or the tax base via increases or decreases. The light red part of the columns refer to PIT base decreases and represent the highest number of reforms for most countries, closely followed by PIT rate decreases in dark red. Overall, rate increases are not as common as base increases. Although these figures illustrate the direction, type, and number of reforms they do not account for the size or importance of reforms and other relevant aspects

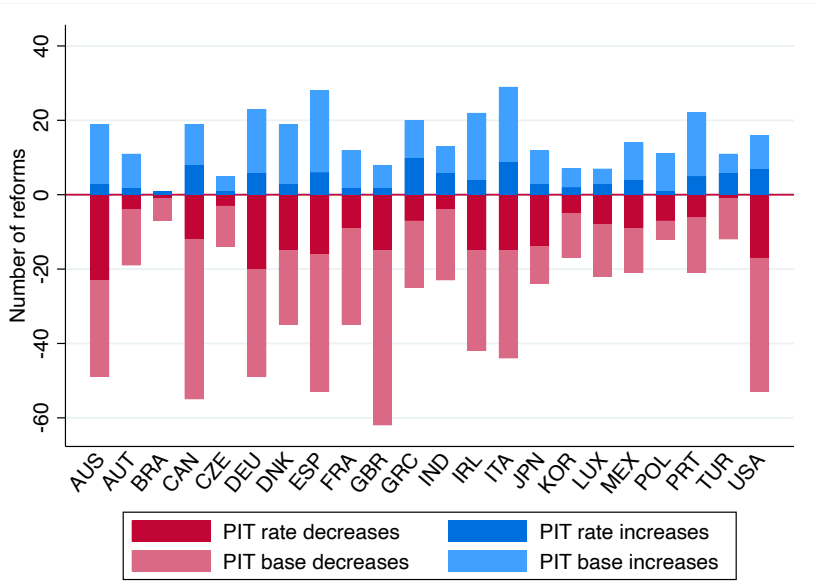


FIGURE II.2: Overview of all PIT reforms

[4] A list of the years that each country is covered is available in Table II.4.2

Corporate Income Taxes

In Figure II.3 we see a clear dominance of CIT decreases, which is in line with the general finding that CIT rates have been decreasing over time (Hallerberg and von Hagen, 2017), the falling of corporate tax rates overtime due to tax competition is called the global race to the bottom(Woodgate, 2020). Some countries decreased corporate taxes to the extent that they more than quadruple the number of increases, such as Luxembourg or Brazil. Given that the directions of taxes do not portray a full picture, the figure also shows that CIT increases mainly pertained to the tax base (light blue) rather than the rate. Furthermore, we show that in most countries in the sample, the most common type of CIT reform was a reduction of the base illustrated in light red. Interestingly, at least in our dataset, Brazil has not had a single CIT rate increase policy in the years it is included.

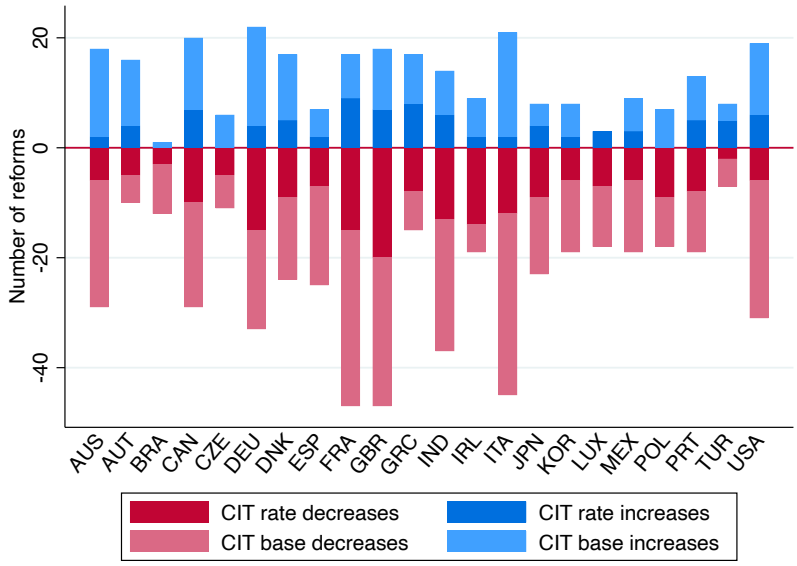


FIGURE II.3: Overview of all CIT reforms

Value Added Taxes

VAT reforms are less common than PIT and CIT reforms. Although VAT is widely used by now - except for the U.S. at the federal level - its introduction in many countries only dates back to the second half of the twentieth century. Table II.1 shows that our dataset covers the introduction of VAT for nearly half of the countries in the sample. Other countries such as France

and Ireland introduced VAT only 7 and 3 years before our dataset began, respectively. Consistent with its growing importance during the period under study, Figure II.4 shows the changes in VAT to be mainly rate increases, in contrast to PIT and VAT. Furthermore, also different from the previous taxes most changes are related to the rate rather than the base.

TABLE II.1: Introduction of VAT across sample

Country	Year of introduction
Australia	2000
Canada	1991
Czech Republic	1993
Greece	1987
India	2005
Japan	1989
Korea	1977
Poland	1993
Portugal	1986
Spain	1986

Note: Made by author based on data from the OECD (2020) report on VAT.

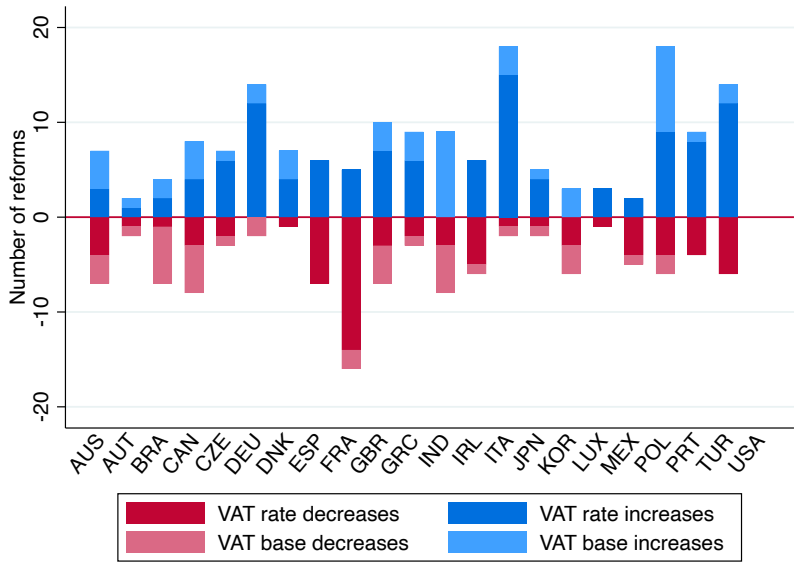


FIGURE II.4: Overview of all VAT reforms

II.4.2 Electoral change in the sample

Table II.2 shows the elections in our dataset. In total, we have 202 legislative elections and 45 executive elections. The majority of our sample consists

of countries with a parliamentary regime, which means that the executive is chosen by parliament. Our main explanatory variable -*elec*- is a composite of legislative elections for parliamentary countries and executive elections for presidential countries. This is in line with recent literature (*see e.g.* Bohn and Sturm, 2021 ; Vergne, 2009; Shi and Svensson, 2006). Nonetheless, we also run the analysis for legislative elections -*legelec*- and executive elections -*exelec*- separately in section V.7. This is especially important given that elections in parliamentary regimes are not exogenous because the government can fall. Therefore, we also run robustness checks for snap elections earlier than expected.

TABLE II.2: Elections in Dataset

Country	Years in Dataset	Legislative Elections	Executive Elections
Australia	1975-2014	14	
Austria	1975-2012	8	1
Brazil	1988-2013	5	6
Canada	1975-2013	11	
Czechia	1991-2012	5	
Germany	1975-2011	9	
Denmark	1975-2012	14	1
Spain	1977-2014	7	
France	1975-2014	9	6
Great Britain	1975-2010	8	
Greece	1987-2013	8	1
India	1988-2014	7	
Ireland	1975-2011	6	
Italy	1975-2014	11	
Japan	1975-2014	14	
Korea	1975-2014	6	5
Luxembourg	1975-2007	6	
Mexico	1987-2013	9	6
Poland	1988-2013	8	5
Portugal	1975-2013	13	5
Turkey	1985-2014	6	
USA	1975-2011	18	9
Total		202	45

II.4.3 Tax and electoral reforms in the sample

Figures II.5 and II.6 illustrate the average number of reforms per country 6 and 12 months before and after an election.[5] When observing the average number of reforms 6 months before, with the exception of Australia and Ireland, in all countries the average total number of reforms before elections are lower than that after elections. Australia might be an outlier because the electoral cycle in Australia lasts only three years. When analyzing the 12 month period, a similar pattern arises, with Ireland as the sole exception. However, it is necessary to bear in mind that snap elections are included in these Figures, which might generate an overlap between pre- and post-electoral periods. For example, Australia had an election in March 1983 and December 1984. This means the months December 1983 till March 1984 are both in the post-electoral period of the March 1983 election and the pre-electoral period of the December 1984 election.

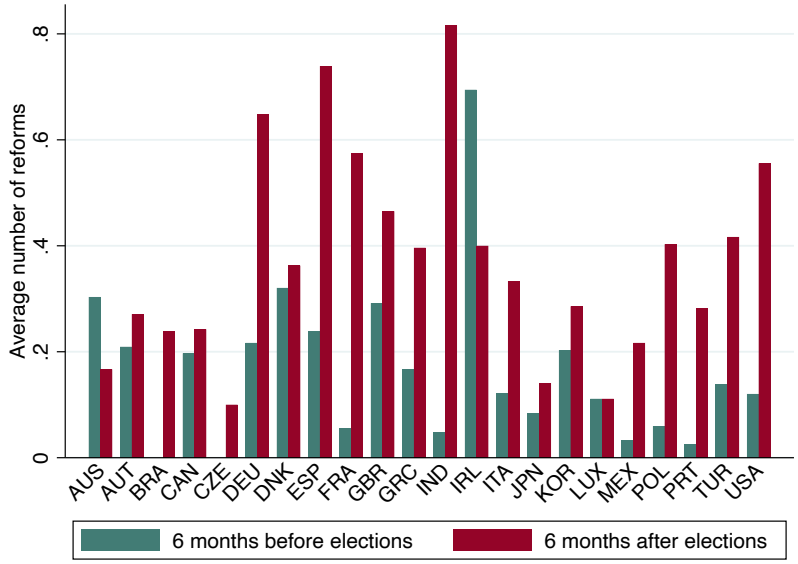


FIGURE II.5: Average of reforms around an election *-6 months-*

[5]We calculate these averages per country by adding the number of reforms in each 6 and 12 month period before elections respectively and per election and later divide this by the total number of elections

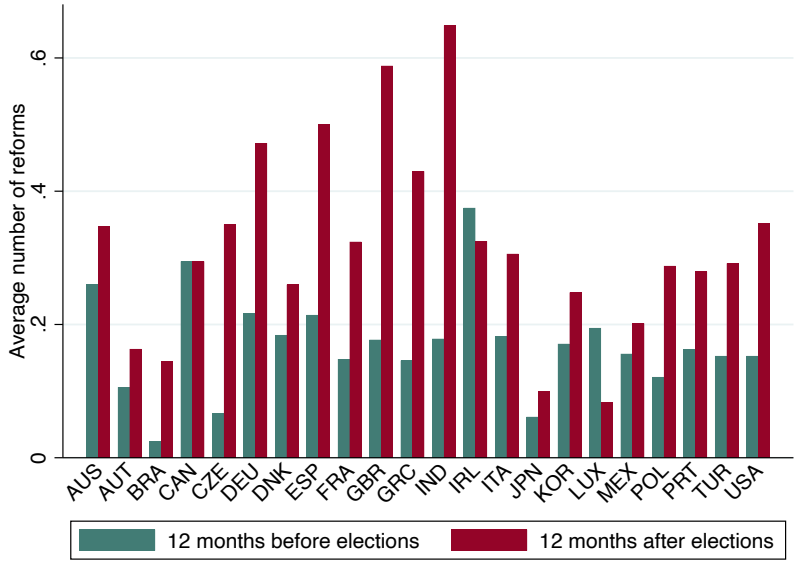


FIGURE II.6: Average of reforms around an election-*12 months*-

Figure II.7 illustrates the total number of reforms on the y axis and the elections on the x axis in bright red vertical lines for selected countries hence the area between the red bars represents the complete political cycle in months. These figures do not give further information on the type or nature of the reforms, but from a first glance, it seems the peak in the total number of announced reforms usually comes after the elections in Australia, Germany, France, and India (see Appendix A.2 for the rest of the countries)

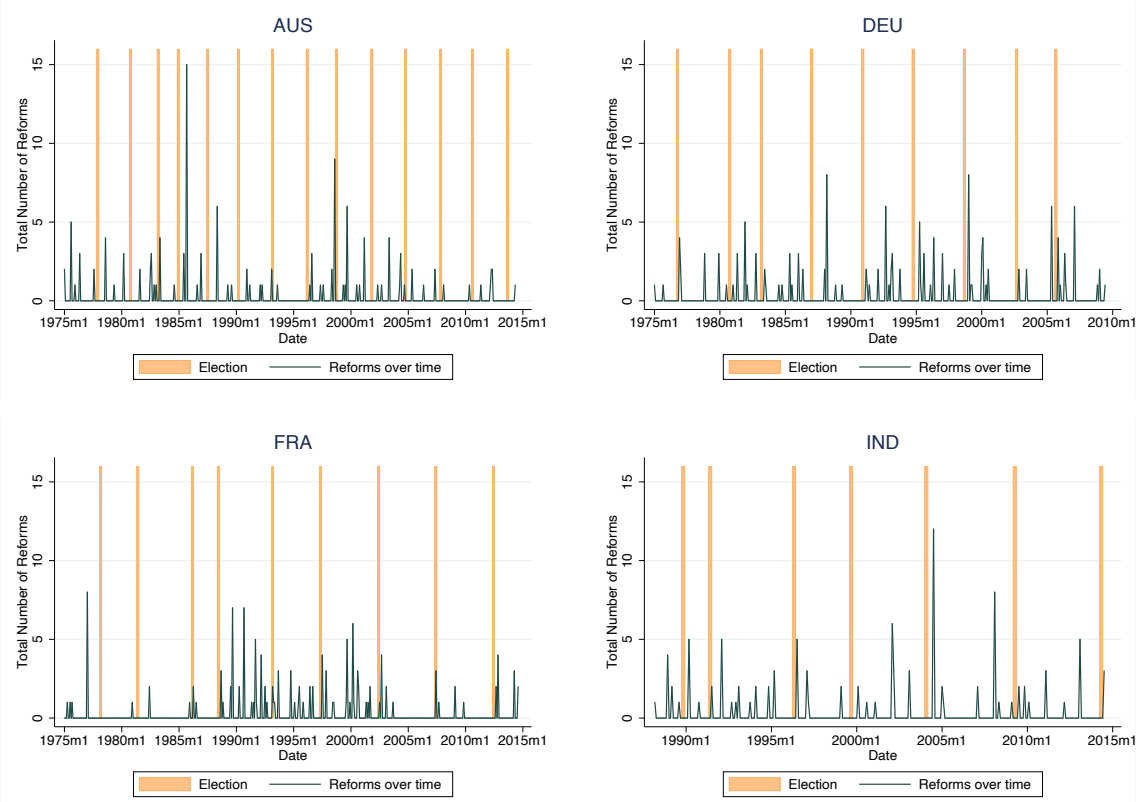


FIGURE II.7: Total number of reforms and the electoral cycle for selected countries

II.4.4 Political and economic control variables

The selection of control variables is based on the existing literature on political business cycles. They can be divided into two main categories: political and economic.

Political control variables come from the DPI (Cruz et al., 2020). We include the Herfindahl index of the government *-herfgov-* defined as the share of seats they have relative to the total. These serve as proxies for the relative power of the government to pass reforms. Similar to Hallerberg and Scartascini (2017) and Castanheira et al. (2012) we also control for the ideology of the ruling party by including a dummy *-right-* equal to 1 for right-wing parties and 0 for left-wing parties. In addition, we control for the influence veto players can have (Hallerberg and Scartascini, 2017), as governments might find it hard to push for reforms if they lack support, we include the variable *-allhouse-* that indicates to what extent the executive has control over the houses that have lawmaking powers.

Economic control variables come from different sources. We use banking crises *-bankingcrisis-* from the Reinhart and Rogoff (2009) dataset [6] and complement it with Laeven and Valencia (2013) for missing data. We also include data from the World Bank and the IMF on the lagged revenue to GDP ratio *-rev GDP-* and the debt to GDP ratio *-debt GDP-* to account for the pressure the government can face to introduce a reform .

II.4.5 Estimation technique

Our dataset has a panel structure with monthly observations. The monthly structure allows us to shed light on the length of the political business cycle. For example, consider Austria, where elections are usually between October and December. When working on a yearly basis, reforms passed almost two chronological years before the election are considered to belong to the year before the election. For a concrete case, consider the elections in November 2002. Our monthly dataset allows us to observe reforms announced between November 2001 and the date of the election. If we had used a yearly structure, reforms from January 2001 would be included as "pre-electoral" and any reform in 2002 would be ignored.

Our main dependent variable, *reform*, is binary: whether the government announced a tax reform in that month or not. Variations of the dependent variable disaggregate by type of reform and whether they were increases or decreases. Our main explanatory variables are the occurrence of an election 6 months prior, or having an upcoming election in the next 6 months. Given that the sample includes parliamentary, presidential and semi-presidential regimes, we have generated a variable called *-elec-*, that reflects the election in which the executive power was elected according to each regime. We also replicate the analysis taking into account a 12 month time-frame. The 6 versus 12 month specifications allow us to take a peek into the length of the political business cycle.

Our baseline model specification is

$$logit(y_{it}) = \beta_0 + \beta Elections_{it} + \gamma X_{it} + \delta Z_{it} + \kappa_i \tag{II.1}$$

where y is coded as 0 or 1 depending on whether that month the government announced a tax reform. The main explanatory variable are elections (having

[6] We use the latest version by April 2020 available on their website.

an election 6 months before/or the period 6 months after the election). X and Z are vectors of the political and economic control variables. We include country fixed effects κ_i to account for differences between countries.

II.5 Results

Table II.3 presents the first results. Model (4) includes all explanatory and control variables and can be considered our main model. In line with **H2a** and **H2b**, reforms are significantly less likely before, and significantly more likely after an election. Table II.4 shows the same models but with 12 month windows before and after an election. Consistent with **H2a**, also 12 months before an election reforms are significantly less likely. However, contrary to **H2b** the post-electoral rush is not significant for the 12-month window. This sheds some first light on the length and the lack of symmetry of the PBC of tax reform announcements. In addition, it shows the importance of working on a monthly basis; a calendar year approach can fail to identify the 6-month post-electoral rush.

However, the likelihood of reform is not the only relevant aspect of the PBC. For the traditional PBC, as formulated in **H1a** and **H1b**, the direction of reform is critical. Table II.5 separates out increases and decreases. Contrary to **H1a** and **H1b**, there is no difference in the direction of the coefficients for increases and decreases. Consistent with **H2a** decreases appear to also be *less* likely prior to an election (significant for the 12-month window only). In addition, consistent with **H2b** but not **H1a** and **H1b**, decreases appear to also be *more* likely after an election (significant for the 6-month window only).

Under the traditional electoral strategy formulation of the PBC, the salience of different kinds of taxes should matter, as per **H1a** and **H1b**. Table II.6 shows that there is weak evidence for salient decreases prior to an election: the coefficients for VAT and PIT decreases before elections are positive, but they are not significant.[7] However, the non-salient CIT does show a marked contrast with significantly *less* decreases prior to an election. After elections, we do not observe a similar difference across the salient VAT and PIT versus the less salient CIT. Consistent with **H2b** more than **H1b**, all reforms appear

[7]Note that the lack of significance for VAT decreases might be due to the limited number of VAT decreases in the sample. Almost half of the countries in our sample introduced VAT after the starting date of our database.

TABLE II.3: Likelihood of tax reform 6 months before and after an election

VARIABLES	(1)	(2)	(3)	(4)
lead_elec6	-0.298**	-0.324**	-0.329**	-0.331**
	(0.125)	(0.133)	(0.145)	(0.147)
lag_elec6	0.314***	0.276***	0.270**	0.271**
	(0.100)	(0.104)	(0.113)	(0.115)
Observations	8,588	8,215	7,309	7,309
Country FE	YES	YES	YES	YES
Political	NO	YES	YES	YES
Economic	NO	NO	YES	YES
Crisis	NO	NO	NO	YES

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

TABLE II.4: Likelihood of tax reform 12 months before and after an election

VARIABLES	(1)	(2)	(3)	(4)
lead_elec12	-0.268***	-0.299***	-0.306***	-0.309***
	(0.102)	(0.107)	(0.0991)	(0.100)
lag_elec12	0.142	0.0949	0.108	0.110
	(0.0939)	(0.0922)	(0.101)	(0.103)
Observations	8,588	8,215	7,309	7,309
Country FE	YES	YES	YES	YES
Political	NO	YES	YES	YES
Economic	NO	NO	YES	YES
Crisis	NO	NO	NO	YES

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

TABLE II.5: Likelihood of increasing and decreasing tax reform 6 months before and after an election

VARIABLES	(1) Tax Increase 6	(2) Tax Decrease 6	(3) Tax Increase 12	(4) Tax Decrease 12
lead_elec6	-0.814***	-0.164		
	(0.236)	(0.146)		
lag_elec6	0.328***	0.290**		
	(0.120)	(0.137)		
lead_elec12			-0.668***	-0.242**
			(0.158)	(0.108)
lag_elec12			0.247*	-0.00326
			(0.129)	(0.103)
Observations	7,309	7,309	7,309	7,309
Country FE	YES	YES	YES	YES
Political	YES	YES	YES	YES
Economic	YES	YES	YES	YES
Crisis	YES	YES	YES	YES

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

TABLE II.6: Likelihood of increasing and decreasing tax reform 6 months before and after an election by type of election *CIT, PIT & VAT*

VARIABLES	(1) CIT-	(2) CIT+	(3) PIT-	(4) PIT+	(5) VAT-	(6) VAT+
lead_elec6	-0.500***	-1.023***	0.0502	-0.618**	0.0621	-1.359**
	(0.169)	(0.348)	(0.172)	(0.259)	(0.393)	(0.545)
lag_elec6	0.263*	0.331	0.324*	0.338**	0.0523	0.564***
	(0.145)	(0.209)	(0.168)	(0.150)	(0.245)	(0.184)
Observations	7,309	7,309	7,309	7,153	6,905	6,905
Country FE	YES	YES	YES	YES	YES	YES
Political	YES	YES	YES	YES	YES	YES
Economic	YES	YES	YES	YES	YES	YES
Crisis	YES	YES	YES	YES	YES	YES

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

more likely after elections, not just painful increases in salient taxes.

II.5.1 Robustness

In order to verify the reliability of our results we run robustness checks that account for potential confounding factors, especially those related to the nature of elections.

Snap elections

The first issue we focus on is related to the nature of elections in our dataset. In the 22 countries that have democratic elections, there are 3 types of political systems: parliamentary, presidential and assembly-elected president. These three different systems have different formats of elections and choose their executive in different ways. In presidential systems there are legislative and presidential elections, these happen every four, five, or six years on a predefined date. Unless there is a *coup d'état*, this is relatively consistent over time. In parliamentary systems, there are legislative elections and it is the parliament that chooses the head of government in the form of a prime minister. Although most countries have a fixed term, the government coalition can fail or parliament can withdraw its support for the cabinet. As a result, the government falls and snap elections need to be called. Since these elections are unplanned, it can be argued that politicians would not have

sufficient time for a political business cycle. Hence, we re-run our main regressions controlling for whether an electoral cycle was complete or not. The results are available in Section A.4.1 of the appendix. The overall conclusion is that our results are robust with respect to incomplete electoral cycles due to snap elections.

Legislative elections

Given the differences amongst the systems, as an additional robustness check we run our models using only legislative elections. The advantage is that these elections are present in all democratic systems and hence can be to some extent compared across countries. Using this sub-sample of elections we find that our results are overall robust, with some differences in the significance of the likelihood of CIT changes post-election and VAT changes pre-election. The complete results are in section A.4.2 in the appendix.

Executive elections only

Just like for legislative elections, we also run our models with only the main executive elections. This means legislative elections for parliamentary regimes, and presidential elections only for presidential and semi-presidential regimes. This decreases the number of elections in our sample from 223 to 182. The results for the impact of elections on the type and direction of reform are overall robust. However, as can be seen in A.4.3 the pre-electoral effect is less significant than in our baseline model. The post-electoral rush result is robust.

Total number of reforms

Our baseline regressions used the likelihood of reform as the dependent variable. As an additional robustness check, we run our models changing the dependent variable to the total number of reforms. We use a standard OLS with fixed effects since this better suits a count dependent variable model. As can be seen in section A.4.4 there are significantly more reforms during the six months after an election and significantly less reforms in the six months prior, in line with our baseline results.

II.6 Discussion and conclusions

Overall our results confirm the existence of a post-electoral rush, where tax reforms are significantly more likely after an election independent of the type and direction of reform. The existence of a political business cycle where politicians intend to influence voting behavior by announcing tax reductions prior to elections seems less clear. Not only do we find that reforms are less likely before elections, we do not find a strategic use of decreases and increases as there is no difference between salient tax reforms or the direction of tax reforms, suggesting that different mechanisms are at play. We hypothesized capacity constraints before elections can explain tax reforms, implying that incumbent politicians are occupied with campaigning and getting reelected. As a result there is less administrative or legislative capacity to come up with tax reforms. Our results confirm that there are less tax reforms announced in pre-electoral periods independent of the type and direction.

Although we find evidence for the political business cycle in tax reforms, we can expect the relationship between the political business cycle and tax reforms weakens over time. Taxes have become more technical and as a result they have escaped from spaces of traditional accountability (Picciotto, 2020), i.e. the control of elected politicians. This means two things on the one hand taxes become harder to comprehend by voters and hence they react less to their reforms, hence politicians cannot use tax reform to attract voters as easily anymore. And on the other hand the technocratization of taxation has made taxes more complex for the average politician. Globalization can be another explanation for a weakening relationship as it has resulted in tax policy being driven by responses to other countries' policies and hence escaping the electoral discussion (see e.g. Bastiaens and Rudra, 2016; Sanchez, 2006).

Data availability limits the representativeness of our results. For instance the database we use has no African countries included. Developed countries are over-represented, especially within Europe which results in parliamentary regimes being over represented. Because parliamentary regimes are subject to snap elections, PBC might be less strong. Our robustness analysis shows that our results are consistent in despite of this. Especially regarding PIT and CIT, the majority of reforms are related to the tax base. Tax base reforms allow politicians to cater to specific groups of voters. For example through reduced CIT for specific industries like fishing or mining. This

strategic interaction cannot be measured with the current data and would need qualitative analysis. Further research should also analyze the political economy behind policy implementation as it might respond to different dynamics than announcements.

Announcing a tax reform is only the first step, reforms still need to be implemented, used and their effects need to play out in practice.

Chapter III

One reform to rule them all?[1]
The Implications of Making Tax Crimes a Predicate Crime for Money Laundering in the EU

III.1 Introduction

Globalization has been a very potent economic force in the past years and has changed the way trade and commerce develop and the way crime and other threats to nations operate. Taxation, being the key source of revenue for governments, has not been exempt from the effects of globalisation, especially after the financial crisis. As mentioned in Chapter I of this thesis tax avoidance and evasion are increasingly recognized as a serious, worldwide concern since they have reduced the ability of governments to raise the revenue necessary to fill their coffers. For example, recent estimates suggest that the tax gap in the European Union might be €825 billion a year based on 2015 data (Murphy, 2019; see: Ferwerda and Unger, 2021 for an overview of the estimates). This phenomenon has resulted in governments needing more and more tools to counteract the noxious effects of tax evasion nationally and on a global scale. Amongst the most controverted and promising reforms is that of tackling the classic crime of tax evasion with the tools of a new global crime: money laundering.

[1] A version of this chapter has been published as: Rossel, L., Unger, B., Batchelor, J., & van Koningsveld, J. (2021). The Implications of Making Tax Crimes. *Combating Fiscal Fraud and Empowering Regulators: Bringing tax money back into the COFFERS*, 236. I would like to thank my co-authors Brigitte Unger, Jason Batchelor and Jan van Koningsveld for their collaboration and dedication to the project.

Since money launderers and tax evaders both used offshore centers to hide their identity and business, it was only a matter of time for the two fields – tax evasion and money laundering – to merge (Unger, 2017). In 2012 the Financial Action Task Force (FATF) amended its recommendations and included tax evasion as a predicate offense for money laundering. Following the direction of the FATF, in 2015, the European Parliament passed the Directive (EU) 2015/849 – otherwise known as the 4th Anti Money Laundering Directive ('4th AMLD')– that incorporated this principle by adding tax crimes as a predicate crime for money laundering. However, the 4th AMLD did not offer a harmonised definition of tax crimes; hence it was left up to each member state to incorporate this principle, as they saw fit, in their national law.

Laws are a crucial part of tax policy and reform, taxpayers should pay their taxes following the law, and tax experts should advise them within the realm of it (Killian et al., 2021), hence avoidance and evasion behaviour are manipulations or blight disobedience to the law, respectively. Law enforcement personnel (investigators, prosecutors and judges) regularly use and interpret the law in order to find who has not paid their taxes and to define whether and how they should be punished for this. In Chapter II of this thesis we analyzed how reforms come to be, yet the question that remains, especially in a globalized world, is what happens once the reform comes to existence. This chapter analyzes exactly that, taking the case of the incorporation of tax crimes into the domain of money laundering legislation in the European Union, we explore how one reform that was set to some extent to "rule them all" ends up actually adapting and changing across countries.

As a result this chapter sheds light on the divergence of tax crimes and money laundering laws across Europe after the implementation of the 4th AMLD. We see the 4th AMLD as a reform that has already passed the first stage, in that it exists yet it needs to pass a second stage of being implemented by each country. How this second stage of implementation happens will be key in determining the success of this policy. We use an innovative comparative approach that involves the analysis of tax evasion through an empirical legal lens. We built a dataset with the legislation of all European Union countries regarding tax crimes and money laundering, as well as other relevant legal variables such as the legal origin of each jurisdictions' legislation and their EU ascension date.

The importance of analysing the heterogeneity of tax crimes and its connection to money laundering legislation across the EU is relevant since to the best of our knowledge it has not been done in a systematic fashion before, furthermore consolidating legal information from a diverse set of countries is crucial in order to allow cross-country comparison and research. Moreover, it is also relevant from a practical policy perspective; this is supported by the 2016 proposal for a 'Directive of the European Parliament and of the Council on Countering Money Laundering by Criminal Law' where it is clearly stated that the differences in the EU legal frameworks can be exploited by criminals wherever they perceive anti-money laundering legislation to be the weakest. Furthermore, the differences in the definitions, scope and sanctions of money laundering can also affect the cooperation between different actors within the tax ecosystem as is stated in the same report:

> "For instance, differences in the scope of predicate offences make it difficult for Financial Intelligence Units (FIUs) and law enforcement authorities in one Member State to coordinate with other EU jurisdictions to tackle cross-border money laundering (e.g. as regards money laundering related to tax crimes). As part of the consultation carried out to prepare this proposal, practitioners - including agencies such as Europol and Eurojust - reported that differences in criminalising this offence in Member States' legislation pose obstacles to effective police co-operation and cross-border investigations.' (COM/2016/0826 final - 2016/0414)".

The proposal highlights that if actions to harmonise are not carried out, there might be a rise in so-called 'forum shopping' where criminals choose the EU jurisdiction that is best for them to commit their illicit deeds in a similar way as in Palan and Nesvetailova (2021) where the authors find popular entrance points for US companies in Europe. In addition to the academic and practical contributions, this chapter also adds to the tax crime field by introducing a dataset that can be used for further research on the treatment of tax crimes across the European Union. This chapter has been divided into four parts. The first part consists of a literature review and a historical accounting of how tax crimes became a predicate crime for money laundering, and how they ultimately landed as a predicate crime for money laundering in the 4^{th} AMLD. The second part details the methodology and the results of our

research. A third part discusses the findings in light of the similarities and divergences across jurisdictions and points out potential explanations for these differences. Finally, the conclusion gives an overview of our findings, what they mean for policy and lines of further research, including the importance of chapter IV that analyzes the third stage of reform: how policy actors use the reforms once they are implemented.

III.2 Literature review

In the late 19th century, Swiss bankers realised that an increase in tax rates across Europe gave them the possibility to attract this money in order to strengthen their financial sector (Guex, 2000). This advance would lay the base for today's money laundering, although back then the legal concept of money laundering did not exist. At the time, criminals, similarly to tax evaders, would simply leave the place where they committed crimes taking their money with them and depositing it elsewhere, as no one ever asked where the money came from.

As for tax evasion, it only became a crime that warranted punishment in the early 20th century, famously getting Al Capone prosecuted as a tax evader rather than a mobster (Von Lampe, 1999 cited in Gelemerova, 2011). Interestingly enough the term for getting ill-gotten gains from crimes into the licit economy owes the name *money laundering* to Al Capone's use of launderettes – a cash-intensive business- to hide his revenues from illegal alcohol sales (Unger, 2013). Clearly tax evasion and money laundering's pasts have been long intertwined yet getting them to connect in the present has taken a long time.

In 1922 the United States criminalised drug abuse, starting a fight that continues today. By the 1970's it became clear that the government was losing the 'war on drugs', and there was a need to continue the fight with new tools, one of them was money laundering regulation. Chasing the money could lead to finding and cutting funds of infamous drug lords. This new financial approach tries to 'hurt' criminals where they feel it the most: money.

In line with the war on drugs, only money from drug trafficking was chased and sought after, the idea of this financial approach was to prevent the criminals from enjoying ill-gained money and making their logistics and

operations harder (Borlini and Montanaro, 2017). Money laundering regulation has increased on par with the crime itself, initially in the United States and other national legislations, and soon through international instruments of soft law.

In the United States, it started with the Bank Secrecy Act of 1970 though the requirements of this legislation were not enforced until the mid-'80s (Nadelmann, 1993 cited in Sheptycki, 2002). Money laundering was criminalised for the first time in 1986 in the US, through The Money Laundering Control Act of 1986 (Koningsveld et al., 2015). As the efforts to fight money laundering grew so did the bilateral and multilateral regulation of money laundering. After all, the globalisation of crimes requires globalised solutions. Initially, through mutual legal assistance treaties (MLATs) and later through the most recognizable form of soft multilateral law on money laundering the Financial Action Task Force.

The G7 and other guest countries initiated the FATF in 1989 during the 5th Economic Summit of the G7.[2] Set as an intergovernmental body to set worldwide standards to fight money laundering, the FATF issued its first set of recommendations in 1990. The 40 Recommendations soon became the international standard for the anti-money laundering fight, and countries that did not commit to these were blacklisted. These recommendations are in the form of soft law;[3] hence, they give individual jurisdictions enough flexibility to adapt their legal framework to comply with the international standard and with their own needs. The FATF recommendations and their soft nature also allow for the cooperation with non-state actors like banks and other financial institutions (Borlini and Montanaro, 2017).

Tax evasion and money laundering would formally meet paths again when in 1996 IMF's Peter J. Quirk noted that improving tax collection and anti-laundering systems go hand in hand as illicit income is usually also susceptible to tax evasion (cited in Sheptycki, 2002). This went in line with the

[2]The FATF is housed in the OECD Parisian headquarters, at its start it had a budget of approximately four million francs and only had three employees Invalid source specified. Today virtually all countries in the world are committed to the FATF standards.

[3]Soft law involves both legal and non-legal instruments. 'These instruments are characterized by the relatively large amount of discretion which is left to the party bound by the obligation. Although soft law norms are discretionary in nature, they are not without important legal and political effects' Invalid source specified.

fact that money laundering methods and techniques are often inversely proportional to those used in tax crimes. This can happen in two ways a) a money launderer wants to show a paper trail (because justification for them is crucial) while a tax evader does not want a paper trail that can track his crime; b) someone can commit tax fraud by declaring less income while they can launder money by declaring more income or more profits (Koningsveld et al., 2015).

When tax evasion and money laundering reconvened, tax evasion was thought as a means towards an end, the end being catching big criminals. It would take more years to consider tax evaders as money launderers, as for many years tax evasion was thought of as a lower kind of victimless crime (Alldridge, 2017).

III.3 Making tax crimes a predicate crime for money laundering

In order to understand the process, it is crucial to comprehend one key concept in the fight against money laundering: predicate offences. The concept of predicate offences comes from American law, much like other advances in money laundering legislation, 'a predicate offence is the underlying criminal offence that gave rise to the criminal proceeds which are the subject of a money laundering charge' (Bell, 2003). As money laundering is the use of criminal proceeds, the predicate crime is the crime that generates the proceeds. Although the first predicate offence was drug trafficking, by the mid-'90s, the definition of predicate offence broadened, and so the scope of AML measures expanded significantly. Perhaps the most 'politically sensitive' (Bell, 2003) or the 'key area of dispute' (Levi, 2002) has been whether tax offences should be a predicate offence for money laundering charges. However, given that tax offences are done today on a global scale and cause significant damage everywhere, it seemed necessary to include them. This considering especially that tax offences are in many jurisdictions a 'loophole' in their money laundering legislation (Bell, 2003).

The are many reasons why it took so long for tax offences to be considered a predicate crime which range from the lack of political agreement on

the issue to the interest of the banking sector and the opposition of many legal scholars. In this chapter, we will summarise them into three categories; later, we will describe how these ideas were overcome and how taxes landed into the 2012 FATF recommendations and the 4th AMLD, respectively.

The first line of argument is that tax evasion or tax offences are not a 'real or serious' crime, as they are white collar crimes and the harm they inflict is not comparable to that of drugs or terrorism. This view is not only flawed, as the law in many if not most countries considers tax evasion as a crime, but also fails to acknowledge the harm that tax evasion inflicts to the national coffers, in the words of the UK's Chancellor of the Exchequer 'All crimes should mean all crimes. Who is the victim is irrelevant. Tax crimes make the law-abiding suffer. It is they who make up the shortfall caused by those who cheat' (cited in Bridges, 1996).

The second line of argument is related to the difference between what constitutes illicit gains in a crime such as drug trafficking and that in a tax offence. The underlying argument is that the conduct behind the tax offence act is a legitimate one, meaning that the profit was made legitimately. The unpaid tax on this profit under this logic does not make the profits illegitimate (Oliver, 2002). However, this definition does not account for the fact that the crime is not the conduct generating the profit rather the concealment of part of this profit that should be paid in taxes — especially considering that the unlawful retention of money also gives a pecuniary advantage to those who commit the act.

The third position was mainly held by those professionals involved in money laundering. For example, in 1998 the European Banking Federation presented a paper to the European Commission stating that because there is not an identifiable asset to which a bank could apply money-laundering prevention, applying this principle would be difficult (cited in Oliver, 2002). Furthermore, applying the principle would be a significant burden on professional advisors, making them prone to being prosecuted for assisting money laundering. It is necessary to emphasise that although in 2015 tax offences were included in the 4th AMLD, the European Banking Federation criticised this inclusion once again (Böszörmenyi and Schweighofer, 2015). This third reason exemplifies how professionals are norm shaping agents of the tax ecosystem.

This discussion continued for much of the '90s and the first decade of the 2000s as can be seen in Table III.1, tax was hardly mentioned in any of the first FATF recommendations. In the first version issued in 1990 tax was not mentioned and in the two subsequent versions the word tax only appears in connection to tax advisors and their professional role as gatekeepers of the financial system, however, taxes are not mentioned as a predicate crime yet. The lack of inclusion of taxation reveals the lack of homogeneity in the global AML regime (Levi and Reuter, 2006) and the spaces that impede cooperation among jurisdictions. It is necessary to highlight that the 2003 FATF recommendations do define severe offences as those that are subject to more than one year or a minimum of six months imprisonment, however, whether taxes fall into this is dependent on each jurisdiction.

The connection of money laundering and tax crimes also became evident for the Organistion for Economic Co-operation and Development ('OECD') who in 2009 prepared a handbook as a practical tool for tax authorities to identify money laundering during the course of a tax audit. According to the OECD, tax authorities have a central role to play in identifying and reporting unusual money laundering transactions to the Financial Intelligence Units (FIU) this handbook was updated in 2019 (OECD, 2019). However, it was not until 2012 that taxes where included as a predicate crime according to the FATF recommendations, tax crimes were included as part of the predicate offences list. Table III.1 illustrates the evolution of mentions of tax in FATF recommendations.

TABLE III.1: Evolution of taxes in the AMLD recommendations.

FATF Recommendations	Mentions of Tax	Explanation
1990	0	
1996	2	R.15 related to tax advisors in their professional role
2005	5	R.15 is now R.13 but intact in terms of content
2015	20	Incorporation of tax crimes in the list of predicate crimes

III.4 The 4th AML Directive

As was the case with the previous editions of the FATF, the principles were incorporated by the European Union through a directive, specifically through the Fourth Anti Money Laundering Directive, the first EU AMLD dates back to 1991. Table III.2 similarly to III.1 details the evolution of taxes in throughout the documents of the EU AML Directives over time, in 1991 there was no mention to taxes, in the 2001 and 2005 editions the word tax was mentioned four and five times respectively and in both only concerning the role of tax advisors in their role as professionals that can facilitate money laundering. By 2015, the mention of taxes increased to twenty, with a particular focus on including tax crimes as predicate crimes for money laundering and emphasising exchange of information in order to fight tax crimes.

The 4th AMLD following the line of the FATF introduces the reference to tax crimes as a predicate offence for money laundering; this includes both direct and indirect taxation:

> "all offences, including tax crimes relating to direct taxes and indirect taxes and as defined in the national law of the Member States, which are punishable by deprivation of liberty or a detention order for a maximum of more than one year or, as regards Member States that have a minimum threshold for offences in their legal system, all offences punishable by deprivation of liberty or a detention order for a minimum of more than six months (4th AMLD Art. 3(4)f)."

TABLE III.2: Evolution of taxes in the AMLD recommendations.

EU AML Directive	Mentions of Tax	Explanation
1991	0	
2001	4	Only related to tax advisors in their professional role
2005	5	Only related to tax advisors in their professional role
2015	20	In addition to the existing articles on tax advice, tax crimes are included in the broad definition of criminal activity. Exchange of information in tax crimes related cases is emphasized

According to Langlois (2013) this definition rather than extending the scope of the directive is more an explicit demonstration of the increase in political will to fight tax fraud and evasion. The 4th AMLD was issued in 2015 and EU Member States had until 2017 to transpose it into their legislation. The definition that the 4th AMLD gives to money laundering is rather broad, as is the inclusion of tax crimes, that despite being explicit fails to give a concrete definition. Thus, leaving each jurisdiction to define or redefine what they consider a tax crime. Additionally, other relevant measures included in the directive are the reinforcement of the sanctioning powers of relevant authorities and provisions for data protection and privacy (Bergström, 2018).

The FATF and the EU are not alone in their efforts to incorporate tax evasion into money laundering regulation and legislation. The G20 and the OECD have also had their eye on the fight against tax evasion in order to ensure a fairer tax system. A clear example of this is the inclusion by the OECD in their 2017 report titled *Fighting Tax Crime: The Ten Global Principles* of Principle 1 that states explicitly that 'Jurisdictions should have the legal framework in place to ensure that violations of tax law are included as a criminal offence and that effective sanctions apply in practice' (OECD, 2017).

It has already been pointed out by many authors that different EU member states have a different understanding of what the purpose of AML law is (Unger et al., 2014). In this sense, it is essential to question whether adding tax crimes explicitly will help fight tax evasion and fraud through AML regulation, or whether these concepts will make AML laws more heterogeneous than before.

The lack of homogeneity across definitions and regulation of money laundering has also been highlighted in the literature (Unger, 2013) and by the EU itself (Thirion and Scherrer, 2017). In 2012, the Commission published a roadmap to harmonise these definitions based on Article 83(1) of the Treaty on the Functioning of the European Union (TFEU) (Borlini and Montanaro, 2017). However, although this proposal had the support of relevant EU bodies such as EUROPOL it was eventually turned down when member states refused to endorse the project (Met-Domestici, 2013).

III.5 Methodology

In order to analyse the implementation of tax crimes as a predicate crime for money laundering across the EU and the divergence on how jurisdictions define this, we built a database[4] that consolidates EU tax crime and money laundering regulation from all twenty-eight European Union members and Liechtenstein.

The comparative tax and money laundering law table uses an extensive number of resources.[5] The base of the information comes from a 2016 European Parliamentary committee (EP) set up in the wake of the Panama Papers.[6] As part of this EP investigation, the Chairman of the Committee requested information about every Member States ability to investigate cases of tax evasion, tax avoidance, tax fraud, and money laundering. In response to this, and published online, the Minister of Finance of each Member State submitted their capabilities of fighting tax crimes. However, this information was slightly dated and not comprehensive enough, so we looked for the relevant laws in the official gazette or legal database of each country.

Additionally, we complemented this search with surveys on tax law available through the Legal Database of Thompson Reuters and the IBFD (International Bureau of Fiscal Direction). Finally, we emailed every countries' ministry of finance and asked them to verify the information that we put on our table.[7] Although we tried to find the official translations to English for each legal text, this was not necessarily available; hence we recurred to translation tools such as Google Translate which we complemented with the

[4]The tax law database was also used as part of the master thesis titled 'Evading your Origins' by Jason Batchelor for the MSc in Economic Policy at Utrecht University. The legal table also had significant input from research assistant Francisca Vallejo J.D MSc.

[5]The references for the legal tables and the legal database is available through the Zenodo platform and/or upon request to the corresponding authors.

[6]The Panama Papers is a leak from 2016 of 11,5 million documents that belonged to the internal administration of the Panamanian law firm and TCSP, Mossack & Fonseca. The leaked documents showed how this firm together with banks incorporated 214.488 offshore companies in tax havens to facilitate tax avoidance, tax evasion and money laundering. (see. www.icij.org). Today every student and interested person can 'play' detecting offshore connections and networks by clicking https://offshoreleaks.icij.org. (Unger, 2017).

[7]The information regarding country replications is available as Appendix I. All suggestions and corrections by relevant authorities regarding form or content have been amended.

translator Linguee and legal translation dictionaries.[8] From the sources mentioned above, we obtained variables that are not only useful for our research, but that could be used in the future to answer other research questions. Tables III.3 and III.4 have a detailed list of the variables available.

We complemented the dataset by generating variables that allow for a more straightforward analysis of the law; this involved extracting the relevant information from the text. For some, this meant generating binary variables reflecting whether a concept is in the law or not, for others, we extracted precise numbers from the text such as the different penalties, thresholds for criminalisation, and prescription length. We converted all monetary figures to Euros, as of the conversion rate on 07/05/2019, and adjusted for purchasing power using the Eurostat Purchasing Power Parity 2017.

Tables III.3 and III.4 show the variables available in our dataset, however there are many more variables that could be obtained such as the maximum penalty for each type of tax crime, all threshold for tax crimes, etc. Hence this dataset is intended to be dynamic and information can be constantly added on or dissected from it.

[8]We complemented this with the help of local lawyers and professionals. Alexandra Nagoyeva, MSc. helped with translations from Hungarian and Slovak. Catalina Paparti, MSc helped with Romianian translations and Linda Kunertova, MSc with Czech.

TABLE III.3: Taxation variables in legal dataset.

Name	Description
Legal Origins	Identifies the legal origin of the law of the country; Scandinavian, Common, French, and German).
Native Terminology	The variable is what tax crime is called in the native language of each jurisdiction.
Translation	The variable is the Native Terminology translated into English.
Tax Crime	The variable contains the provisions for the tax crime as stated in the law of each country.
Threshold for Criminalisation	The variable contains the provision outlining the thresholds needed to be evaded for it to be considered a tax crime in law for each country.
Min threshold for criminal liability	The variable contains the minimum sum of money needed for it to be considered a tax crime in law for each country.
Min threshold to be eligible for max penalty	The variable contains the minimum sum of money needed to be evaded for it to attract the maximum penalty for the tax crime in law for each country.
Punishment for Crime	The variable contains the provision outlining the available punishments attached to the tax crime in law for each country.
Max-max criminal punishment	The variable is the maximum number of years in prison attached to the tax crime in law.
Prescription Criminal Time	The variable is the prescription time attached to the maximum possible penalty for the Tax Crime.
Legal person liability	The variable equals zero if only the legal person can be criminally liable for the crime, and equals one if both the legal person and the natural person who committed the offense can be criminally liable for tax crime. The variable equals 2 if the legal person cannot be criminally liable.

TABLE III.4: Money laundering variables in legal dataset.

Name	Description
Money Laundering Law	The variable contains the provisions for money laundering, as stated in the law of each country.
Money Laundering Punishment	The provision outlining the available punishments attached to the money laundering in law for each country. The references for each country are available in the table reference list.
Fine	Severest possible pecuniary punishment for the offense of money laundering, in Euros.
Threshold for Maximum Penalty	The minimum sum of money, in Euros, needed to be laundered for the maximum penalty to be attached to the offense.
Maximum Possible Jail Time	The variable has a numerical value that reflects the maximum jail time for money laundering. To code this, we code a max-punitive approach, meaning we take the maximum prison time.
Prescription Time	The variable contains the provisions established in the law for the prescription of money laundering as stated in the law of each country.
Minimum Threshold to be Eligible for Maximum Penalty	The monetary threshold necessary to be eligible for the maximum penalty in a country, if exists.
Money Laundering Prescription Time	The variable has a numerical value that reflects the prescription time for money laundering This might be either general prescription time or a specific one. In cases where prescription time is dependent on possible jail-time we take into consideration the prescription time that matches the maximum jail time for tax crimes. E.g. In Belgium, crimes that get above three years of jail time prescribe in ten years. Hence, we do not consider potential lower prescription times in cases of lower sentencing.
Natural Person liability for Legal person actions ML	The variable equals zero if only the legal person can be criminally liable for the crime, and equals one if both the legal person and the natural person who committed the offense can be criminally liable for tax crime. The variable equals 2 if the legal person cannot be criminally liable.

III.6 The legal dataset

The final output of the database mentioned above resulted in a total of 1708 data entries, and these are consolidated and summarised as an appendix to the end of this chapter.

Although the core tenants of the law are similar between the Member States, there were large discrepancies as to how they treat both money laundering and tax crimes. Every country has tax crimes as a predicate crime for money laundering, with almost all using the all crimes approach. The only countries in our dataset that use the list approach are Greece, Liechtenstein, Luxembourg, and Malta (Figure III.1).

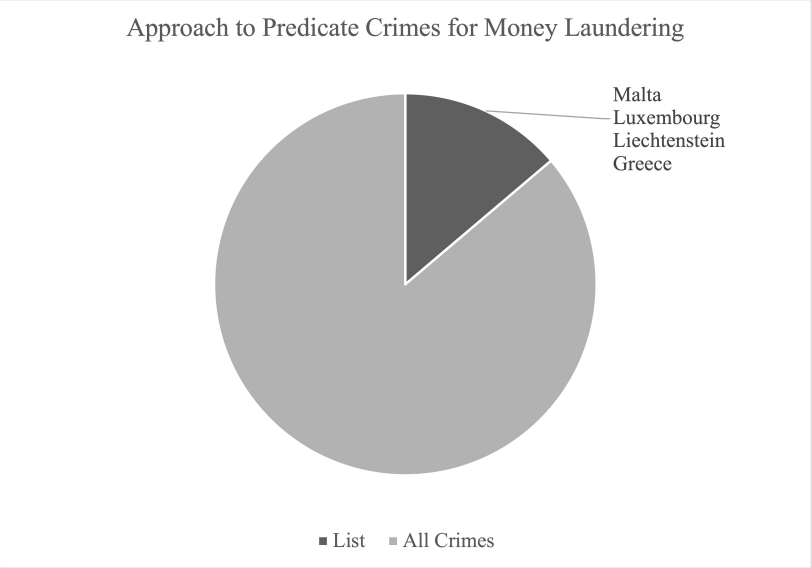


FIGURE III.1: Approach to predicate crimes for money laundering.

In this chapter we will analyse to core parts of the law for tax and money laundering, the penalties and the prescription time. Heterogeneity across the EU in either of them can pose serious challenges for the fight against tax crimes and can define the usefulness of money laundering a means towards fighting tax crimes. In addition, we draft potential explanations of these divergencies by seeing the commonalities between jurisdictions.

III.7 Penalties

Criminal legal codes have the main goal of setting the limits between what conducts are allowed and what actions are illegal. The penalties in a criminal code indicate the rules that govern citizen behaviour, when citizens violate these rules criminal law determines if the perpetrator is criminally liable and third it imposes the liability (Darley et al., 2001). Penalties do not only fulfill a deterrent role in a criminal code they also reflect how serious a crime is, for example in the case of a parliamentarian or semi-parliamentarian government they reflect 'parliament's view of the seriousness of the most extreme example of the offence' (MacKinnell et al., 2010).

This chapter explores the differences in penalties for tax crimes and money laundering across the European Union. Albeit, we take into consideration the penalties found within the tax crimes related articles as well as the articles related to money laundering, we do not take into consideration that jail sentences can be added up in certain jurisdictions or in case of aggravating factors such as when tax evasion is committed as part of organised crime. In order to determine the maximum penalty, we have taken a maximum-maximum approach hence we use the highest available prison time for the worst category of crime, the minimum is set relative to the same crime hence it is the minimum for the maximum crime. We do this in order to make the numbers comparable between countries, as jurisdictions can have anywhere between two to four or more categories of crimes with different punishments. Additionally, the minimum is zero for jurisdiction where sentencing is only established based on a maximum but do not specify a minimum, this is the case for jurisdictions such as: Cyprus, Denmark and France for Tax Crimes and Slovenia, Malta and the Netherlands for Money Laundering. This does not mean that judges do not have a practical minimum.

Analysing the heterogeneity of penalties both minimums and maximums has a twofold relevance. On one hand, these differences can lead to forum shopping across the member states which means that criminals may choose to focus their activities in member states with the least severe sanctions (Bondt and Miettinen, 2015) and criminals may not only choose for different locations but they can also exploit the differences in legal systems to their advantage (Arnone and Borlini, 2010). On the other hand, these differences can also signal the seriousness given to these crimes across member

states as a result of political, historical or economic reasons.

III.7.1 Penalties for tax crimes across the EU

When it comes to taxation the main deterrent goal of the penalty is to scare offenders and taxpayers from violating tax laws. However, there is still an ongoing debate on whether prison sentences foster voluntary compliance (Walker, 2000). If they have any effect it is in conjunction with the probability of detection as high penalties do not work by themselves. Table III.5 illustrates the overall picture for prison times for tax crimes in the EU 28[9].

When analysing minimum and maximum penalties across the EU it is crucial to do a between analysis. This means comparing the penalties between jurisdictions, this because in the case of forum shopping we can assume a criminal will want to go to the jurisdiction with the most lenient penalties in relation to his/her own country. For example, following Figure III.2 a map of the jurisdiction where the lightest jurisdictions are those with higher penalties and the darkest those with the lowest maximum penalties, in that case a criminal would prefer to go to a 'darker' country.

Figure III.3 illustrates the country specific situation of the ranges of prison penalties for tax crimes. The lowest minimum prison time is zero, this is the case in the UK, the Netherlands and Malta. For example, the lowest maximum prison time is half a year in Malta. The highest minimum prison time is seven years in Slovakia where they also have the highest maximum prison time which is twelve years same as Slovenia. On average the minimum prison time across the EU is 1.3 years and the average maximum prison time is seven years. The dashed vertical represents the 4^{th} AMLD requirement that tax crimes must be punished with a maximum penalty of over one year.

In this chapter we analyses the patterns of penalties for tax crimes in light of two key variables from the Financial Secrecy Index:[10] avoids promotion of tax evasion and administrative capacity. The indicator of 'avoids promotion of tax evasion', assess whether or not a jurisdiction facilitates tax evasion.

[9] At the moment of writing this chapter the United Kingdom was still part of the European Union hence it is considered as such in our analysis

[10] A full description of all variables of the FSI is available at: https://www.financialsecrecyindex.com/

TABLE III.5: Prison times for tax crimes across the EU.

	Minimum prison time *(in years)*	Maximum prison time *(in years)*
lowest	0	0.5
highest	7	12
average	1.3	7

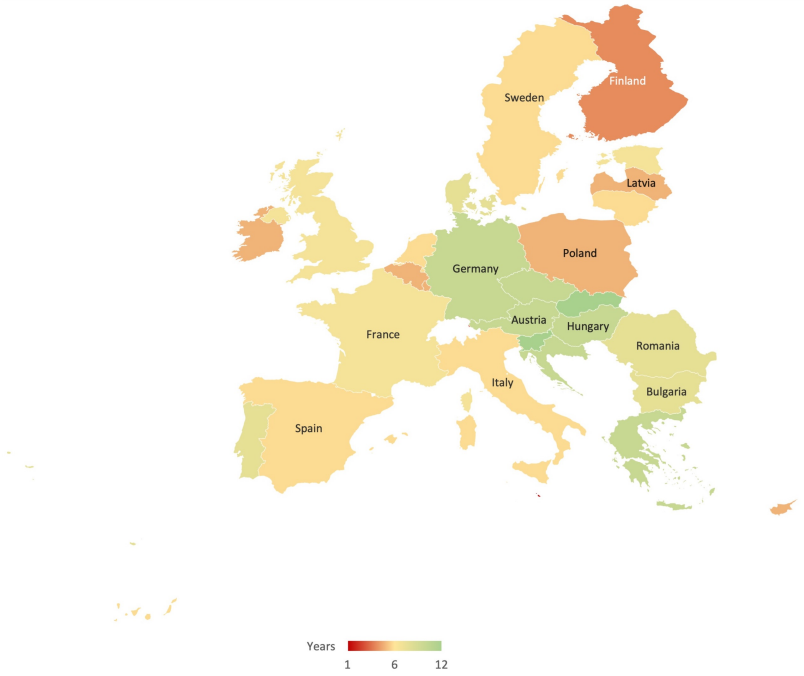


FIGURE III.2: Heatmap of maximum prison time for tax crimes.

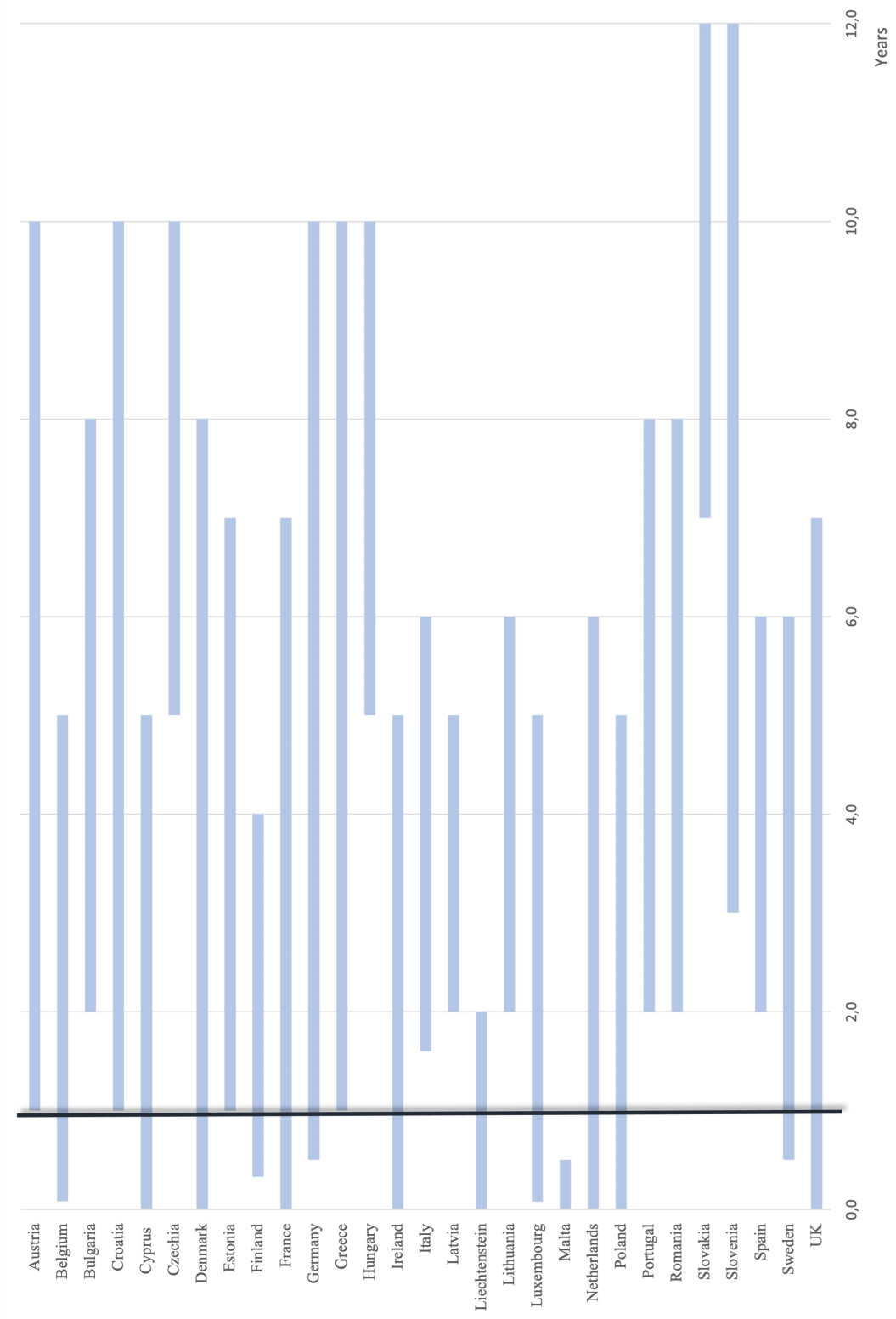


FIGURE III.3: Ranges of prison penalties for tax crimes.

The administrative capacity indicator considers the capacity of a jurisdiction's tax authority to collect and process data for investigating and taxing those who can escape their tax duties. Additionally, we use a descriptive variable from our own dataset based on the legal origins of each jurisdiction, in order to see if countries with the same legal origin follow the same patterns in terms of their punitive approach. There are four legal origins in Europe: common law which is predominant in Anglo-Saxon countries (Ireland and the UK) and three different strands of civil law: Germanic, French, and Scandinavian. Former socialist countries that belonged to the USSR are also re-coded into one of the latter.

In the EU there are three countries that have very low maximum penalties Malta (half a year), Lichtenstein (two years) and Finland (four years), two of these countries Malta and Liechtenstein rank high in terms of the facilitation of tax evasion according to the Financial Secrecy Index (see Chapter 6). Although Finland has a very low maximum penalty it does not seem to be a jurisdiction that promotes tax evasion, the reason behind its low ranking is most likely related to a historical decrease in its punitive legal features by finding alternatives to imprisonment (Lahti, 2017).

A similar logic applies to those countries that have high maximum penalties for tax crimes (Austria, Croatia, Czechia, Germany, Greece, Hungary, Slovakia, and Slovenia). All of these countries have between ten and twelve years of prison for tax crimes, and with the exception of Czechia and Slovakia they all rank relatively low in terms of facilitation of tax evasion. Furthermore, the FSI ranks ten EU jurisdictions high on the promotion of tax evasion, out of these only Czechia and Slovakia have high minimum prison times (Table III.6).

All other jurisdictions ranking high on the promotion of tax evasion have between zero and two years minimum prison time for tax crimes. In Figure III.3 we can see the range of prison time that can be awarded for tax crimes, Liechtenstein and Malta both have a very low range of prison time that can be given to a tax offender. Between zero and two years in Liechtenstein and between zero and half a year in Malta. Both of these jurisdictions also rank high in terms of promotion of tax evasion. In Table III.6 we list the top ten of EU Jurisdictions that promote or facilitate tax evasion. We find that those countries that promote tax evasion on the FSI also have low minimum

prison times for tax crimes and medium to low maximum prison times for tax crimes. The seriousness given to a crime is related to the maximum sentence available, hence it is not surprising that those countries that promote it also don't have serious penalties for it. There are two interesting outliers in this list Slovakia and Czechia. Both have been actively trying to fight tax crimes more strongly which could be the reason why they have a high minimum and maximum prison time. Yet these changes in the law are only the first step and hence do not yet result in lowering their promotion of tax evasion rank.

Another relevant variable is that of tax administrative capacity. When ranking the EU Member States by their tax administrative capacity the worse performing are Belgium, Estonia, Germany, Lichtenstein and Luxembourg. With the exception of Germany, all these jurisdictions have either a low or medium maximum prison time for tax crimes and a negligible minimum prison time that ranges between zero and one year.

When it comes to maximum prison times there is also a slight trend in the line of legal origins theory, as all of the countries with the highest prison times have a Germanic legal origin. Table III.7 shows a list of the countries with the highest maximum prison times in years and their legal origin. Although Greece seems to be the exception in our list, the German legal tradition did influence the legal structure of Greece (La Porta et al., 2008).[11] In addition and in line with our expectation countries with Scandinavian tradition have either low or medium maximum penalties, as these nations have reformed their laws in order to reduce the use of imprisonment (Lappi-Seppälä, 2007).

III.7.2 Penalties for money laundering across the EU

Similar to tax, the role of prison sentences for money laundering is both deterrent and punitive. However, money laundering legislation is seen as an additional deterrence, to deter the criminal from committing the crime that originates the dirty money and to impede them from enjoying their ill-gotten

[11] For our dataset we used the excel coding of legal origins available with the following paper: La Porta et al., 1999. 'The Quality of Government.' Journal of Law, Economics and Organization 15 (1): 222-279, where Greece is coded as of French legal origin. However in a more recent paper of the same authors Greece is said to have Germanic influence.

TABLE III.6: Promotion of tax evasion (FSI) and prison times.

	Promotion of Tax Evasion	Minimum Prison Time	Maximum Prison Time
1	Slovakia	7	12
2	Romania	2	8
3	Netherlands	0	6
4	Liechtenstein	0	2
5	France	0	7
6	Czechia	5	10
7	Ireland	0	5
8	UK	0	7
9	Malta	0	0.5
10	Luxembourg	0.1	5

TABLE III.7: Maximum prison times and legal origin.

	Promotion of Tax Evasion	Maximum Prison Time	Legal Origin
1	Austria	10	Germanic
2	Croatia	10	Germanic
3	Czechia	10	Germanic
4	Germany	10	Germanic
5	Greece	10	French*
6	Hungary	10	Germanic
7	Slovakia	12	Germanic
8	Slovenia	12	Germanic

gains. Table III.8 illustrates the overall picture for the EU regarding maximum and minimum penalties in prison time for money laundering. The lowest minimum prison time is zero and the highest is 12, regarding maximum prison time the lowest maximum is five and the highest 20.

TABLE III.8: Maximum prison times across the EU for money laundering.

	Minimum prison time (in years)	Maximum prison time (in years)
Lowest	0	5
Highest	12	20
Average	1	10

Figure III.4 illustrates the range of punishments available in terms of jail time for money laundering across Europe. Many countries have more than one money laundering article, each with its own criminalization and punishment. For the sake of comparison, we take into consideration the primary offence and its corresponding punishment. The harshest punishments can be found for Slovenia (where an individual could face up to twenty years of prison for money laundering), Malta (where it can go up to eighteen years) and Bulgaria (where an individual could face up to fifteen years in jail).

When it comes to low maximums for money laundering, there are four jurisdictions where the maximum is only five years: Luxembourg, Liechtenstein, Germany, and Belgium. These four jurisdictions also rank as weak in terms of tax administrative capacity. This is interesting as tax administrations do not only have a role in identifying tax evasion but also in reporting suspected serious crimes such as money laundering (OECD, 2017). Furthermore, Luxembourg and Liechtenstein have other similarities in common, as mentioned previously, they both rank highly in terms of facilitation of tax evasion.

To analyse prison time for money laundering we also take into consideration the anti-money laundering variable in the FSI that measures the extent to which the countries regime is failing to meet the recommendations of the FATF. The index assigns a score to each jurisdiction between 0 and 1, where 1 means the country is failing to meet the FATF recommendations. The worst

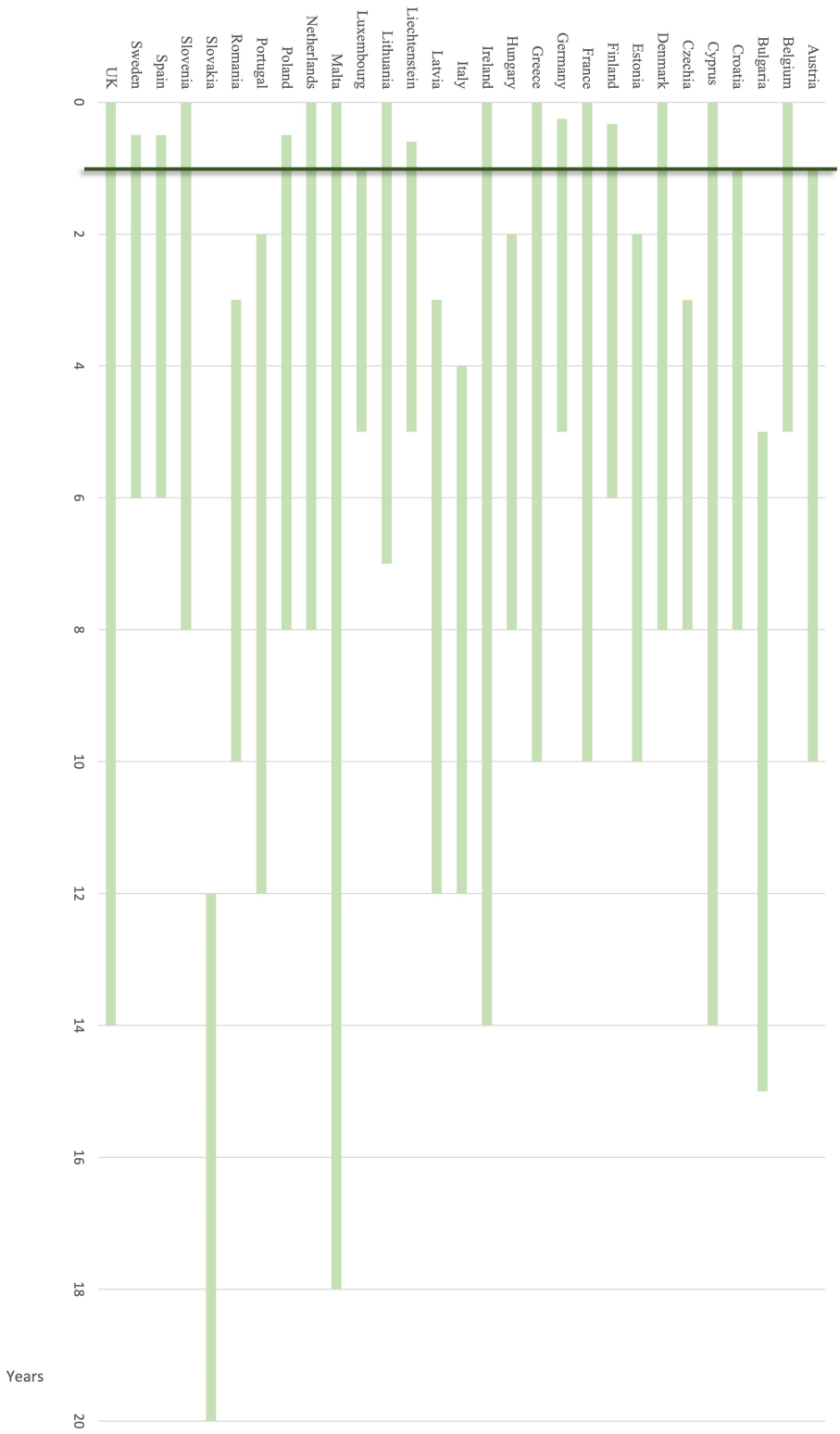


FIGURE III.4: Prison penalties for money laundering

performing EU country is Greece and it scored 0.66 points. There is no pattern in the countries that rank the worst in this variable in regard to the maximum possible penalty for money laundering. In regard to their legal origin, the pattern that repeats itself if that none of the Scandinavian countries have a high maximum penalty. In Sweden, Finland and Denmark the maximum penalties range between six and eight years.

Finally, but very relevant for the future harmonisation of money laundering law across the EU, in 2018 the European Parliament and Council informally agreed on, among other issues, to set a standardized EU minimum penalty for certain crimes. The amount of years discussed was four years of imprisonment for money laundering maximum sentences (Parliament, 2018). Our data shows that there are only three countries that satisfy this principle (Italy, Bulgaria, and Slovakia). Hence this requirement would require many countries to heavily increase their minimum sentences.

III.7.3 Tax evasion and money laundering

Penalties reflect the seriousness attached to a crime, but in many cases, it is also a reflection of the prevailing culture of the country. We find that countries that promote tax evasion (as determined and defined by the the FSI) also do not punish it as harshly as those who do not. Yet, given that the implementation of the 4^{th} AMLD makes tax crimes a predicate crime for money laundering, this analysis would not be complete without seeing both side to side. Figure III.5 represents the maximum penalties for tax crimes (in black) and money laundering (in light grey), if the maximum is the same there is only a black dot.

From the image it is clear that there are three types of jurisdictions: those that consider money laundering 'worse' than tax crimes, those that consider it equal and those who consider it less (see Table III.9). In the first category we have sixteen countries; Bulgaria, Cyprus, Estonia, Finland, France, Italy, Latvia, Lichtenstein, Lithuania, Malta, the Netherlands, Poland, Portugal, Romania, Slovakia, and the United Kingdom. There are seven countries in the second category of countries who punish them with an equal maximum: Austria, Belgium, Denmark, Greece, Luxembourg, Spain and Sweden. Lastly, there are six countries that have higher available punishments for tax

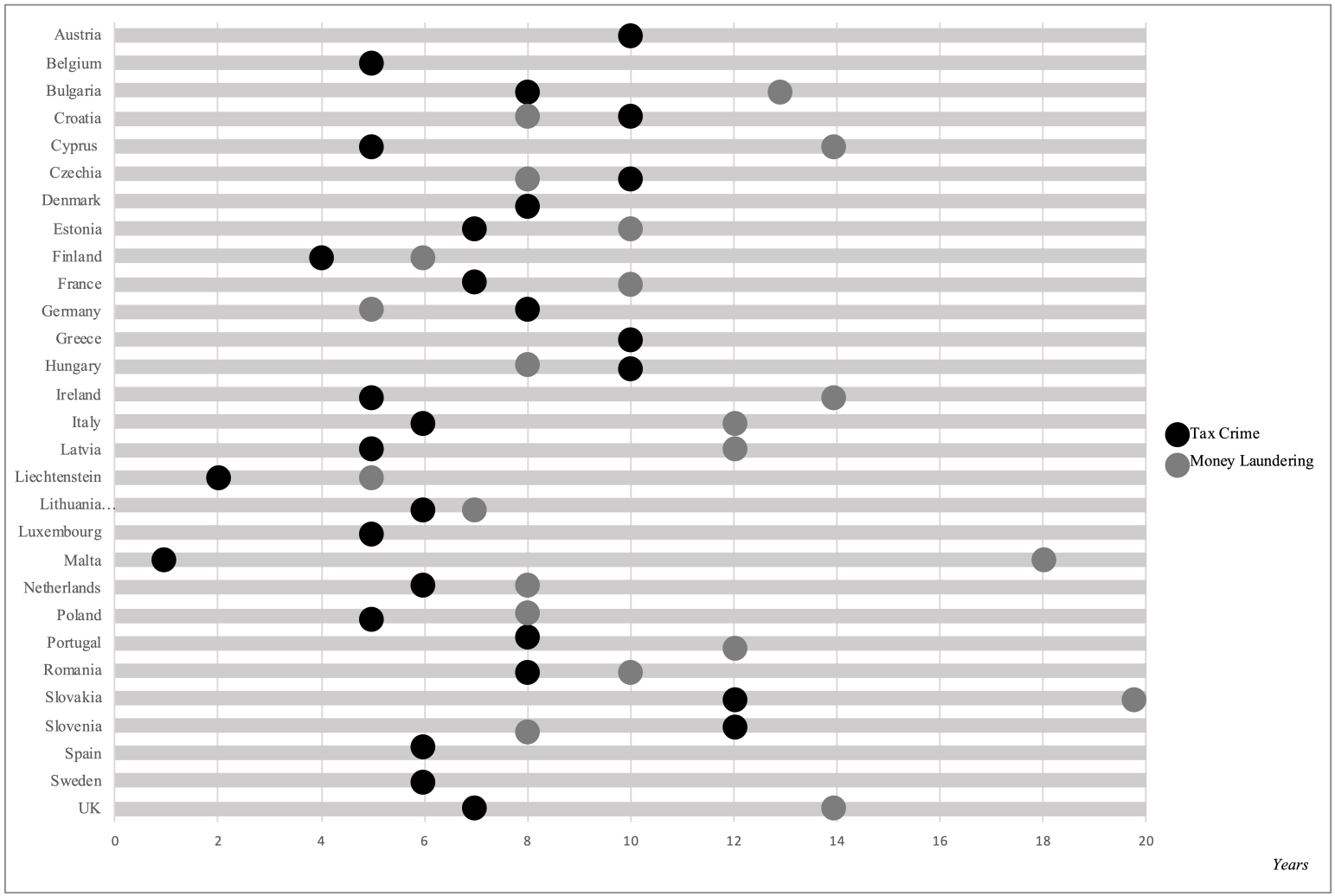


FIGURE III.5: Maximum prison times for tax crimes and money laundering compared

crimes than money laundering; Croatia, Czechia, Germany, Hungary, Romania and Slovenia.

TABLE III.9: Money laundering and tax crime treatment.

Tax and Money Laundering Treatment	Countries
Money laundering >Tax crime	Bulgaria, Cyprus, Estonia, Finland, France, Italy, Latvia, Lichtenstein, Lithuania, Malta, the Netherlands, Poland, Portugal, Romania, Slovakia, United Kingdom
Money laundering = Tax crime	Austria, Belgium, Denmark, Greece, Luxembourg, Spain, Sweden
Money laundering <Tax crime	Croatia, Czechia, Germany, Hungary, Romania, Slovenia

When analysing these three groups we find that all countries that punish tax crimes more than money laundering share in common that their laws are of Germanic legal origin. In addition, the three countries that have a common law origin (Malta, Ireland and the UK) all punish money laundering more than tax crimes. Furthermore, with the exception of Czechia, no country that ranks high in promotion of tax evasion punishes tax evasion more than money laundering. An extreme case is that of Malta that has the lowest maximum punishment for taxes and the second highest maximum punishment for money laundering.

How these sentencing possibilities will play out in practice still needs to be seen and it will depend on their approach to sentencing. Countries that can add up the sentence of tax crimes and money laundering, and those countries that punish money laundering harsher than tax crimes and sentence based on the 'worst' crime can benefit from the incorporation of tax crimes as a predicate for money laundering as it allows for a harsher punishment and potentially better deterrence. Recidivism is high in white collar crimes such as tax crimes due to the lenience in sentencing and punishment (Fredericks et al., 2016), hence having higher punishments available can deter those who would commit a tax crime.

III.8 Prescription Times

The second relevant variable that this chapter analyses are prescription times or their common-law equivalent of statute of limitations. These times reflect

how long can the crime be prosecuted after it has been committed. Their relevance is two-fold, on one hand prescription periods are crucial for co-operation among countries, on the other they represent a ticking clock for prosecutors and investigators. By making tax crimes a predicate crime for money laundering, the prescription time of money laundering becomes relevant for tax crimes and vice versa. In this sub-section first we will briefly explain the dual functionality of prescription periods, second we provide an overview of the prescription periods across the EU and find the patterns they follow in the EU and finally we analyse their interactions and how can this help in the fight against tax crimes.

The cooperation role of prescription times is related to the mutual assistance that jurisdictions can give each other in terms of exchange of information, notification of liabilities and asset (unpaid tax) recovery. Although states must assist each other, the formal procedure of requesting such assistance is limited by the prescription period (Baker et al., 2011). In spite of the fact that cooperation might happen through other channels, their validity can still be questioned in court, if it does not abide by principles that respect the so-called 'fundamental tax rights' such as the statute of limitations (Dourado, 2013). In practical terms this means that if in jurisdiction A tax crimes prescribe after eight years, and it asks information of a certain account in jurisdiction B where tax crimes prescribe after four years; jurisdiction B might not be able to give information that can be crucial to the case.

The second role of prescription times is to limit the time that a crime can be prosecuted. The main argument behind this is to protect individuals from false accusations as the accused might not be able to access evidence to disproof the claims. It is also said that these times are a way to make officials (investigators, prosecutors, etc.) discover and take to trial those who violate the law as swiftly as possible ('The Statute of Limitations in Criminal Law: A Penetrable Barrier to Prosecution' 1954). In recent times, prescription times were discussed widely in the context of the Panama Papers, where for example the Panamanian prosecutor of the Mossack Fonseca case, had a tough job as the violations of Panamanian law by the company were subject to a strict statute of limitations (Bernstein, 2019).

Figure III.6 illustrates the different prescription times for tax crimes and money laundering across the EU. Many countries have higher prescription

periods for money laundering than for tax evasion[12]. Out of the twenty-nine jurisdictions, nine have higher prescription periods for money laundering than for tax crimes, fourteen have the same prescription periods for both offences and six have higher prescription periods for taxes than for money laundering.

When taking into consideration these three groups of countries, the countries that have higher prescription periods for tax crimes than for money laundering (listed in Table III.10) also have higher maximums for tax crimes than for money laundering. This reinforces the notion that criminal law is a reflection of what is considered a 'harsher crime'. In these countries tax evasion seems to be more serious or at least it seems to guaranty having stronger means of punishing both in terms of higher prison sentences and more time to process the crime.

TABLE III.10: Difference of prescription times between tax crimes and money laundering.

	Money Laundering	Tax Crimes	Difference between Tax Crimes and Money Laundering
Romania	8	10	2
Hungary	8	10	2
Germany	5	10	5
Slovenia	20	30	10
Latvia	5	15	10
Belgium	10	never	89

The countries that can theoretically benefit the most according to our table are those with very low prescription times for tax evasion relative to money laundering: Austria, Ireland, Malta, Portugal, the Netherlands, Italy, Poland, Luxembourg and Bulgaria. Having tax crimes as a predicate crime for money laundering can extend the period over which tax crimes can be investigated and ultimately prosecuted.

However, there are more factors that come into play. In certain jurisdictions the limitation periods can be extended when the crime is committed by a criminal organisation, in others the conviction of money laundering is only

[12]In order to have comparable data we use the highest possible prescription time for both tax crimes and money laundering.

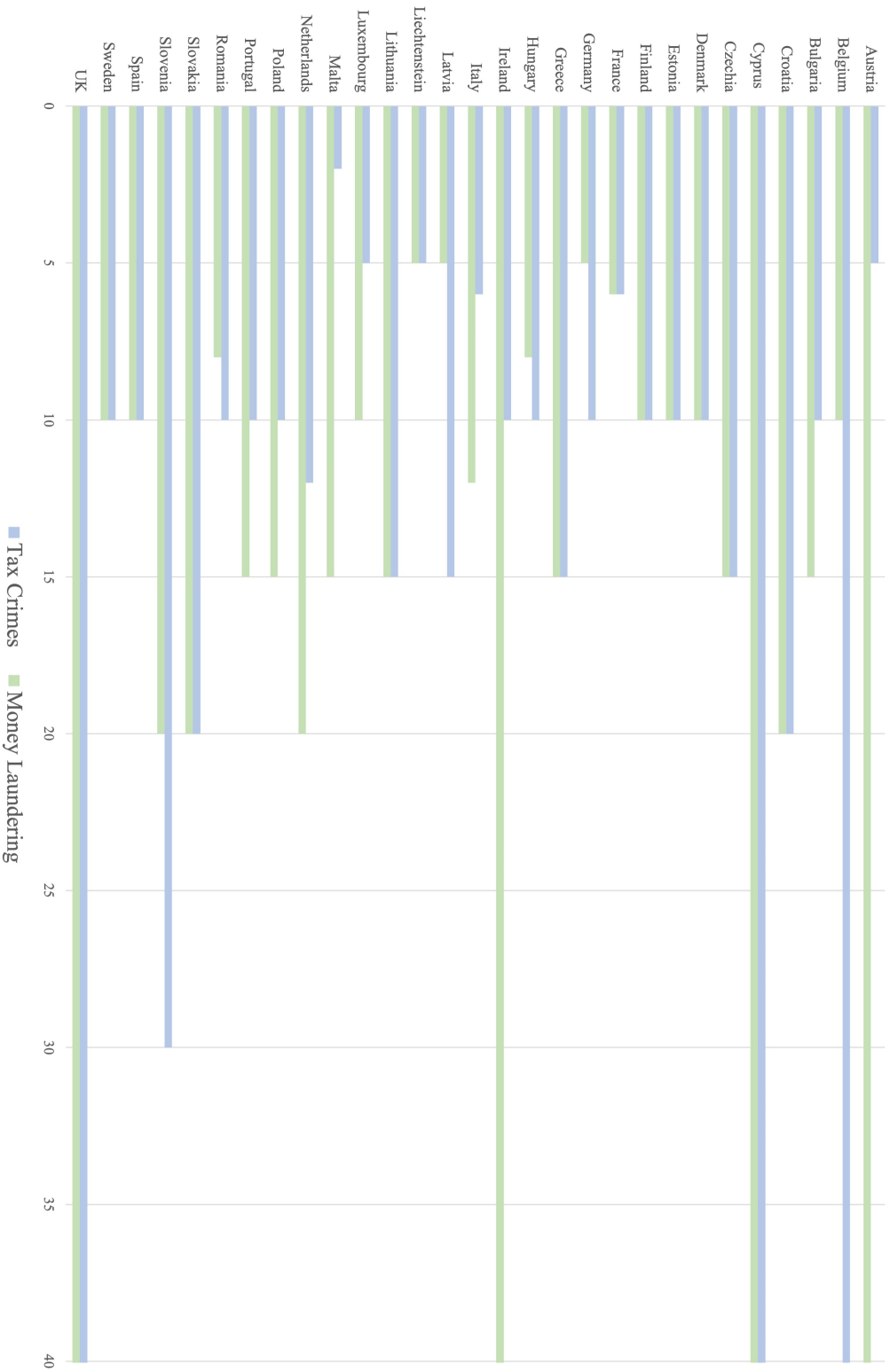


FIGURE III.6: Prescription times for tax crimes and money laundering in the EU.

possible if the predicate crime has not prescribed (Stephenson et al., 2011), in jurisdictions such as the Netherlands, money laundering is considered an 'on-going' crime that exists as long as the money is there, and hence can practically never prescribe – although the law states the period is 12 years – (Huygen van Dyck, 2015). Hence in order to understand the full complexity it would be necessary to go into the nitty-gritty of each country's specific prescription times. However, our data does show the overall picture of the current situation in the EU, and how making tax crimes a predicate crime for money laundering can be useful legal tool.

III.9 Conclusions

This chapter sheds light on the divergence of tax crimes and money laundering legislation across Europe after the implementation of the 4th AMLD. We analysed the 4th AMLD as a shock that put the tax ecosystem into money laundering regulation, and we analysed the way two key factors – prison times and prescription times– limit or affect the use of money laundering regulation in the fight against tax crimes.

The implementation of the rule that tax crimes are a predicate crime for money laundering is a historical step in the fight against tax evasion. However, our research also shows that this step alone is not enough. When taking into consideration the heterogeneity of tax laws and money laundering across the EU we see two practical implications a) space for forum shopping due to the differences in minimum and maximum prison times for both crimes and b) difficulties for cooperation amongst countries due to differences in statutory limitations to tax or money laundering prosecution. The heterogeneity of tax crime law in Europe adds on to the problem of lack of harmonisation in money laundering regulation across Europe

When analysing the reasons that might explain this divergence, we find that jurisdictions that promote tax evasion according to the Financial Secrecy Index (see: Ateş et al., 2021) are also more lenient than other jurisdictions when it comes to their tax crime law. Hence these jurisdictions are not only attractive to tax avoiders but potentially to tax criminals and those who wish to commit their crimes in the most lenient jurisdictions. This aspect is worth

analysing further. It would be especially interesting to compare the maximum and minimum prison times in the law to those that judges give in practice. For such an analysis to be possible, all EU countries would have to make tax crime statistics widely and freely available.

Another aspect to be considered are the trends related to the legal origins of countries. Implementation and drafting of EU directives often fails to recognize that historical and legal differences can impact the way legislation is implemented across Europe, if these differences are known beforehand, they can be accounted for when enacting regulation.

This research has raised many questions in need of further investigation. What would be now needed is a cross-national study analyzing the effectiveness of tax and money laundering investigations. A big challenge for our research was finding information about cases, number of prosecutions, number of investigators, etc. per country. For further work on this topic, it is crucial to increase transparency and availability of such information across the European Union.

Chapter IV

All bark, but who bites?[1]
Shedding Light Inside the Black Box of Reform Implementation

IV.1 Introduction

As mentioned in III in 2012 the Financial Action Task Force (FATF), an intergovernmental organization that sets international standards to fight money laundering, recommended to include tax crimes as a predicate offense[2] for money laundering. The European Parliament followed the FATF and in 2015 passed the 4th Anti-Money Laundering Directive[3] (4th AMLD, Directive (EU)

[1]A version of this chapter has been published as: Rossel, L., Unger, B., Ferwerda, J. (2021). Shedding light inside the black box of implementation: Tax crimes as a predicate crime for money laundering. *Regulation Governance*. I would like to thank my co-authors Brigitte Unger and Jason Ferwerda for their collaboration and dedication to the project.

[2]Defined as "the underlying criminal offense that gave rise to the criminal proceeds which are the subject of a money laundering charge" (Bell, 2003)

[3]So far, the EU approach towards money laundering has come in the form of Directives as they allow individual countries to decide how they transpose regulation into their legislation. Directives work more as guidance of minimum standards leading to minimum levels of harmonization. Unlike the two other European Policy instruments regulations and decisions that are directly applicable and result in maximum harmonization or identical legislative agreements (Kirschenbaum and Véron, 2018)

2015/849)[4] that incorporates tax crimes[5] as a predicate crime for money laundering into EU regulation. EU Member States had until 2017 to transpose the 4th AMLD into their legislation. However, tax crimes are included without a concrete definition, leaving each jurisdiction to define or redefine what they consider a tax crime. This means discrepancies can arise in the practical implementation of said principle.[6]

An example of the striking differences across countries is the following. We asked respondents from different countries to analyze the same case, inspired by a former Bayern Munich football player who evades 5 million euros in taxes through a Swiss bank account. Responses diverged so much that this superstar's situation would have been entirely different in neighboring countries, Belgium and the Netherlands. In Belgium, the former player would not face jail time, while in the Netherlands, he would face both tax crime and money laundering charges and go to jail for at least eight years. In Greece, this same case would have been only subject to administrative charges due to "bureaucratic reasons," as our respondent highlights. What explains that these countries treat such a case differently after implementing the same EU Directive?

[4]There have been many changes in the tax and anti-money laundering legislation landscape since the issuance and implementation of the 4th AMLD in 2015 and 2017, respectively. The 5th AMLD was adopted by the European Parliament on April 19th, 2018 and published in the Official Journal of the European Union June 19th, 2018. The 5th AMLD is often called the 4th AMLD amendment, not only because it came so soon after it but because rather than putting forward new initiatives it modifies and deepens the 4th AMLD in three areas: ultimate beneficial ownership, use of prepaid credit cards and financial intelligence units. The 5th AMLD keeps the inclusion of tax crimes as a predicate offence for money laundering (EU, 2018/843) but still does not provide a concise definition of tax crimes. For an analysis of the 5th AMLD refer to Turksen and Abukari (2020). The 6th AMLD issued in 2018 must be transposed by December 2020.

[5]"All offences, including tax crimes relating to direct taxes and indirect taxes and as defined in the national law of the Member States, which are punishable by deprivation of liberty or a detention order for a maximum of more than one year or, as regards Member States that have a minimum threshold for offences in their legal system, all offences punishable by deprivation of liberty or a detention order for a minimum of more than six months (4th AMLD Art. 3(4)f))".

[6]The lack of a concrete definition for tax crimes goes in line with the notion that directives work as guidance of minimum standards and with Art. 83 (1) and (2) of the Treaty on the Functioning of the European Union (TFEU) that allows the establishment of minimum rules concerning definitions of criminal offenses and their sanctions while keeping a balance between European interests and internal coherence of the own laws and sanctions of Member States (ECLAN and ECORYS, 2015). And in line with Directive 2017/1371 on the fight against fraud to the Union's financial interests by means of criminal law, whereby the structure and functioning of the tax administrations is left to each Member State.

This chapter seeks to complement III, that analyzes how different countries implement a law in their books, by exploring how laws are used by different public actors, and how this practical implementation also affects the success of a reform. In addition the chapter contributes to the ongoing quest to understand how the Europeanization and domestication of policy are complementary forces (Thomann and Sager, 2017) that interplay in the practical implementation of policy both in the books and in action. We choose the implementation of tax crimes as a predicate crime for money laundering as an example of a *single-issue* tackled by a European Directive. Single-issues can be a more relevant unit of analysis as Directives regulate diverse issues that can often be transposed into different national legislations (Thomann, 2015; Toshkov, 2010). This particular single-issue is the result of European regional governance and global recommendations. The global influences are evident because, like the FATF, the EU did not incorporate a concrete definition of tax crimes. The decision to designate which tax offenses are defined as crimes was left to each member state, potentially leading to a divergent (practical) implementation of this principle and other rules of the 4th AMLD (Mitsilegas and Vavoula, 2016; Unger, 2017). The absence of a unified definition of tax crimes in the EU *acquis communautaire* results from a lack of consensus among member states (Thirion and Scherrer, 2017; Turksen and Abukari, 2020). However, it is relevant to highlight that the parliament noted that "Agreeing on a definition of tax crimes is an important step in detecting those crimes" (of the European Union, 2014).

Directives by construction leave discretion to the Member States as to how regulations are transposed into legislation. As a result, traditional *Europeanization* research has focused on whether European Directives are or not transposed into domestic laws, focusing mainly on dates and rates of transposition and the legal compliance of minimum standards (conformance implementation) set by European Directives across different countries (Toshkov, 2010; Treib, 2014). However, this neglects the degree to which policies and recommendations can be modified, and the domestic variations, customization or *domestication* process (Bugdahn, 2005) that can occur when implementing supranational regulation. Moreover, it neglects that while a Directive may be "perfectly" transposed into national legislation, it might still be practically implemented differently and not function similarly in practice across countries. For example, although by 2005, there was a 98% success rate on the transposition of EU Directives, this number does not tell how

these Directives were transposed (Mastenbroek, 2005). Finally, as Thomann and Zhelyazkova point out, "studying legal compliance without considering adaptations of EU policy to domestic circumstances provides an incomplete picture of EU implementation" (Thomann and Zhelyazkova, 2017).

However, a more comprehensive analysis of the law in the books still misses how regulation is interpreted, used, and applied in practice *(law in action)*. Bureaucrats are implementing EU Directives and therefore act as a *second frontline*. This can create significant legal ambiguities (Dörrenbächer, 2017). There has not been enough research on how individuals implement EU policy on the ground (Thomann and Sager, 2017). How the practical implementation of EU Directives works out across the EU Member States is thus considered a black box or black hole in the study of EU regulatory compliance (Mastenbroek, 2005; Thomann and Sager, 2017; Versluis, 2007).

We study the legal adaptations or differences in defining tax crimes across the European Union after implementing tax crimes as a predicate crime for money laundering and how this principle is used in practice. We build a unique dataset[7] that includes legal and practical information for the 28 EU Member States[8].

For the law in action, we conducted a survey where we asked experts in the second front line of implementation (e.g., lawyers, public prosecutors, and tax inspectors) how they would proceed in the prosecution and investigation of three sample cases related to tax crimes and money laundering. Our methodology allows us to compare the handling of the same case across all EU Member States and understand its legal basis. We use this survey as an alternative to the traditional comparative criminal law analysis that often results in hundreds of pages to answer only one single question[9] for few countries.

For the law in the books, opposite to a binary yes/no variable approach

[7]We thank Dr. Jan van Koningsveld and two research assistants that contributed significantly to this dataset Jason Batchelor and Francisca Vallejo. The law in the books can be found online at: https://doi.org/10.5281/zenodo.3476656 (Rossel et al., 2019)

[8]When this research was carried out the United Kingdom was still part of the European Union and hence is included in the analysis.

[9]E.g., the Ph.D. of Hufnagel (2004), answers a question *(whether a lawyer who defends a drug dealer is a money launderer)* for Germany, Austria, Switzerland, and the US in 293 pages.

(Schwarz, 2011), we collected legal information, such as maximum and minimum prison penalties and prescription times for both crimes, to capture more than whether a crime is punishable or not by law. Knowing more than whether the country abides by the minimum standards of the Directive allows us to go beyond the compliance vs. non-compliance debate that masks significant implementation variance (Bondarouk and Liefferink, 2017). We complement our data with semi-structured, in-depth interviews with selected investigators and prosecutors. This mixed-method approach allows us to better understand the nuances of the implementation process.

The findings of this chapter contribute to the overarching aim of this thesis to understand tax policy and its reform as multi-staged process. In addition the findings contribute to the understanding of how and why EU policy can entail divergent national outcomes. In general, we find that when zooming in the implementation of a single issue, countries *fall back in their old ways* when they have the leeway to do so. As Thomann and Zhelyazkova (2017) suggest, the customization process can show how member states try to regain control. By falling back, we mean that country characteristics do not explain just transposition patterns, as previously found in the literature (Falkner et al., 2005; Toshkov, 2010). Instead, country characteristics might also explain the domestication and customization that regulation goes through when implemented in a countries' legislation and how those who are part of the *second frontline* of implementation use and apply the rules in action.

We put forward and test two hypotheses that can explain said differences. First, basing ourselves on implementation theory that suggests that bureaucratic capacity, regulatory styles, and administrative traditions can explain transposition patterns and non-compliance (Börzel et al., 2010; König and Luetgert, 2009; Toshkov, 2010; Zhelyazkova et al., 2016), we argue that government capacity and quality can explain differences in the performance implementation of tax crimes as a predicate crime for money laundering. We operationalize government capacity and quality through country features such as corruption, government effectiveness, and regulatory quality. Second, we use implementation theory complemented by theory on preferences and attitudes of Member States and their actors and apply it directly to the tax realm. Thus, we argue that cross-country differences can be explained by tax specific authorities' characteristics and the beliefs and preferences of

domestic actors (Mastenbroek and Kaeding, 2006) regarding taxation. We operationalize this through a tax profile concept, a composite of variables such as tax morale and tax administrative capacity.

We find that less corrupt countries that rank better in terms of regulatory quality and have more effective governments are less punitive in the books and tend to prosecute a case only for tax crimes rather than for money laundering. Furthermore, we also find that countries with high tax morale and less secretive tax courts, and high administrative capacity, give more discretionary power to judges. Finally, we find that countries with low tax administrative capacity and harmful tax structures tend to limit the prosecution of tax crime cases.

The rest of the chapter is structured as follows. Section IV.2 provides a framework that merges the global and European governance of money laundering with the literature on Europeanization and domestication of European Directives and provides the underpinnings behind our choice of explanatory variables. Section IV.3 details the data collection and methodology. Section IV.4 contains the analysis and results, and Section IV.5 explains the conclusions, limitations, and suggestions for further research.

IV.2 Global influence and European implementation of money laundering directives

Money laundering has become subject to supranational governance on a global and regional scale. On a global level, the most recognizable form of soft multilateral law on money laundering started when the G7 and other guest countries initiated the Financial Action Task Force (FATF) in 1989. The FATF established international standards by issuing a set of Forty Recommendations. Countries that did not commit to these standards were pressured to comply through blacklists (Muller et al., 2007; Schwarz, 2011; Unger and Ferweda, 2008). Given the FATF Recommendations' soft law nature, individual jurisdictions have the flexibility to adapt their legal framework to comply with both the international standard and their own needs. This feature remains polemic as academics and practitioners have not reached a consensus on whether the flexibility hinders or fosters effective enforcement

and convergence (Nance, 2018).

On a regional level, the European Union was not exempt from the pressure to regulate money laundering. Hence, its regime evolved through regional standard-setting parallel to the global standards of the FATF. As Mitsilegas and Vavoula (2016) point out, all EU anti-money laundering Directives have been justified as necessary to implement FATF recommendations. As a result, the expansive approach in terms of predicate crimes by the FATF is followed regionally. The timeline of their evolition can be seen in figure IV.2

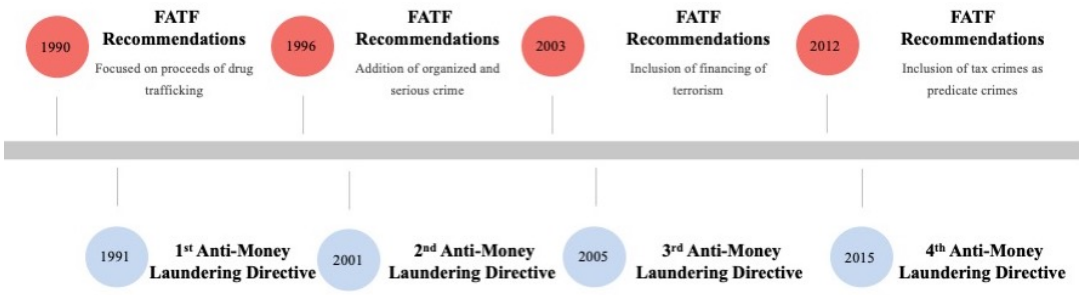


FIGURE IV.1: Timeline of FATF standards and European AMLDs

Directives have been the main focus for Europeanization research as they incorporate the notion of discretion amongst jurisdictions during implementation. However, the study of how this discretion works has long been focused on formal transposition issues such as dates and delays. This does not capture that member states have their own regulatory or administrative traditions and styles that influence how they formulate policy (Thomann and Zhelyazkova, 2017).

The differences in implementation can be explained by two, often ignored, reasons. First, countries customize laws according to their domestic settings (Thomann, 2015), the process by which policy is *Europeanized* is complemented by the domestic policy choices of each country that are tailormade to their circumstance (Bugdahn, 2005). Second, the individuals in each country in charge of the implementation of EU policy can interpret the law in the books differently. In this sense, practical implementers often become EU lawmakers, as EU implementation does not end when transposition is done given that rules and principles continue to be used in practice (Dörrenbächer

and Mastenbroek, 2019; Versluis, 2007).

In the case of money laundering, "global" reforms stem from the FATF. Whereas the individuals in direct contact with the application of EU Directives rest on three pillars. The first pillar consists of administrative authorities (e.g., AML supervisors within tax authority or banking authority) who supervise and impose administrative fines on entities (e.g., banks, casinos, accountants, etc.) if they do not comply with the regulation. The second pillar consists of Financial Intelligence Units (FIUs), which are in charge of collecting, analyzing, and disseminating the reporting done by the entities mentioned above. Finally, the third pillar consists of law enforcement agencies and the justice system in charge of the prosecution of individuals and entities that do not abide by AML regulation. These three pillars apply the implemented regulations individually and interact with each other (Kirschenbaum and Véron, 2018). This is illustrated in IV.2.

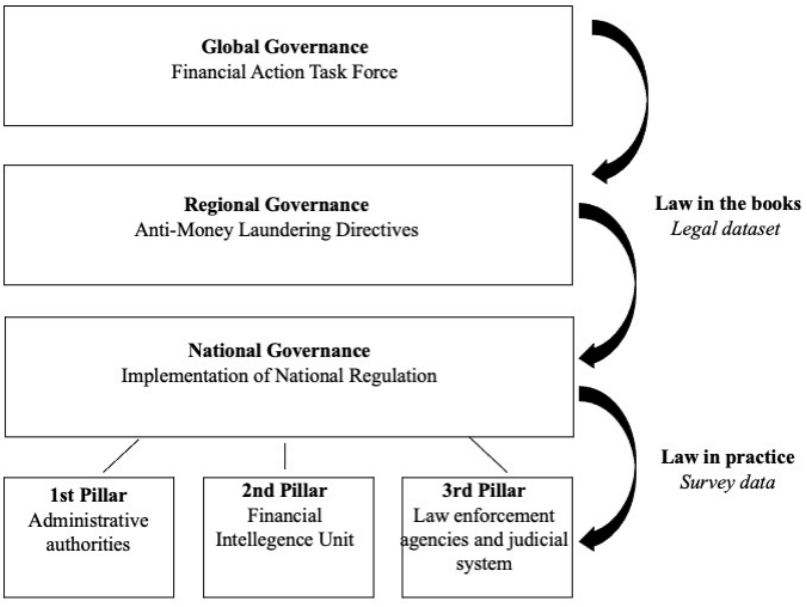


FIGURE IV.2: Pillars of AML regulation

Case studies have already suggested that even when the implementation of EU policy is considered compliant, it can still result in divergent national outcomes (Falkner et al., 2005; Versluis, 2007). Based on this, we expect that the case of tax crimes as a predicate crime for money laundering will also

diverge across jurisdictions, as national legislations adapts and interpret EU Directives differently. Hereafter we present the reasons why this may be.

Government quality and capacity

Implementation theorists have tried to understand what explains patterns in EU compliance. This includes whether Member States transpose directives on time or not (König and Luetgert, 2009), explanations for non-compliance (Mbaye, 2001), and the existence of differences between legal and practical implementation (Falkner et al., 2005). The varied explanations are most likely due to a lack of agreement on what compliance is and if it is transposition delays, infringements, or application records (Angelova et al., 2012). Yet, a common thread to this research is the finding that state power or government quality and capacity matter, especially when this is proxied through administrative capacity, bureaucratic capacity or efficiency, and government quality.

Toshkov, for example, confirms in a literature review of all quantitative research on EU law up until 2010 that there is strong evidence that administrative efficiency positively influences Member State compliance with EU law (Toshkov, 2010). A potential explanation for this is that in the presence of low bureaucratic capacity, administrative actors recognize that their ability to comply with legislation is low, which results in a lack of incentives to ensure proper implementation of policy (Huber and McCarty, 2004), hence in worse compliance. Besides, authors such as Berglund et al. (2006) and Mbaye (2001) argue that inefficient bureaucracies are more prone to private interests.

When it comes to the practical implementation of EU regulation, few studies try to understand what determines legal and practical compliance systematically. Falkner et al. (2005) state that the "enforcement systems of some member states are institutionally ill-equipped to assure practical compliance" (p.243). Yet, to the best of our knowledge, Zhelyazkova et al. (2016) are the first to systematically analyze legal and practical implementation across all member states. They find that practical implementation is mostly shaped by institutional capacity. In this line, government quality and capacity are even more critical for the practical implementation of national laws (Zhelyazkova et al., 2016).

Tax profile

Research on EU implementation has focused on a limited range of policy areas (Angelova et al., 2012). However, issues do matter. The saliency of an issue determines whether it is ignored, therefore, less salient matters tend not to be customized (Thomann, 2019). Moreover, saliency can indicate the importance of a policy, and as Perkins and Neumayer (2007) suggest, the policy preferences of national governments matter. Hence the importance of including considerations specific to the policy field of study. In the case of tax crimes as a predicate crime for money laundering, salience might be relevant because whether tax offenses should be a predicate offense for money laundering has been "politically sensitive" (Bell, 2003) and a "key area of dispute" (Levi, 2002).

We can divide the literature on preferences and attitudes into two: those that focused on the preferences and attitudes and their influence in state-level decisions, and those that focused on how these preferences and beliefs affect the domestic institutions and actors who implement policy. We build upon both. When it comes to state-level preferences, research has found that member states with a strong preference for EU policy will comply faster than countries that oppose said policy (Toshkov, 2010). Perkins and Neumayer (2007) found that when focusing on the implementation of EU environmental policy, Member States with more vested interests or more to lose have a worse implementation record. Yet it is not only the topic that influences how policies are implemented, countries formulate and implement policies influenced by previous and long-lasting policies on an issue and by their regulatory tradition (Adam et al., 2017). We can add that the tradition of specific institutions, such as a country's legal system, can also affect compliance (Perkins and Neumayer, 2007). This is especially relevant because, as Thomann (2019) points out, local administrations interpret or reinterpret the overarching norm to fit their national identities. Given the importance of saliency, we expect this to differ across different administrative institutions.

When it comes to traditions and preferences influencing actors, Mastenbroek and Kaeding (2006) highlight the need to focus on the "preferences and beliefs of domestic actors regarding a particular EU policy input" (p.339). This is especially important since implementers on the ground are the second frontline of implementation and those who interpret definitions from directives (Bondarouk and Mastenbroek, 2018) and that legislators can "pass

the buck" to practical implementers (Dörrenbächer and Mastenbroek, 2019). Both the state and the preferences of practical implementers encounter each other through societal legitimacy or public support. As Zhelyazkova et al. say, "public support for EU policy and national institutional settings seem to shape the incentives of administrative actors to comply with domestic legal outputs and EU policy requirements" (Zhelyazkova et al., 2016).

IV.3 Methodology and data

We base our research on three sources of information. The first is the tax crime and money laundering legislation -the law in the books- (Rossel et al., 2019)[10]. Our second is data obtained from an expert survey of the so-called second-frontline implementers, which gives insight into how the national regulation is perceived, understood, and applied by those who interact with it. Both information sources were compiled into a single comprehensive database that includes law in the books and law in action for all 28 EU Member States. Finally, we use in-depth semi-structured interviews to provide context and accurately interpret our data.

IV.3.1 The law in the books and law in action database

The field of comparative law has mainly relied on either detailed qualitative comparisons of a small sample, two to four countries (Hufnagel, 2004), or on the extraction of concrete quantitative variables from broader samples (La Porta et al., 2008). We combine these, as our database contains primary qualitative information from the original national law, translated into English, and quantitative data such as the maximum and the minimum number of years somebody could be sent to prison if he/she is convicted for tax crimes or money laundering.

To compare the law in the books, we gathered tax and money laundering laws from all 28 EU Member States. Taking the PANA[11] committee's

[10]The full dataset is available through www.coffers.eu. It includes complete texts we use from each countries' tax crime and money laundering law that we base the research on.

[11]The PANA commitee was established by the European Union in order to investigate alleged contraventions and maladministration in the application of European Union regarding money laundering, tax avoidance ,and tax evasion after the Panama Papers

inquiry, we complemented and updated this information, completed, categorized, and found the articles in the laws that corresponded to what was reported. This was done based on primary sources such as the official gazettes. We used official English translations, when not available, we translated with the help of online legal dictionaries and local lawyers[12]. We revised our work with Thomson Reuters and IBFD[13] legal databases' and sent our collected information to each country's relevant ministry requesting feedback. Table IV.1 presents a summarized version of the variables available in the dataset.

We capture two crucial areas of the law in the books through these variables: the punitiveness or jail time and the prescription time for a crime. Analyzing penalties is relevant for three reasons. First, variations between countries can cause *forum shopping* across EU Member States, suggesting criminals can focus their activities in countries with less severe (expected) sanctions (Bondt and Miettinen, 2015). Criminals might not solely choose different locations but rather conjointly exploit the variations in legal systems to their advantage (Arnone and Borlini, 2010). Second, penalties have a deterrence function (Carlsmith et al., 2002). Third, they reflect how "serious" a crime is considered (MacKinnell et al., 2010).

Current literature has already discussed that countries have different interpretations of what money laundering (Unger et al., 2014) and tax crimes are (Levi and Soudijn, 2020) and how they are punished. Our contribution to the literature is that we do not only capture whether a crime is punishable or not by law through a binary yes/no variable (Schwarz, 2011), but rather the extent to which it can be punished.

Jail time reflects the punitiveness that a country gives to a crime, prescription times (or statute of limitations) reflect the limits put by the law to the prosecution of crimes. The prescription period is the number of years that a crime can be prosecuted after being committed. Their relevance is two-fold. On the one hand, prescription periods are crucial for cooperation among countries[14]. On the other hand, they represent a ticking-clock for prosecutors and investigators. By making tax crimes a predicate crime for

[12]We thank: Alexandra Nagoyeva - Hungarian and Slovak; Linda Kunertova – Czech; Catalina Papari- Romanian; Tomas Balciunas-Lithuanian; Giovani Caroli – Italian, and Andoni Montes Nebreda – Spanish, for their contributions in translating.

[13]International Bureau of Fiscal Direction.

[14]The cooperation role of prescription times is related to the mutual assistance that jurisdictions can give each other in terms of exchange of information, notification of liabilities,

money laundering, both crimes' ticking-clocks have to some extent merged.

We complement the *law in the books* with variables that reflect the law in action through an expert survey to understand how international recommendations translate into national regulation and how they are perceived, understood, and applied. For example, the maximum of years an individual can be sent to prison, according to the law in the books, is not the only key factor in analyzing the differences in the country's punitiveness or penal policy (Krajewski, 2014). It is also essential to know the likelihood of really having to go to prison or the practical enforcement of a sentence, whether it is served or not (Coffee, 2007). Through our survey, we ask questions relative to the prosecution of tax crimes, money laundering, and tax crimes as a predicate crime for money laundering, the penalties or sentences attributed to both of these, and the overall challenges that prosecutors and investigators face. To make this tangible and comparable, we gave survey participants three cases: a tax crime committed by an individual, one committed by a company, and a cross-border case. They were inspired by real situations and did not divulge any private judicial outcomes. The questions were tested beforehand on two occasions by practitioners with different linguistic, professional, and legal (common and civil) backgrounds. The cases were intended to trigger participants into fringe situations, to see where and which problems would arise. Table IV.2 details the three cases.

With our survey, we try to overcome the inherent complexity of comparative tax law by formulating specific tax crime cases and ask practitioners in each country how they would deal with these cases and based on which legal arguments.[15] We ask them to quote their national legal sources, which served as a double-check for our legal recompilation.

To obtain answers, we used non-probabilistic sampling in the form of purposive expert and snowball sampling, which helped us target those who work directly or indirectly with the transposition or application of the 4th AML Directive. To reach possible participants, we contacted all prosecutorial departments in Europe and ministries of justice/finance, FIUs, tax administrations, and Europol, among others. We also asked these participants

and asset (unpaid tax) recovery. Although states must assist each other, the formal procedure of requesting said assistance is limited by prescription periods.

[15]The complete survey is available upon request.

TABLE IV.1: Selected number of variables in our legal dataset for all 28 EU Member States

Variable	**Type of Variable**	**Description**
Tax Crime Law	Qualitative	Translation of the national regulation of tax crimes.
Maximum and Minimum Jail Time for Tax Crimes	Quantitative	Maximum and minimum years an individual can be sent to jail for the highest/worse tax crime.
Prescription Time for Tax Crimes	Quantitative	Amount of years after which the highest/worse tax crime can no longer be prosecuted.
Money Laundering Law	Qualitative	Translation of the national regulation of money laundering.
Maximum and Minimum Jail Time for Money Laundering	Quantitative	Maximum and minimum years an individual can be sent to jail for the highest/worse money laundering offence.
Prescription Time for Money Laundering	Quantitative	Number of years after which the highest/worse money laundering offense can no longer be prosecuted.

Source: (Rossel et al., 2019)

TABLE IV.2: Survey cases

Case	***Details***
1 (individual)	It has been proven that a football player, who is a taxpayer in **YOUR** country, did not declare 10,000,000€ (or equivalent in your currency) of his/her personal income to tax authorities over the period of 2010-2015. This money is placed in a Swiss bank account through a company. It has been proven that this was done with the explicit intent to pay less tax. Please apply current regulation to answer.
2 (company)	A pizza company, that has its own legal personality and is a taxpayer in **YOUR** country, has evaded 10,000,000 € (or equivalent in your currency) of taxes on profits by generating false invoices to reduce its profits by increasing its deductibles over the period of 2010-2015. Please apply current regulation to answer.
3 (cross-border)	For this case respondents get the case twice. The first for coding is referred to as A and second time as B, this is not visible for respondents A. Company **X** (a company with its own legal personality) has evaded 300,000 € in taxes in **YOUR** country. Over the last year, this individual has spent this money investing in real estate in another jurisdiction within Europe B. Company **X** (a company with its own legal personality) has evaded 300,000 € in taxes in another jurisdiction within Europe. Over the last year, this individual has spent this money investing in real estate in **YOUR** country

to share the survey with colleagues to harness the power of snowball sampling.

The survey was hosted through Qualtrics and was open from November 2018 until February 2020. We first asked participants to evaluate the inclusion of tax crimes as a predicate crime for money laundering in the 4th AMLD. Second, we requested respondents to analyze the three model cases. Respondents were asked questions such as how each case would be prosecuted in their country, based on which laws the case would be handled, whether there would be a jail sentence for the individuals involved[16], and whether this sentence would be served or not. To minimize respondent fatigue, we limited the number of follow-up questions and asked mostly multiple-choice questions. Regarding our respondents, only 4% responded less than 50% of the survey and the majority of participants were male as can be seen in figure IV.3.

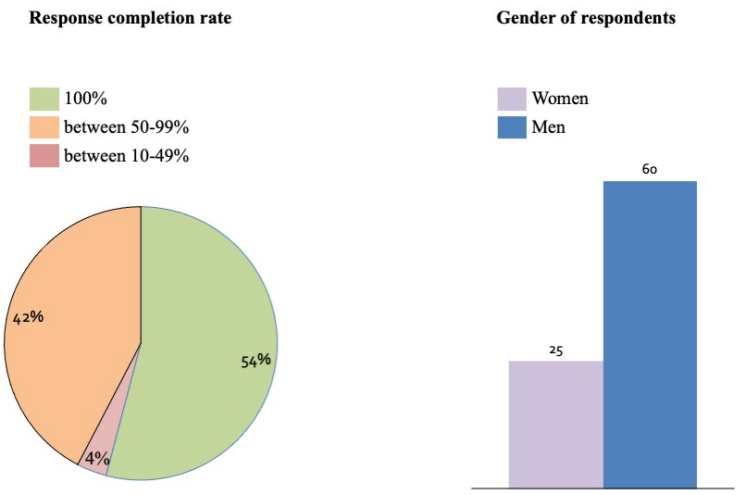


FIGURE IV.3: Characteristics of survey participants

To have one response per country, we condensed the answers when there were multiple participants[17]. This was done in multiple steps: we took the

[16]For *Case 2* we ask this question twice to understand the differences in liability of natural and legal persons. Given that this is more pertinent to a legal analysis we do not use this information in our correlations in Section IV.4. The survey data is available upon request and can serve to further understand the workings of articles 6 and 9 of Directive 2017/1371 (issued after the 4th AMLD) on liability of natural and legal persons.

[17]Documentation on this process is available upon request.

most common answer for each question (mode). In case this was not possible, or there was a tie between answers, we used the answer of the most experienced respondent. In the few cases where two respondents had discerning answers and had the same years of experience, we chose the answer of the respondent with the highest rank, e.g., we would pick the answer of a Head Prosecutor over that of an investigator. We received responses for all EU Member States, except Malta[18]. For 22 countries, we have at least two answers. On average, respondents were between 35-44 years old and predominantly male, had eleven years of experience with taxation, and had been in their current position between 5-10 years.

IV.3.2 Interpreting the law in the books and practice: in-depth interviews

We conducted in-depth semi-structured interviews to provide context and accurately interpret our data. These interviews took place between 09/2019 and 01/2020. The focus was to obtain a mixed pallet of interviewees. This can be seen in Table IV.3

TABLE IV.3: Details of conducted in-depth semi-structured interviews

Date of Interview	Organization	Country or Countries	Number of Interviewees
February 2019	FIOD – Fiscal Information and Investigation Service (former employee)	The Netherlands	1
March 2019		Denmark	1
May 2019	Scottish Police	United Kingdom (Scotland)	1
June 2019	Tax Administration	Belgium	1
July 2019	Europol	Latvia, United Kingdom, Bulgaria	3
December 2019	Public Prosecutor	Hungary	1
January 2020	Justice Ministry	Portugal	3

Source: made by authors

IV.3.3 Country characteristics from other databases

We operationalize our explanatory factors – government quality and tax profile – with country characteristics from publicly available data sources. To

[18]Due to the snowball sampling we also got responses from Moldova, however we do not use these in our analysis

measure government quality and capacity, we use the following indicators: Government Effectiveness (Zhelyazkova et al., 2016) Corruption Perception Index, and Regulatory Quality. All these indicators are World Bank Governance Indicators.[19] Furthermore, we add inequality measured through the GINI coefficient.

We emphasize in our theory section the need to focus on field-specific characteristics. We select variables that can reflect the preferences and characteristics of tax and money laundering related authorities, practitioners, and the overall civil society. We call this the tax profile. We include tax morale or the nonpecuniary motivation to comply with taxes (Luttmer and Singhal, 2014) as a measure of the societal opinion of taxation. Tax-to-GDP[20] ratio measures a countries' tax revenue relative to the size of its economy, which also serves as a measure of the tax burden (Joumard, 2002). Effective corporate tax rates reflect the average rate at which companies are effectively taxed instead of the statutory tax rate (Tørsløv et al., 2018), which can indicate the countries position on taxation.

We also incorporate the Financial Secrecy Index[21] that ranks countries and jurisdictions based on their contribution to secrecy in global financial flows on a 0 (lowest) to 1 (highest) scale (Cobham et al., 2015). We add four sub-indicators from the FSI:

1. Tax administration capacity. Reflects a country's tax administration capacity to collect and tax people and companies. It evaluates organizational capacity, informational data processing preconditions, and the availability of rules for targeted collection of intelligence. This indicator is crucial as it reflects administrative capacity, which has been found significant in the literature, specifically for the realm of taxes.

[19] Although most research has focused on bureaucratic quality indicators, some authors have used GDP and GDP per capita as a proxy for state power or state capacity (Börzel et al., 2007) finding no significant results. However, as Angelova et al. (2012) find 67% of the research focused on environmental and labor and social policy. This finding suggests that GDP variables might still influence other policy fields.

[20] We have no clear indication of the expected sign of the tax to GDP ratio, because the relationship with tax evasion can be complicated: as low ratio can either indicate a low tax burden or a high tax burden with a high evasion rate. Yet the tax-to-GDP ratio is still a relevant indicator, for example in Europe, Denmark has one of the highest tax-to-GDP ratios and very low evasion (Kleven, 2014). Furthermore as Kleven et al. (2016) mention developing countries tend to have a low tax-to-GDP ratio which tends to increase as they develop.

[21] For information on the Financial Secrecy index visit: fsi.taxjustice.net/en/

2. Promotion of tax evasion.[22] This indicator judges whether a jurisdiction facilitates tax avoidance and encourages tax competition.

3. Tax court secrecy. This indicator assesses the openness of a countries' judicial system regarding tax matters, intended to operationalize judicial culture, specifically for taxation.

4. Harmful tax structures. This indicator evaluates the availability of four harmful instruments and structures: large banknotes, bearer shares, series limited liability companies, and trusts with flee clauses. In the theory section, we delve into how long-lasting policy traditions can shape current policy decisions. For example, countries with a long history and tradition of financial secrecy, such as Switzerland, long refused to cooperate with any attempt to improve policy on international tax cooperation (Emmenegger, 2017). Hence the harmful tax structures indicator is meant to reflect the country's position in the tax realm.

5. Anti-money laundering. This indicator reflects to what extent the AML regime of the country fails to meet FATF recommendations.

Table IV.4 provides an overview of the variables we use to operationalize our explanatory factors.

TABLE IV.4: Overview of variables for the operationalization of explanatory factors

Variable	**Source**	**Source and Explanation**
Legal Origins	La Porta et al., 2008	Legal origin of the country (Scandinavian, French, German, or English). (La Porta et al., 2008)
GDP (total and per capita)	World Bank Indicators 2018	GDP and GDP per capita in USD for the most recently available year from the World Bank Indicators.
Financial Secrecy Score	FSI 2018	The Financial Secrecy Scores from 2018 range from 0-1 and measures the extent to which a country offers secrecy. We add four sub-indicators from the FSI: Tax Administration Capacity, Harmful Tax Structures, Tax Court Secrecy, Anti-Money Laundering, and promotion of Tax Evasion.
Corruption Perception Index	CPI 2018	The Corruption Perception Index goes from 0 (most corrupt) to 100 (least corrupt).
Regulatory Quality	World Bank 2019	Regulatory efficiency ranges from -2.5 to 2.5, where a higher score represents more regulatory quality.
Government Effectiveness	World Bank 2019	Government effectiveness ranks countries from less (-2.5) to more (2.5) effective.
Inequality	World Bank 2019	Gini Index from 0-0.5 where 0 is maximum equality

Source: made by authors

[22] In the 2020 edition of the FSI this variable is renamed as "avoids promoting tax evasion".

IV.4 Results

IV.4.1 Shedding light inside the black box

We see stark differences in the law in action and law in the books. For the law in action, we illustrate this through the first case in which a football player fails to pay taxes for 5 million Euros in a Swiss bank account. We asked respondents if this case would be pursued as a criminal case or as an administrative case. In most countries, this case would be subject to both administrative and criminal sanctions. However, in Slovenia,[23] it would only be subject to administrative sanctions. Moreover, in Greece's case, one respondent answered that the case would have been only subject to administrative charges due to "bureaucratic reasons". We then asked respondents if the case would be prosecuted as a tax offense, money laundering, or both. Interestingly no jurisdiction would prosecute this case only as a money laundering offense. Figure IV.4 illustrates how this differs across countries.

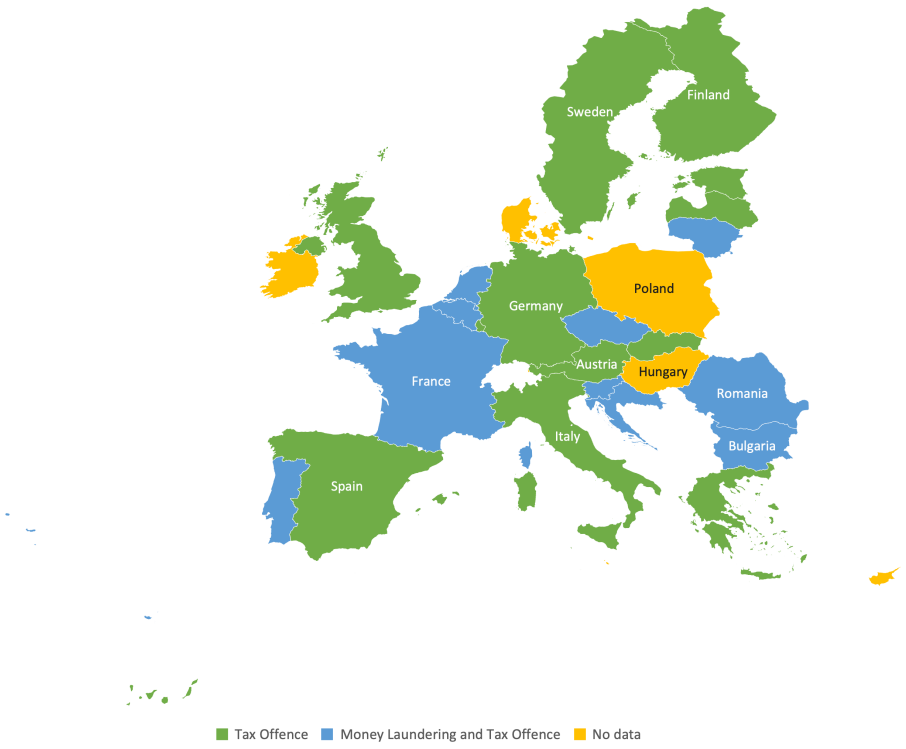


FIGURE IV.4: Tax offense or money laundering prosecution

Once the type of prosecution that a country's authorities would pursuit was evident, we proceeded to ask questions on penalties. When it comes to

[23] Also in the non-EU member state Liechtenstein.

jail time in Belgium, the former player would not serve any time, while in the Netherlands, he would face both tax crime and money laundering charges and go to jail for at least eight years. Figure IV.5 illustrates the responses of all countries when asked if, in this case, an individual would serve jail time or not. The x-axis shows the maximum number of years for tax crimes, and different shades of grey represent whether the individual would actually serve time in prison. Respondents in Belgium, Estonia, France, Greece, Italy, Latvia, and Lithuania say that when it comes to applying the law in action, said individual would not serve the time in jail in their country.

When shedding light on the implementation of tax crimes as a predicate crime for money laundering in the EU through the law in the books, we can illustrate two key points of contention: the maximum jail penalties established by law and the prescription period for these crimes.

The 4th AMLD gave the minimum indication that tax crimes were those that "are punishable by deprivation of liberty or a detention order for a maximum of more than one year," yet the maximum penalty for tax crimes across the EU can go anywhere between 6 months to up to 12 years according to the law in the books[24]. In Figure IV.6 we illustrate the maximum years of prison that can be given by law for money laundering and tax crimes, here it becomes clear that the practical implementation of EU law is very different across countries. The practical relevance of this is that by making tax crimes a predicate crime for money laundering, a criminal can be either sentenced for both crimes (summing the sentences) or just the highest sentence.

Equally interesting are the differences in the ticking-clocks given to prosecutors through prescription periods or statute of limitations in Figure IV.7[25].

[24]Some considerations when interpreting this data as the maximum number of years an individual can be sent to jail can depend on factors such as the accumulation of sentences or aggravating factors. Hence some discretionary decisions have been made to facilitate the correlation analysis. For example, in the case of the UK this sentence could be up to a lifetime when the individual is charged under cheating the public revenue. However, this is a "judge-made" criminal offence. Hence we include the maximum penalty as established in the law for personal income tax evasion which is seven years. In the case of Poland, jail sentencing for tax crimes can be found in the Fiscal Criminal Code (Art.54 and 56) under tax evasion and tax fraud and in the Criminal Code (Article 270a) related to false invoices for tax fraud. We take the Fiscal Criminal Code to make it comparable to other countries in the sample. In Hungary the maximum cumulative sentence according to Section 36 of the Criminal code is twenty-five years, however Section 396 of the same code specifies ten years as the maximum years for budget fraud, we take the latter into account.

[25]It should be noted that as of the 5th AMLD (Directive 2017/1371) includes prescription periods in recital 22 "Member States should lay down rules concerning limitation periods

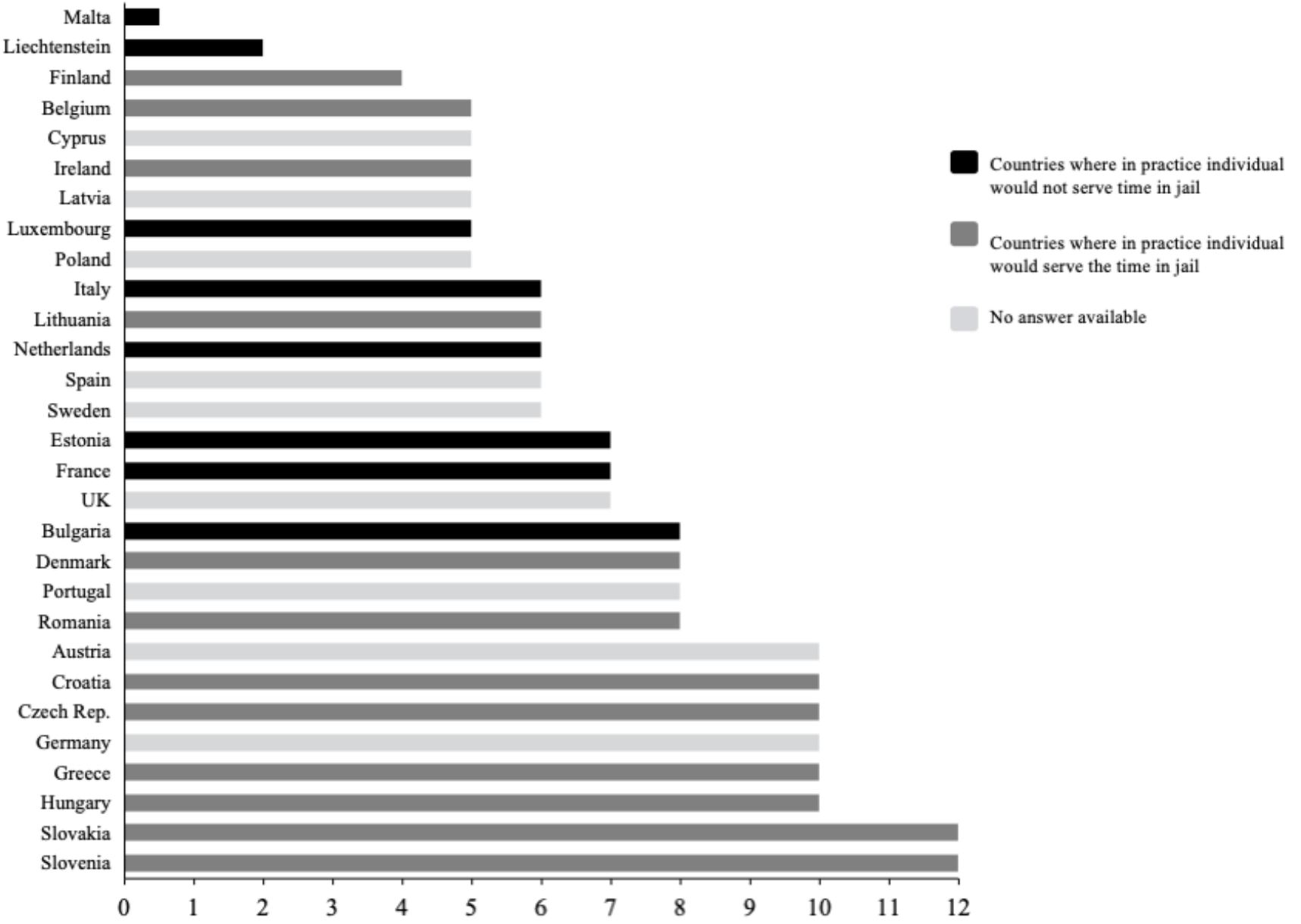


FIGURE IV.5: Jail time served or not in the EU

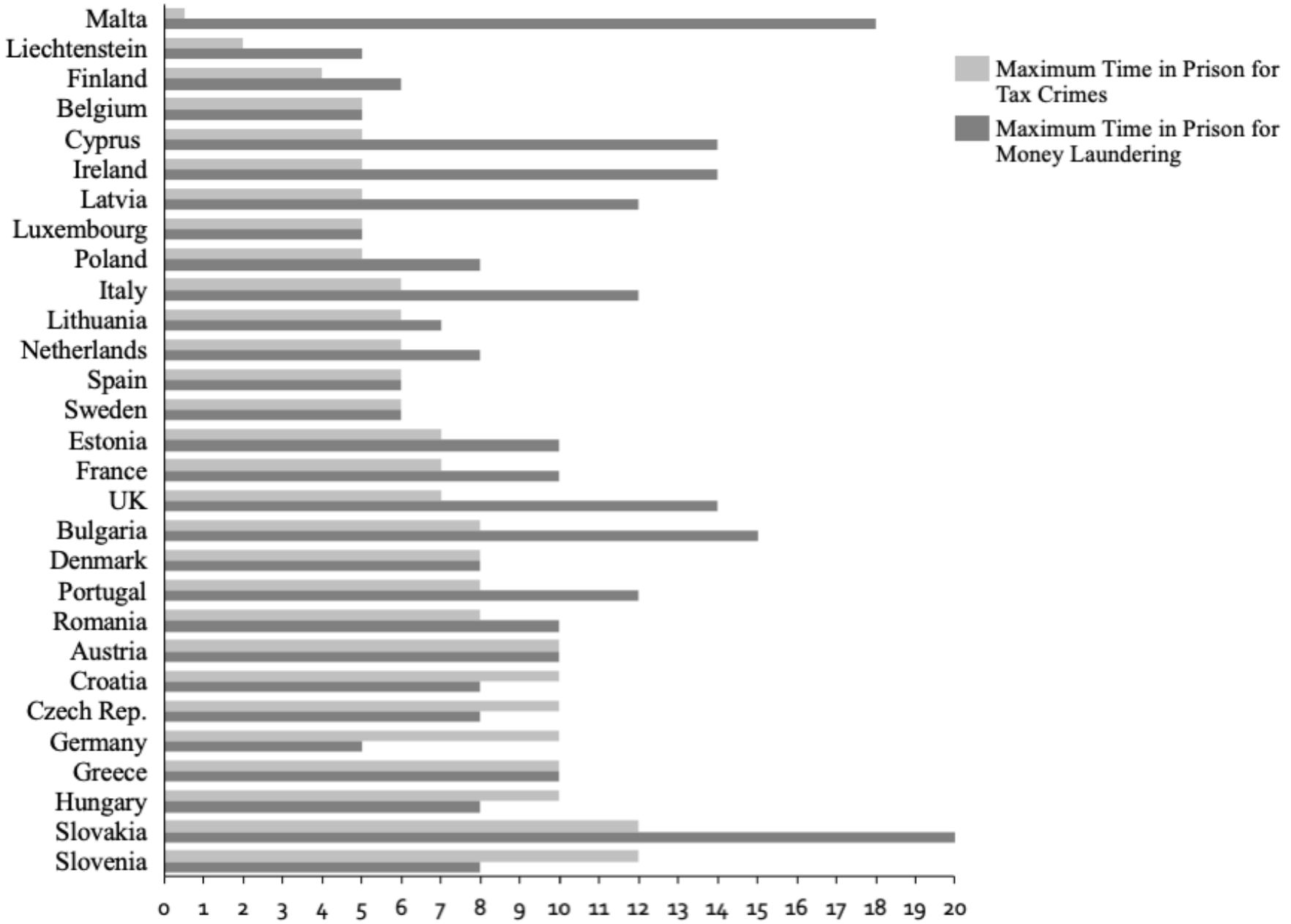


FIGURE IV.6: Maximum prison sentences for tax crimes and money laundering

These play a crucial role in cooperation amongst countries through the mutual assistance that jurisdictions can give each other with information exchange, notification of liabilities, and asset (unpaid tax) recovery. Throughout our interviews, this issue was highlighted by respondents. From the Netherlands: *"Prescription is an important issue with tax evasion. Some countries have a low prescription, this means you can't prosecute because the information we get is always old"*. Our respondent from Portugal highlighted that previously if the crime had ended, you could not prosecute the crime. Our respondent from Hungary pointed at the fact that *"When the statute of limitations has already passed, money laundering can still be used"*. Out of the 29 jurisdictions in the figure below, nine have higher prescription periods for money laundering than for tax crimes, 14 have the same prescription periods for both offences and six have higher prescription periods for taxes than for money laundering.

necessary to enable them to counter illegal activities at the expense of the Union's financial interests. In cases of criminal offences punishable by a maximum sanction of at least four years of imprisonment, the limitation period should be at least five years from the time when the criminal offence was committed. This should be without prejudice to those Member States which do not set limitation periods for investigation, prosecution and enforcement."

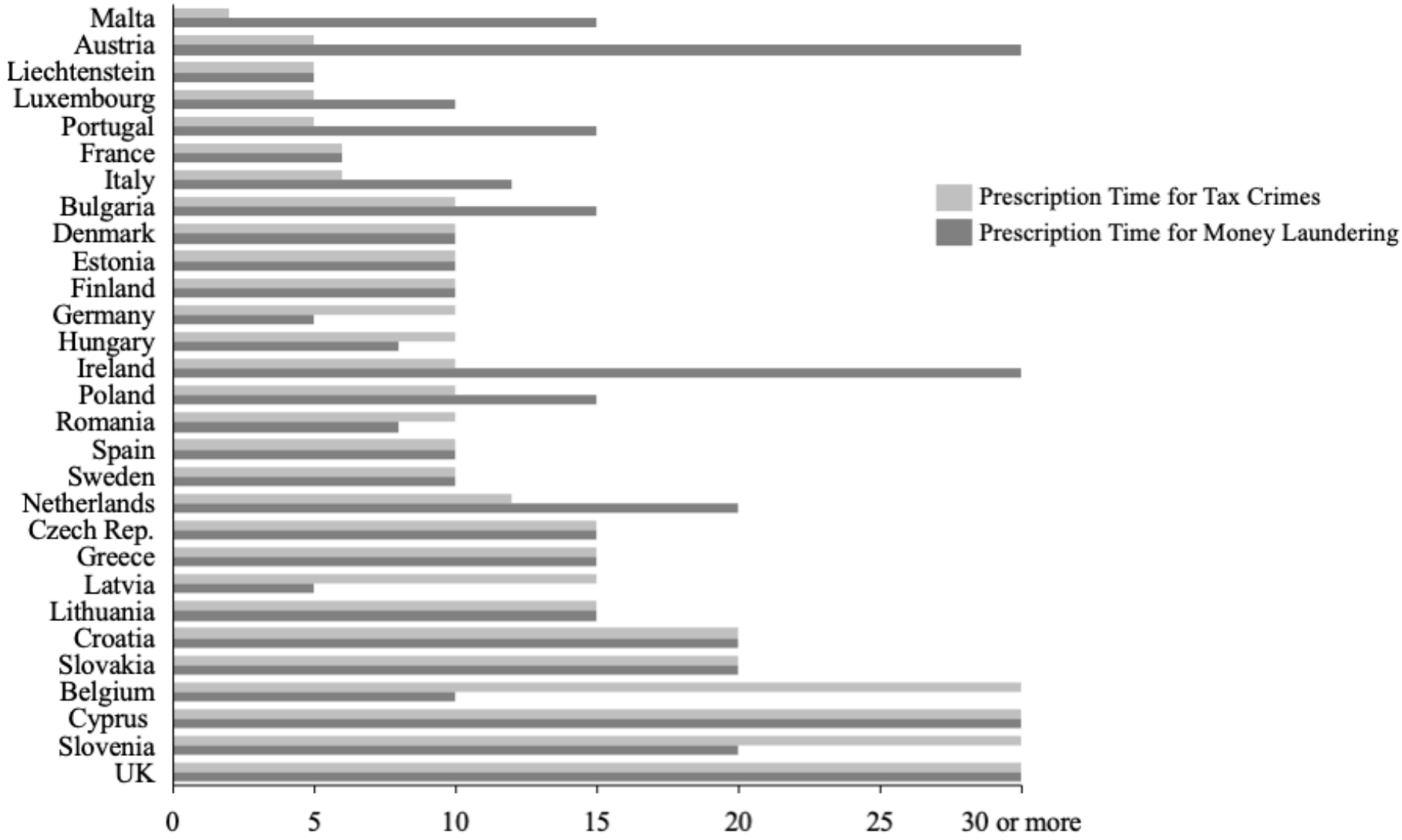


FIGURE IV.7: Prescription times for money laundering and tax crimes

IV.4.2 Explaining the black box

The question remains how we can explain the heterogeneity of tax crime and money laundering law in the books and in practice from section IV.4.1. We find that countries fall back on their old ways or patterns. We discuss this for our two explanatory factors: government quality and capacity, and the tax profile.

Government quality and capacity

Literature describes how government quality and capacity affects the implementation (transposition, practical application, and enforcement) of European Directives. Although the findings of this line of research are varied, the results in general point at factors such as government quality and corruption that affect overall compliance (Toshkov, 2010). We are interested in whether these variables would affect the domestication of laws in the books and laws in action. We measure government capacity and quality with indicators such as corruption, regulatory quality and government effectiveness, GDP per capita, and the level of inequality. We find that these variables affect how the tax crime as a predicate crime for money laundering principle is transposed from the 4th AML Directive into national legislation, both in the books (Table IV.5) and in action (Table IV.6).

The heterogeneity of the number of years that an individual can be sent to prison for both tax crime and money laundering is related to government capacity. Correlation results in Table 5 show that countries that are less punitive than their counterparts have a higher GDP per capita, rank better regarding perceived corruption, have higher regulatory quality, and are more effective governments. Meaning that countries with higher government capacity have significantly lower minimum and maximum prison times for tax crimes and money laundering. This matches the notion that countries with high government capacity have high political legitimacy and are less punitive, as they tend to focus more on social policy, which in turn fosters penal moderation (Snacken, 2015). These results are, to some extent, mirrored when analyzing the law in action, although we find less significance.

When asked if they would prosecute the same case for money laundering and/or a tax crime, these countries were less likely to prosecute the case for both crimes, choosing more often for prosecuting only tax crimes and not

TABLE IV.5: Government quality and capacity-law in the books

Variables	GDP per capita	Inequality (GINI)	Corruption Perception	Regulatory Quality	Government Effectiveness
Tax Crime-Minimum years in prison	-0.472**	-0.198	-0.393**	-0.461**	-0.433**
Tax Crime-Maximum years in prison	-0.295	-0.184	-0.363*	-0.386**	-0.258
Money Laundering- Minimum years in prison	-0.328*	-0.050	-0.385**	-0.345*	-0.415**
Money Laundering- Maximum years in prison	-0.299	0.102	-0.216	-0.233*	-0.350*

**** p<0.01, ** p<0.05, * p<0.1. All correlations in this table are based on 28 observations (the 27 EU Member States plus the UK).*

money laundering.

The preference of rich developed countries for prosecuting tax offenses only as tax crimes and not for money laundering can be due to two factors. First, the inclusion of tax crimes as a predicate crime for money laundering is related to the need to use money laundering as a tool to fight tax evasion. This is further reinforced by the correlation between countries with high GDP per capita being more likely to agree with the statement that incorporating tax crimes as a predicate crime for money laundering was unnecessary. As with other predicate crimes such as corruption where money laundering is more helpful for developing countries (Sharman and Chaikin, 2009), our results signal that for countries with stable government quality and capacity, this tool is neither much used nor necessary.

Second, our results could indicate a specific line of interpretation of the *ne bis in idem* principle, where countries with higher regulatory quality go more often after one crime only, in this case, the underlying predicate crime.[26]

We asked respondents whether an individual guilty of a tax crime was likely to serve his/her prison time. In seven countries, the individual would not have to serve his/her time in prison. Our analysis shows that this is correlated with a countries' inequality level. More unequal countries are less likely to have effective prison times. This answer is even more relevant considering that the case described to respondents was that of a football player evading 5 million euros, hinting that wealth plays an important factor in more unequal countries, especially when it comes to sentence enforcement. A practical example of how wealth and popularity influence sentencing or case treatment is the answer from a respondent from the Dutch National Police who stated that this individual would be both legally and practically prosecuted for a tax crime and money laundering because: *"The purpose was to hide the money for the government, it's a huge amount and a football player has a kind of exemplary function"*.

[26]Maugeri (2018) discusses these issues in more detail.

TABLE IV.6: Government quality and capacity- law in action

Variables	GDP per capita	Inequality (GINI)	Corruption Perception	Regulatory Quality	Government Effectiveness
Would a person serve their sentence for a tax crime?	0.291 N=22	-0.436** N=22	0.120 N=22	0.285 N=22	0.290 N=22
Would a person serve their sentence for money laundering?[a]	-0.357 N=11	0.049 N=11	-0.669** N=11	-0.274 N=11	-0.204 N=11
Prosecuting as a crime instead of only administrative offence	0.089 N=22	0.377* N=22	0.038 N=22	0.203 N=22	-0.013 N=22
Prosecuting for money laundering in addition to tax crimes	-0.422* N=22	-0.094 N=22	-0.289 N=22	-0.433** N=22	-0.333 N=22
The incorporation of tax crimes as a predicate crime was unnecessary	0.367* N=25	-0.214 N=25	0.058 N=25	0.254 N=25	0.256 N=25

*** $p<0.01$, ** $p<0.05$, * $p<0.1$

[a]For this question N=11 is explained by the fact that it could only be answered by respondents who had previously stated in Case 1 that the individual could be prosecuted for money laundering.

The tax profile

We find indications that the way tax crimes as a predicate crime for money laundering is implemented is influenced by what we call the national "tax profile". These characteristics define the dynamics of tax crimes and money laundering within a jurisdiction both in the books (Table IV.7) and in action (Table IV.8).

A key component of the law in the books is judges' discretionary power, broadly understood as the space that judges have to make their own decisions. We operationalize this as the leeway judges have regarding sentencing prison time. Sentencing is ultimately related to the judiciary independence, and it is an area in which judges are limited by regulation (Asp, 2013). The minimum and maximum prison times set these limits. We find that countries with high tax morale, less secretive tax courts, and more administrative capacity give higher discretionary power to judges for sentencing in the case of money laundering. Although this relationship must be interpreted carefully, it can indicate that in countries with closed or secretive judicial systems, the law in the books tries to constrain the discretionary power of judges due to a lack of trust.

A second finding is about the role of prescription times. If discretionary sentencing power is a limit to judicial decision making, prescription times are a limit or a ticking-clock for investigators and prosecutors. Furthermore, similarly to jail times, prescription times reflect the seriousness of a crime. The more serious the crime, the longer it takes to prescribe (Tak, 2008). We find that countries with poor tax administrative capacity, and more harmful tax structures, also have lower prescription times either for tax crimes or money laundering. This can hint that countries that follow these profiles might not want tax crimes chased; prescription times can be used to limit the prosecution and sentencing of such tax crimes.

Regarding the correlations between our law in action variables and the tax profile, we find evidence of the "false-friend" effect whereby tax havens punish money laundering activities harshly (Masciandaro, 2005; Schwarz, 2011). This is especially evident when analyzing the outcomes of a case that included the cross-border factor. We asked respondents whether and how they would prosecute a fictitious case in which a tax crime was committed in a jurisdiction different from theirs, but the money was invested in their

TABLE IV.7: Tax profile and law in the Books

Variables	Tax Morale	Tax-to-GDP ratio	Effective Corporate Tax Rate	Promotion of Tax Evasion	Tax Court Secrecy	Tax Admin. Capacity	Harmful Tax Structure	FSI
Tax Crime-Minimum years in prison	-0.201	-0.461**	0.331	0.156	0.238	0.088	-0.195	-0.073
Tax Crime-Maximum years in prison	0.032	-0.251	0.443**	-0.048	0.314*	0.095	-0.184	-0.141
Tax Crime- Prescription time	-0.140	0.251	0.155	-0.002	-0.301	-0.101	-0.309*	-0.313*
Tax Crime-Discretionary Sentencing Power	0.212	0.074	0.278	-0.193	0.195	-0.046	-0.067	-0.116
Money Laundering-Minimum years in prison	-0.250	-0.352*	0.300	0.270	0.371*	0.146	-0.105	0.107
Money Laundering-Maximum years in prison	0.104	-0.053	0.016	0.339*	-0.027	-0.288	-0.134	0.196
Money Laundering-Prescription time	0.153	0.321*	-0.133	0.120	-0.196	-0.485***	-0.108	-0.083
Money Laundering-Discretionary Sentencing Power	0.313*	0.204	-0.211	0.197	-0.313*	-0.453**	-0.079	0.151

**** p<0.01, ** p<0.05, * p<0.1. The FSI and its sub-indicators range from 0 to 1, where 1 is highly secretive, so countries that fare poorly in an indicator get closer to 1. All correlations in this table are based on 28 observations.*

jurisdiction. We find that countries that have a *secretive profile* meaning that they rank high in the indicators of tax court secrecy, harmful tax structures, and tax administrative capacity, respond more often than they would punish and chase this as money laundering.

Our findings suggest that countries do not only "fall back on their old ways" or implement a principle in a path-dependent manner regarding the way they apply the law but also regarding the timing of adopting a principle. In our survey, we asked practitioners if their laws had already incorporated tax crimes as a predicate crime for money laundering, and if so, when. We find that countries that have more harmful tax structures and are more secretive also incorporated this principle later than other EU Member States.

TABLE IV.8: Tax profile and law in action

Variables	Tax Morale	Tax-to-GDP ratio	Effective Corporate Tax Rate	Promotion of Tax Evasion	Tax Court Secrecy	Tax Admin. Capacity	Harmful Tax Structures	FSI
Year tax crime became predicate for ML	0.026 N=17	0.220 N=17	-0.402 N=14	0.090 N=17	-0.182 N=17	0.108 N=17	0.491** N=17	0.491*** N=17
Tax crimes as predicate for ML in the 4th AMLD facilitated prosecuting tax evasion	0.068 N=25	-0.084 N=25	-0.409* N=20	-0.248 N=25	0.029 N=25	0.220 N=25	0.299 N=25	0.240 N=25
Incorporating tax crimes as a predicate for ML was unnecessary	0.156 N=25	0.478** N=25	-0.206 N=20	0.282 N=25	0.032 N=25	0.257 N=25	-0.228 N=25	0.081 N=25
Tax crimes as a predicate for ML is a useful construction to combat tax crimes	-0.408** N=25	-0.069 N=25	-0.228 N=20	-0.228 N=25	0.058 N=25	0.229 N=25	-0.095 N=25	-0.286 N=25
Would a person serve their sentence for a tax crime?	0.389* N=21	-0.126 N=21	-0.191 N=17	0.188 N=21	0.213 N=21	-0.136 N=21	0.189 N=21	-0.002 N=21
Legal to prosecute a case where foreign tax crime proceeds are invested in your jurisdiction	-0.095 N=19	0.150 N=19	0.180 N=16	0.040 N=19	-0.130 N=19	0.283 N=19	0.376 N=19	-0.036 N=19
Prosecute foreign tax crime hiding money in your country as money laundering	0.045 N=17	-0.321 N=17	0.080 N=14	0.027 N=17	0.579** N=17	0.571** N=17	0.482* N=17	0.165 N=17

*** $p<0.01$, ** $p<0.05$, * $p<0.1$

IV.5 Conclusion

There has been an increased awareness that even perfect transposition of EU Directives does not necessarily translate into homogeneous rules or homogeneous application of rules across the EU. Ambiguities in EU regulation leave space for second frontline implementers or those who work with the rules, to apply and use them differently. In 2012 the FATF put forward the standard to consider tax crimes a predicate crime for money laundering. In 2015 the EU followed suit through the 4th Anti-Money Laundering Directive. By 2017, EU member states had to transpose and implement the 4th AMLD. This chapter analyzed how one concrete part of the 4th AMLD was implemented both in paper and in practice. Tax crimes were made a predicate crime for money laundering, so AML regulation could be used to combat tax evasion. However, tax crimes were not defined by the FATF or the 4th AML Directive, leaving leeway for countries to incorporate this term into their legislation as they saw fit.

Through a database that includes both the law in action and in the books, we find differences in 1) whether a case is prosecuted through an administrative or a criminal procedure, 2) whether a case is prosecuted as a tax crime, a money laundering crime, or as both, and 3) whether this prosecution leads to the same punitive consequences for those who commit the crime, both in the books and in practice. The differences are striking. For example, the same crime can lead to 6-month imprisonment in Malta and 6 years in Sweden or Spain. Regarding the explanations for these differences, we find four key results.

First countries that have higher government quality, meaning that they are less corrupt and have better regulatory effectiveness, are less punitive than their counterparts. Second, these countries also fall back on their government quality and capacity when it comes to choosing how to prosecute crimes, leaning on administrative and tax prosecution rather than criminal and money laundering prosecution. Third, countries with more "secretive" profiles limit their judicial structure more in two ways: judges get less discretionary power, and investigators and prosecutors get less time investigating and prosecuting the crimes. Fourth, countries that have a secretive profile fall back on money laundering prosecution, hinting at a "false-friend" effect.

The correlation results in this research must be interpreted with caution considering that we relied on a small sample and in one point in time. This is why said results are accompanied by a qualitative narrative stemming from in-depth interviews and qualitative answers in our survey. Although our study does not provide a legal analysis of the treatment of tax crimes across the EU and rather seeks to find overarching patterns, the database we created can serve as a starting point for other types of analysis.

Yet, we believe the results are relevant in at least two respects. First, we find that although regulation has gone global and regional, in practical terms the nation-state still has control and a path-dependent implementation of international principles. Second, our analysis opens the door to questions on the future of global and regional regulation, given that national implementation is still so diverse.

The results of this study paint a picture where European countries seem to fall back on old national habits when it is their turn to domesticate global and regional policy both in the books and in action. This, on the one hand, can be positive for maintaining the variety of Europe by keeping alive the original EU motto *In varietate concordia* (United in diversity). On the other hand, too much diversity can hinder cooperation in dealing with global challenges such as transboundary crimes.

Chapter V

Be thankful I don't take it all[1]

Behavioral responses to tax authority unfairness in an online experiment

V.1 Introduction

Following the "stage" approach of this thesis, this chapter relates to the final stage, that of human behavior. Thus what happens once reforms have occurred (Chapter II), have been put into law (Chapter III) and are being applied and used by public servants (Chapter IV). As a result, this chapter seeks to illustrate how individuals can react to reforms. We do so by analyzing how an ineffective audit, where income is overestimated by the tax authority, affects tax compliance behavior. Although the tax authority making a mistake is not a reform in itself, the behavior of tax authorities is the indirect result of reforms. For example, reforms that minimize expenses by pushing for personnel cuts or those that push for an excessive focus on revenue maximization (Feria, 2020).

As mentioned in I assessing and collecting tax revenue owed by tax contributors is a crucial task of any tax authority, after all said revenues are what

[1]A version of this chapter is being prepared for submission together with Bora Lancee and Matthias Kasper. I would like to thank Bora Lancee, we started this project as friends and office partners in an attempt to merge our expertise, and the process has been great. The project has only improved with the comments and insights of our third co-author Matthias. Furthermore this chapter benefited enormously from the feedback from prof.dr Erich Kirchler, dr. Andre Hartmann and Martin Müller at the Economic Psychology Department of the University of Vienna

allows for the state to fulfill their goals. Performing audits is essential to determine if taxpayers have reported their income honestly. When it comes to the impact of tax audits on tax compliance, 80% of tax experiments find that, all else equal, an increase in the probability of being audited will increase tax compliance (Malézieux, 2018). However, a majority of this research assumes audits are always fully effective,[2] this is far from realistic. As a result, there is an increased interest in the effect of audit effectiveness on compliance (e.g., Kasper and Alm, 2021; Bernasconi and Bernhofer, 2020; Rablen, 2014; Beer et al., 2020).

We expand the audit effectiveness research by analyzing experimentally type I errors. We research tax compliance if an audit is expected *-compliance-* when there is a possibility that the tax authority overestimates a tax payers' gross income, and after the experience of an audit *-post-audit compliance-*. What does being overestimated mean? For example, a fully honest taxpayer who has been *"victim"* of overestimation would be found guilty of tax evasion - while she reported her entire income -, and fined based on the amount of overestimation. On the other hand, a taxpayer who has been *"dishonest"* could be found more *"dishonest"* than she actually was. We examine the effects of the probability and the magnitude of overestimation on taxpayers' behavior through a preregistered online experiment with a representative UK sample. We test the effect of the possibility of overestimation on all taxpayers compliance behavior. Additionally, we also study the effect on the compliance behavior in the next tax declaration for those taxpayers who experienced an audit that was overestimated.

Research on more realistic types of audits is relatively new. For example, the first laboratory research in the topic, by Bernasconi and Bernhofer (2020) and Kasper and Alm (2021) study ineffective audits *-that do not detect all undeclared income-* and find that the deterrent effect of tax audits depends on the audit effectiveness. Both focus on type II errors or false-negative audits, the undeclared income that is not discovered by the tax authority. However, type I errors that result in a false-positive audit also occur in the present day. As pointed out by Kasper and Alm (2021), tax authorities "may even find evasion when it is not, in fact, present." Empirical evidence exists, in the fiscal year 2018, US taxpayers challenged over 10 billion USD in additional taxes

[2]If a non-compliant individual is audited, the tax authority will detect the entirety of the money they have not declared (Rablen, 2014)

recommended by the Internal Revenue Service (IRS),[3] while almost 4 billion of tax and penalties were under appeal in US tax courts (Internal Revenue Service, 2019). On the other side of the pond, in 2020 and 2021, the Dutch Tax Authority was under severe scrutiny for wrongfully accusing families of fraud -*toeslagenaffaire*- (Berg, 2021). This raises the question of how type I errors affect taxpayers willingness to comply in the future. Although, intuitively, taxpayers can always complain or raise issues with mistakes made by the tax authority, in reality, they face several limitations in doing so. Examples of these constraints are time limits (e.g., NL 60 days), monetary limits (legal fees example), knowledge (e.g., the identification of mistakes made), and bureaucratic limits (e.g., excessive paperwork, forms that must be sent by post, etc.).[4]

We find no evidence of a rational response in taxpayer compliance after an increase in the probability or size of overestimation. This is contrary to the predictions made grounded in the traditional economics of crime (Becker, 1968) based portfolio model (Allingham and Sandmo, 1972) that would suggest an increase in compliance. In addition, we find that participants who have been audited with an overestimation reduce their tax compliance in the following tax declaration by at least five percentage points relative to individuals who have only been audited. Finally, we find that even when controlling for the height of the fine, the audit outcomes affect post-audit compliance behavior. We explain our results for the presence of overestimation based on an alternative model that incorporates behavioral (e.g., non-financial) factors that influence tax compliance. Our findings contribute to understanding the behavioral dynamics of tax compliance in light of more realistic audit schemes.

Our results are robust to different subsamples, modeling techniques, and a reformulation of the dependent variable. We also conduct a qualitative robustness check to confirm the answers' quality and reliability and gain further insights into taxpayer motivations. Based on this and additional survey

[3]Similarly, in the UK for the year 2019, over 100,000 disputes were filed in the tribunal corresponding to the HMRC. The complaints against the HMRC are aggregated with those to the Department of Pensions and other compensation matters. Nonetheless, this tribunal is the one that receives the highest number of complaints or disputes. https://data.justice.gov.uk/courts/tribunalscourts-tribunals-social-security

[4]Recent work from Richard Thaler and Cass Sunstein call these kinds of limitations *sludges*, unnecessary or unhelpful frictions. According to the authors, in the US, "the part of government that contains the greatest amount of excessive sludge may be the tax system" (Thaler, 2021)

responses, we provide insight into behavioral taxpayer motivations. For example, we find that individuals for whom being honest was their main motivation had an average compliance rate of 90%.

The following chapter is structured as follows: Section V.2 gives an account of the related literature, Section V.3 outlines our theoretical predictions solely based on an extension of the Allingham and Sandmo portfolio model; in Section V.4, we add to the model behavioral considerations that can influence tax compliance behavior; Section V.5 contains the experimental design including the experimental details and the flow of the experiment; Section V.6 presents the regression output for our two hypotheses and exploratory results from our survey and qualitative analysis; in SectionV.7 we run robustness checks with different estimations and dependent variables; in Section V.8 we discuss our findings in light of the literature and pose solutions to the main issues with our research. Finally, in Section V.9 we conclude and give suggestions for further research.

V.2 Related literature

The importance of audits is twofold; first, when a taxpayer is audited and is found non-compliant, there is a *direct effect* from the additional tax and fines collected. Second, there are *indirect effects* that come from potential changes in the future behavior of taxpayers. The way taxpayers change their compliance behavior can be divided into a) the changes in the behavior of audited taxpayers, this is called *-corrective, preventive, or direct deterrent-* effect and b) the changes in non-audited taxpayers, this is called the *deterrent or indirect deterrent* effect.[5] Tax audits have been part of the economics of tax compliance literature since the introduction of the portfolio model of tax compliance by Allingham and Sandmo (1972) as a tax-specific application of the Becker (1968) economics of crime model.

The economics of crime approach or portfolio model of tax evasion portrays an individual with income I, a tax rate t, an audit probability p, and if found not compliant a fine f, we expand on the details of this in section **??**. The result from this model is straightforward: individuals' tax compliance behavior results from economic optimization. Hence, tax compliance

[5]Gemmel and Ratto(2012) use the term corrective or preventive whereas Alm et al. use the terms direct and indirect deterrent effects

depends on enforcement, the combination of audit probability p and fines f. As a result, much of the audit literature has focused on testing different types of auditing rules. For example, random audits, cut-off audits (Alm et al., 1993), audits conditional on earnings (Collins and Plumlee, 1991), delayed feedback (Kogler et al., 2016), are some examples. However, this stream of literature has in common the underlying assumption that audits p are always performed effectively.

However, this assumption is far from reality. Already in 1991, Feinstein suggested that there was significant heterogeneity in the detection rates of tax examiners at the IRS. Therefore, he proposes a "fractional detection model" where the detection process is not the standard "all-or-non" detection (Feinstein, 1991). More recently, Rablen 's (2014) theoretical model also stays away from the fully effective, all or none assumption by modeling the trade-off the tax authority has to make between the number of audits they can perform and their effectiveness, given a constrained budget. As a result, they must either perform a few fully accurate audits or more frequent yet less accurate ones. These theoretical models point towards the importance of stepping away from the assumption of perfect audits.

Recent empirical work has used taxpayer data to understand how audits, which in real life are far from perfect or effective, affect taxpayer compliance behavior. Gemmel and Ratto (2012) and Beer et al. (2021), find that post-audit compliance behavior depends on the audit outcome. In general, their findings point towards an increasing post-audit compliance for those found non-compliant at the time of the audit while decreasing for those audited and found compliant. This research highlights the need to dive deeper into not only the type of audits, as has been done before, but the outcome, results, and effectiveness of audits. Although empirical data provides valuable insights on the behavioral consequences of effective audits, true tax behavior remains unknown since this is private to the taxpayer herself (Best et al., 2021), this calls for a controlled setup where compliance and audit effectiveness can be disentangled further.

This quest for a deeper understanding of audit results is also reflected in new laboratory experiments. For example, Bernasconi and Bernhofer (2020) research the response of taxpayers to the probability of audit p being split into the probability of an audit α, and the binary probability of this audit

being effective or not β, they find that individuals respond stronger to effectiveness compared to the probability of an audit. Taking a more nuanced approach Kasper and Alm (2021), study the behavioral responses to tax authority effectiveness,[6] where effectiveness is not absolute and ranges between $0.3 - 1$, hence the tax authority can either underestimate compliance or estimate it accurately. Their results suggest that audits have a differential effect on post-audit tax compliance, rather the effectiveness of an audit influences post-audit behavior.

Our study contributes to this literature by analyzing another side of effectiveness or rather the possibility of the tax authority being "over-effective." We do so by implementing the probability of facing an audit where the tax authority overestimates income. Our results aim to shed new light on the assumption of effectiveness on tax compliance behavior. Understanding the taxpayers' response to an *"imperfect"* authority is essential. Especially considering that tax authorities are under increasing pressure due to an excessive focus on revenue maximization rather than combating fraud (see among others Feria, 2020; Weffe, 2020).

Moreover, if we build on Rablen's (2014) theoretical work on tax authorities facing trade-offs when it comes to effectiveness, the scenario described above raises the question of whether tax authorities will make more mistakes in the future. Especially considering that tax authorities are under extreme financial pressure given that the IRS today has fewer auditors than any time since World War II (Geithner et al., 2021), which can lead to an inaccurate application of the law. To the best of our knowledge, our research is the first one to account for the possibility of the tax authority overestimating income.

Finally, we also contribute to the tax laboratory experiment literature by addressing some of the main criticisms it has received, such as the lack of a representative sample and the use of student participants. We do so by running our experiment with a representative UK sample through Prolific. So far, most tax laboratory research has been done with students in a university laboratory setting, exceptions are Bilancini et al. (2019), Olsen et al. (2019), and Hope et al. (2021). To the best of our knowledge, the latter is the only

[6] In the extremes, a fully effective audit would detect all undeclared income, and a fully ineffective audit would not find any undeclared income, regardless of the amount

one that used a representative sample.

V.3 Theoretical predictions

We base our theoretical predictions on the Allingham and Sandmo (1972), "Income tax evasion: A theoretical analysis," model. In it a taxpayer earns a gross income I and reports income R, and pays a tax t on this reported income. The tax authority observes I through audits with a certain probability p, and if caught cheating, the taxpayer faces a fine $f > 1$. This results in the following expected utility EU

$$\text{EU} = (1-p)X + p(Z),$$

where

$$X = I - tR,$$
$$Z = I - tR - tf\Big[I - R\Big].$$

V.3.1 Extended portfolio model

We start by extending the portfolio model by adding the possibility of the tax authority overestimating income I. As a result, in our model, the taxpayer is not only confronted with the p probability of audit but also the q probability that the tax authority will overestimate their income I. The size of the overestimation of I is αI.[7]

Expectation value of the utility function

The expectation value of the utility function is

$$\text{EU} = (1-p)X + p\,\Big[qY + (1-q)Z\,\Big],$$

[7]The parameter use is similar to the Bernasconi and Bernhofer, 2020, however in their case β (q) represents the effectiveness and can only take the value of either 0 or 1

where

$$X = I - tR,$$
$$Y = I - tR - tf\Big[(1+\alpha)I - R\Big],$$
$$Z = I - tR - tf\Big[I - R\Big].$$

Where, similar to Allingham and Sandmo (1972) p is the probability that a taxpayer gets audited [0,1], and X and Z are the utility a taxpayer has when they are not audited, and when they are correctly audited, respectively. We extend our model with Y which occurs with probability $p * q$ [0,1], which is identical to Z except for the overestimation α [0,1] of income I by the tax authority. In expectation, Y takes place with the compound probability of (p*q).

Probability of overestimation -q- dependency

The following steps show how the model predicts changes in optimal reporting behavior R_* with respect to the probability q of overestimation taking place. The derivative of the optimal value R_* with respect to q,[8] i.e.

$$\dot{R} \equiv \frac{\partial R_*}{\partial q}$$

Were $\dot{R}$ reflects the optimal reporting behavior given a change in q and *ceteris paribus* all other variables, including the size of the overestimation α. Where $\dot{R} \leq 0$ indicates that optimal reporting behavior will decrease as probability q increases, and $\dot{R} > 0$ predicts the opposite.

The optimal value of EU as a function of R is obtained by

$$\frac{\partial \text{EU}}{\partial R}\bigg|_{R=} = 0 \tag{V.1}$$

Where is the value of R that optimizes the utility function. The latter can be obtained from Eq.(V.1) as

$$-t(1-p)X_* + pqt(f-1)Y_* + p(1-q)t(f-1)Z_* = 0 \tag{V.2}$$

[8] An optimal solution x_* is a point in Ω that satisfies: $f(x_*) \geq f(x), \forall x \in \Omega$. The optimal solution may not exist and may not be unique. However, given our assumption of the risk-averse taxpayer (see also Alm (2019)) we assume a concave utility function and thus have a unique solution for $f(x_*) \geq f(x), \forall x \in \Omega$.

where $X_* = X|_{R=}$ for all parameters. Solving Eq.(V.2) informs us about the optimal reporting behavior . We are interested in finding the sign of the derivative of w.r.t. q to find $\dot{R}$. Let us derive (V.2) with respect to q. We expect optimal reporting behavior to be dependent on the probability of overestimation q hence ($R = R(q)$) as long as $\alpha \neq 0$.

$$\begin{aligned} t^2(1-p)X_*\dot{R} + pt(f-1)\Big[Y_* + qt(f-1)Y_*\dot{R}\Big] \\ + pt(f-1)\Big[-Z_* + (1-q)t(f-1)Z_*\dot{R}\Big] = 0 \end{aligned} \tag{V.3}$$

By rearranging, we find

$$\dot{R} = \frac{p(f-1)\big[Z_* - Y_*\big]}{(1-p)tX_* + pqt(f-1)^2Y_* + p(1-q)t(f-1)^2Z_*}, \tag{V.4}$$

where $X_* = X|_{R=}$ for all parameters. Since $\alpha > 0$ if $q > 0$ we have by definition $Z_* \geq Y_*$. Given our assumption of a risk averse tax payer, X is increasing and concave, we have by definition $Z_* \leq Y_*$.

All values $(p, q, t, f-1, I)$ are by definition positive, thus assuming concavity, we see that the numerator of Eq.(V.4) has the same (negative) sign as the denominator. That means $\dot{R} > 0$, the model thus predicts that an increase (decrease) in probability q of an audit with overestimation ($\alpha > 0$) by the tax authority leads to an increase (decrease) of optimal taxpayer reporting behavior. A rational taxpayer thus increases their tax reporting choice when faced with a higher probability of an audit that would overestimate their income. Because in the margins, it is optimal to increase reporting to minimize the fine given $f > 1$

Magnitude of overestimation -α-dependency

Additionally, we test the effect of an increase (decrease) in α, the size of the audit overestimation. Similar to our hypothesis of q we are interested in how optimal reporting behavior R_* changes with respect to the size of the overestimation α. We refer to R' as the derivative of the optimal value $R\hat{}*$ with

respect to α (given $q > 0$), i.e.

$$R' \equiv \frac{\partial R_*}{\partial \alpha}$$

Where $R' < 0$ indicates that optimal reporting behavior will decrease as α increases, and $R' > 0$ predicts the opposite. Similar to the section above we base our analysis on Eq.(V.2) the optimal reporting behavior. Summarizing, we are interested in finding the sign of the derivative of w.r.t. α. Similar to the section above we derive Eq.(V.2) w.r.t α (and assume that $R = R(\alpha)$ given $q > 0$),

$$\begin{aligned} & t^2(1-p)X_*R' + pqt^2(f-1)^2Y_*R' + p(1-q)t^2(f-1)^2Z_*R' \\ & = pqt^2f(f-1)Y_*I, \end{aligned} \tag{V.5}$$

Rearranging R' gives

$$R' = \frac{pqt^2f(f-1)Y_*I}{t^2(1-p)X_* + pqt^2(f-1)^2Y_* + p(1-q)t^2(f-1)^2Z_*}, \tag{V.6}$$

where $X_* = X|_{R=}$, for all parameters. Given our prior assumption of the risk averse tax payers,[9] and given that all values $(p, q, t, f-1, I)$ are positive, we find that the numerator of Eq.(V.6) has the same sign as the denominator. This means $R' > 0$ for all values of α as long as α happens with a positive probability q. Therefore we expect that a rational taxpayer will increase (decrease) tax reporting behavior as the size of the overestimation increases (decreases), under the assumptions of the extended economics of crime model.

V.4 Alternative predictions

V.4.1 Behavioral considerations

The section above introduced an extension to the Allingham and Sandmo classic portfolio model of tax evasion. The following section introduces our alternative predictions incorporating behavioral considerations that might influence taxpayer behavior into the standard portfolio model with overestimation. The incorporation of behavioral considerations to the study of tax

[9] risk aversion is not a necessary assumption, the result holds for all linear utility functions given that X, Y, Z follow the same functional form.

compliance in economics is not new (For a recent overview see: Alm, 2019; Mascagni, 2018; Kirchler and Wahl, 2010). We extend subsection **??** to include a non-monetary behavioral element that drives taxpayer behavior. This element groups the behavioral considerations and enters the expected utility of the portfolio model as a dis-utility.[10] To some extent, we could interpret this element as an "overestimation aversion" whereby the behavioral responses enter the expected utility calculations of the individual. To model this we include an element B that captures the dis-utility that a taxpayer gets when the tax authority overestimates its income.[11] As a result, we modifying the original model so it becomes:

$$\mathrm{EU}_2 = (1-p)X + p\Big[(q(Y-B) + (1-q)Z)\Big],$$

where

$$\begin{aligned} X &= I - tR, \\ Y &= I - tR - tf[(1+\alpha)I - R], \\ Z &= I - tR - tf[I - R], \\ B &= B(R, I) \end{aligned}$$

where $B > 0$ is the behavioral (dis)utility agents get from being mistaken on. We assume that $B = B(R, I)$, in that the dis-utility is dependent on both reported and actual income. We impose this dependency, since we work under the assumption that the experienced dis-utility is dependent on reporting behavior, such that the dis-utility might not be the same for a completely honest individual as for an individual who has not complied. Similarly, we include the dependency on I since α is a percentage of I. Thus the dis-utility is a function of being audited and overestimated. We assume that the following relationships hold:

1. $\dfrac{\partial B}{\partial R} = \Gamma > 0$; if R increases B increases
2. $\dfrac{\partial \Gamma}{\partial q} = \dot{\Gamma} > 0$; if q increases Γ increases
3. $\dfrac{\partial \Gamma}{\partial \alpha} = \Gamma' > 0$; if alpha increases Γ increases

[10] The incorporation of non-monetary considerations to tax compliance is not new, for example, Sandmo (2005) proposes to incorporate the dis-utility individuals have from evading into the portfolio model.

[11] We make no assumptions on which behavioral driver is at play, as they all have similar predictions in terms of modelling

Where Γ is the renaming of the derivative for the remainder of this chapter. The first relationship rests on our assumption that an honest taxpayer that reports all of their income, could potentially feel a "larger dis-utility" when being treated unfairly. Our second and third relationships hold given that we assume $R = R(q)$ and $R = R(\alpha)$ (see also V.3.1). Thus, the reporting behavior changes with q and α, similarly it is a reasonable assumption to presume that the dis-utility of mistakes increases when either the probability or size of the overestimation increases. The next section will show the predictions of the model for our alternative hypothesis. In section V.5 we will describe the experimental design that will test which of the 2 suggested models best predicts taxpayer behavior.

V.4.2 Alternative q dependency

Similar to the traditional model, we use the expected utility model and first predict optimal reporting behavior R_*. Thereafter we will calculate how optimal reporting behavior R_* will change with respect to changes in q probability of overestimation and α the extent of the overestimation. The optimal value of EU_2 as a function of R is obtained doing

$$\left.\frac{\partial EU_2}{\partial R}\right|_{R=} = 0, \tag{V.7}$$

where is the value of R that optimizes the utility function. Assuming that B is increasing in R, performing the differentiation yields:

$$-t(1-p)X_* + pqt(f-1)Y_* + p(1-q)t(f-1)Z_* - pqB_*\Gamma = 0 \tag{V.8}$$

where $X_* = X|_{R=}$ for all parameters. and $\Gamma = \dfrac{\partial B}{\partial R}$. Similar to Eq.(V.4), let us derive Eq.(V.8) w.r.t q (given $R = R(q)$), since this will predict how tax payer behavior will change as a response to a change in the probability q of an audit with overestimation $\alpha > 0$. However, in this alternative model we also include the behavioral dis-utility B from an increase in probability q rather than solely the monetary utility that is included in the traditional portfolio model.

$$
\begin{aligned}
&t^2(1-p)X_*\dot{R} + pt(f-1)\Big[Y_* + qt(f-1)Y_*\dot{R}\Big] \\
&\quad - pq\Big[\Gamma^2 B_*\dot{R} + B_*\dot{\Gamma}\Big] - p\Gamma B_* \\
&\quad + pt(f-1)\Big[- Z_* + (1-q)t(f-1)Z_*\dot{R}\Big] = 0
\end{aligned} \tag{V.9}
$$

where $X_* = X|_{R=}$ for all parameters, $\dot{R} = \dfrac{\partial R}{\partial q}$ and $\dot{\Gamma} = \dfrac{\partial \Gamma}{\partial q}$

Rearranging leads to:

$$
\dot{R} = \frac{p(f-1)\big[Z_* - Y_*\big] + p\Gamma B_* + pqB_*\dot{\Gamma}}{(1-p)tX_* + pqt(f-1)^2Y_* + p(1-q)t(f-1)^2Z_* - pq\Gamma^2 B_*}, \tag{V.10}
$$

Given positive (p, f, q) and the assumption that B is increasing in R, the numerator is negative given:

$$
(f-1)\big[Z_* - Y_*\big] > \Gamma B_* + qB_*\dot{\Gamma} \tag{V.11}
$$

, and positive otherwise.

With respect to the denominator, the sign depends on the taxpayers' utility function. In order to limit the assumptions on the taxpayers' functional form of the non-monetary (dis)utility, we look at 3 scenarios. If we assume that functional form of B_* is:

- **linear**: the denominator is always negative
- **convex**: the denominator is always negative
- **concave**: the denominator is negative if:

$$
(1-p)tX_* + pqt(f-1)^2Y_* + p(1-q)t(f-1)^2Z_* > pq\Gamma^2 B_* \tag{V.12}
$$

, else positive

We will test these assumptions in the experimental design. Intuitively, whether the taxpayer will increase or decrease tax reporting behavior depends on which of the contributions ("economic" vs " behavioral") of the previous equations are stronger, and on the functional form of the utility function of the taxpayer.

V.4.3 Alternative α dependency

Following exactly the same procedure, denoting this time $R' \equiv \partial R/\partial\alpha$, we build on the alternative optimal reporting model of R_* in Eq.(V.8) and take the derivative w.r.t. α (given $R = R(\alpha)$).

$$\begin{aligned} &t^2(1-p)X_*R' + pqt^2(f-1)^2Y_*R' + p(1-q)t^2(f-1)^2Z_*R' \\ &- pqt^2f(f-1)Y_*I - pqB_*\Gamma^2R' - pqB_*\Gamma' = 0 \end{aligned} \tag{V.13}$$

where $X_* = X|_{R=}$ for all parameters, $R' = \dfrac{\partial R}{\partial\alpha}$ and $\Gamma' = \dfrac{\partial\Gamma}{\partial\alpha}$
Rearranging leads to:

$$R' = \frac{pqt^2f(f-1)Y_*I + pqB_*\Gamma'}{t^2(1-p)X_* + pqt^2(f-1)^2Y_* + p(1-q)t^2(f-1)^2Z_* - pq\Gamma^2B_*}, \tag{V.14}$$

Given the assumption of $B_* > 0$ and $\Gamma' > 0$ the numerator is negative given:

$$pqt^2f(f-1)Y_*I > pqB_*\Gamma' \tag{V.15}$$

, else positive

As with respect to the denominator, all values $(p, q, t, f-1, I)$ are positive (Γ^2 by definition also always positive). To make no assumptions on the functional form of B we consider the three most common utility shapes.

If we assume that functional form of B_* is:

- **linear**: the denominator is always negative
- **convex**: the denominator is always negative
- **concave**: the denominator is negative given

$$t^2(1-p)X_* + pqt^2(f-1)^2Y_* + p(1-q)t^2(f-1)^2Z_* > pq\Gamma^2B_*, \tag{V.16}$$

, else positive

Similar to the case of q , taxpayer behavior will be determined by which contributions of the previous equation are stronger and the functional form of the utility function of the taxpayer.

Hypothesis 1: taxpayer compliance

If the traditional portfolio model holds, an increase in q and α will always lead to an increase in taxpayer compliance. However, if the behavioral model holds, the predictions are less clear-cut. Therefore, if the behavioral model has predictive power, we expect that an increase in q will either lead to a decrease in compliance behavior or work as a counterforce and therefore partially adjust taxpayer compliance downward. [12] Based on the above, we will test the following hypotheses:

Hypothesis 1a: predictions of the rational model without behavioral considerations
An increase in the probability of overestimation q or the size of overestimation α of the upcoming audit will *increase* taxpayer compliance

Hypothesis 1b: predictions of the behavioral model with a predominant weight on economic incentives
An increase in the probability of overestimation q or the size of overestimation α of the upcoming audit will *have no effect* on taxpayer compliance

Hypothesis 1c: predictions of the behavioral model with a predominant weight on behavioral considerations
An increase in the probability of overestimation q or the size of overestimation α of the upcoming audit will *decrease* taxpayer compliance

Hypothesis 1a holds if the extended portfolio model explains behavior accurately. On the other hand, if the predictions based on the behavioral considerations model are correct, taxpayer behavior changes depending on the weights given on the behavioral considerations versus the economic incentives. If weight is solely given to the economic incentives, taxpayer behavior will increase accordingly to the size of q and α. However, if behavioral considerations come into play this increase might be downplayed or even cause no behavioral adjustment. Lastly, if behavioral considerations predominately determine agent behavior and economic incentives play a little role, taxpayer

[12] We do not make any assumptions on the functional form of the taxpayer's reporting function, we assume that the situation of [negative numerator positive denominator] or [positive numerator negative denominator] is least likely and therefore we expect opposite predictions of the alternative model. However, if we do see a 'rational' increase in taxpayer compliance -following the portfolio model-, we cannot completely rule out that behavioral factors have an influence given our ignorance regarding the functional form.

compliance will decrease.

Hypothesis 2: taxpayer post-audit compliance

Research has found that not only the probability and properties of an audit matter but also whether an individual experiences an audit and what are the results of said experience (Beer et al., 2020; Kasper and Alm, 2021). Hence, post-audit behavior in t is often influenced by the audit experience and its outcome in $t-1$, rather than solely the conditions for the upcoming audit. For example, laboratory tax experiments have found that audited individuals often report less in the round after an audit, coined the "bomb-crater" effect (Guala and Mittone, 2005; Mittone et al., 2017). One potential explanation for the decrease in reporting behavior after an audit is "loss-repair", here taxpayers perceive the result of the audit as a loss and hence report less in the following rounds to compensate for their perceived loss (Andreoni et al., 1998; Kastlunger et al., 2009).[13]

An additional strand of the literature suggests that it is not only the results but also the auditing process that affects an individuals' decision to comply. In that sense, the concept of procedural fairness or the quality of treatment and quality of decision-making received by an authority (Murphy, 2017) plays an important role. A long strand of literature has found that people who are treated with "dignity, respect, and fairness" (K. Murphy and Tyler, 2008; K. Murphy, 2009) are more likely to evaluate the authority positively and comply with the rules that emanate from said authority (Tyler, 2006). This also applies to the tax literature (Hartner et al., 2008) where K. Murphy and Tyler (2008) found that people are more likely to abide by the tax authority decision if they are treated fairly. Other authors such as van Dijke and Verboon (2010) have found that tax compliance is high when expected procedural justice is high. [14] However, if the rational model holds, previous experiences should not affect current behavior, as individuals are

[13] Another possible explanation is that individuals tend to estimate the likelihood of an event based on how often they have experienced it (Clotfelter and Cook, 1993). In taxation, this is translated as individuals estimating that a random audit "is more likely to occur because it has not happened for a while or it is less likely to occur because it recently happened" (Maciejovsky et al., 2007, p.2). We address this explanation by including the exact probabilities for all outcomes in our experimental design, see section V.5.1 for more details.

[14] A factor that relates to this is that of tax morale, or the intrinsic motivation to pay taxes (Torgler, 2007; Alm and Torgler, 2006) as this intrinsic motivation can be affected by the fairness of the procedure.

influenced by the probability of an audit and size of the fine, and these do not depend on past (audit) outcomes under a random audit scheme (Allingham and Sandmo, 1972). We, therefore, hypothesize:

Hypothesis 2a: predictions of the rational model without behavioral considerations
The experience of an audit (with overestimation) will have *no effect* on taxpayer compliance in the next period

Hypothesis 2b: predictions of the behavioral model - outcome based
The experience of an audit (with overestimation) will *decrease* taxpayer compliance in the next period, and depend on the size of the fine

Hypothesis 2c: predictions of the behavioral model - process based
The experience of an audit with overestimation will *decrease* taxpayer compliance in the next period compared to an audit without overestimation, independent of the height of the fine

Hypothesis 2a holds if the rational extended portfolio model explains behavior accurately. On the other hand, if the predictions based on the behavioral considerations framework are correct, taxpayer behavior might change after the experience of an audit. This experience has two components, 1) the audit's outcome in terms of height of the fine might influence loss-repair incentives and decrease taxpayer compliance in future tax declarations. 2) the audit process, whether an audit is executed with overestimation or without, might influence the tax morale of taxpayers, even when accounting for the size of the fine. Since "incorrect assessment" will have a different effect on fairness considerations than a "fair" punishment of unreported income.

V.5 Experimental design

V.5.1 Experimental details

The experiment used the fundamental elements of a voluntary income tax reporting game, following Alm and Jacobson's standard procedure (2007).

Each round of the experiment[15] represented a reporting decision where participants received a random income that fluctuated between 20000 – 30000 in increments of 100 Experimental Currency Units (ECU).[16] Based on these parameters participants had to decide how much to report to the tax agency. Their reported income was taxed at a rate $t = 0.25$. After submitting their report, participants faced the probability of being randomly selected for an audit, this probability was fixed at a p of (0.40).[17] If audited, the tax authority "estimated" the participant's income and compared it to their declared income. However, with a probability q (of either: 0, 0.1, or 0.5), the tax authority could overestimate -on top of- the received income by a factor α (either 0.1 or 0.5) percent of income I. Given this setup, fully honest taxpayers could still be potentially fined if their income was overestimated since $I - R \geq 0$. On the other hand, a dishonest taxpayer could be fined "fairly" in certain rounds if there was no overestimation and "unfairly" in others since the difference between $I - R$ would increase. The fine f for noncompliance was twice the estimated evaded amount $2(I - R)$ detected by the tax authorities (one time owed taxes and an extra time a punishment). After submitting their income report, participants were informed whether they had been audited or not, overestimated or not, and if so, by how much. Participants played 18 rounds in random order; in order to prevent last round effects, participants were not informed of the exact number of rounds.

Round	**q**	α	R_*	**Occurence**
1	0	0	59.70%	4 times
2	0.1	0.1	60.94%	3 times
3	0.5	0.1	65.65%	4 times
5	0.1	0.5	69.16%	4 times
7	0.5	0.5	95.21%	3 times

TABLE V.1: Predictions of optimal reporting behavior for different probabilities (q) of overestimation and size of overestimation (α)

[15]This study was preregistered before collecting any data at https://aspredicted.org/blind.php?x=13Z$_M$*GKandisstoredaspreregistration*74194

[16]We based our distribution on the median income for UK residents for the 2018-2019 tax year that is £25000. This is disclosed in the National Statistics "Distribution of median and mean income and tax by age range and gender" and updated yearly https://www.gov.uk/government/statistics/distribution-of-median-and-mean-income-and-tax-by-age-range-and-gender-2010-to-2011

[17]We choose our p and q in order to maintain realism and overlap with other research (e.g. p 0.40 is a very common audit probability (Malézieux, 2018) while also balancing the statistical power of overestimation on the other hand. With p combined with q [0, .1, .5] participants experience an audit with overestimation in 10% of their tax declarations

Table V.1 shows the parameters we chose for q and α and the optimal reporting strategy R_* (under relative risk aversion and CRRA) as predicted by the traditional model with the taxpayer portfolio model. There were four rounds where q and α are 0, this is equivalent to approximately 20% of rounds, we do this to establish a baseline of behavior in the absence of overestimation. Given our work's exploratory character, we used a high and a low level of α to see if the magnitude of the overestimation impacts tax compliance. Participants played all possible combinations of q and α multiple times.

V.5.2 Experimental flow

The experiment ran on Prolific, an online platform dedicated to data collection.[18] After reading the introduction to the experimental task, participants proceeded to play three practice rounds of the game (one not audited, one audited with no overestimation, and one audited with overestimation).[19] Once the practice rounds were over, before allowing the participants to proceed, we asked them two questions to check their comprehension of the experimental parameters. If one or both questions were answered erroneously, the participants were redirected to an explanation of the correct answers and an additional practice round.

Participants were informed of all parameters (p, q, α, f, t) in each round. To prevent effects that are the result of an ineffective translation of declared income to expected payoff, similar to Kasper and Alm (2021) we provided a calculator in each round that shows how declared income translates into expected after-tax income conditional on audit effectiveness for the three different scenario's (e.g., not audited, audited without overestimation, and audit with overestimation). Once participants have played all 18 rounds, they were directed to an exit survey. The first part of the exit survey consisted of demographic questions. The second part retrieved one round where the participants were audited with overestimation and asked questions about the reasoning, motivation, and strategy they used. Finally, we asked standardized questions on risk aversion (Menkhoff and Sakha, 2016), tax morale (World Value Survey, 2017), and procedural fairness (Kirchler and Wahl, 2010).

[18] https://www.prolific.co/

[19] Screenshots of the experiment and a transcription of the instructions is in C.1

V.5.3 Participants

General Characteristics

We recruited a total of five hundred and one (n=501) participants for the experiment using Prolific. We used a representative sample of the UK population, with demographics matching the demographic composition of the UK in age, race, and gender. Although Prolific competes with other online platforms, research shows that Prolific respondents produced high-quality data and were far more diverse than those from other platforms (Peer et al., 2017; Eyal et al., 2021).The overview of the general characteristics of the sample is in table V.2[20], one of the benefits from using Prolific has been the number of non-student participants, only 42 participants (8,38%) were students, as opposed to a traditional laboratory study on campus. In addition, our participants were, on average, 44 years old.

TABLE V.2: General characteristics of sample

Variable	**Categories**	**Nº**	**Percent**
Gender	Female	253	50,50%
	Male	240	47,90%
	Other	8	1,60%
Occupation	Employed	262	52,30%
	Self-employed	57	11,38%
	Student	42	8,38%
	Unemployed	50	9,98%
	Other	90	17,96%
Education	High-school	108	21,56%
	Vocational training	89	17,76%
	Bachelor	210	41,92%
	Masters	65	12,97%
	PhD	15	2,99%
	Other	14	2,79%
Income	0-1500 GBP	220	43,91%
	1501-3000 GBP	174	34,73%
	3001-5000 GBP	54	10,78%
	$\geq$ 5000 GBP	31	6,20%
	I don't know	22	4,39%
Region of birth	Africa	9	1,83%
	Americas	13	2,64%
	Asia	25	5,08%
	Europe	33	6,71%
	Oceania	1	0,20%
	United Kingdom	411	83,54%

[20]For more information see Appendix C.1.2

Time investment and payoffs

Based on a trial of the study, we estimated that participants would take approximately 20 minutes to finish the task and questionnaire. Participants took on average 20.5 minutes (18 median) to complete the study. Following Prolific payment rules, participants were entitled to a minimum income based on the servers' considerations of a fair hourly wage.[21] Given our time estimations we guaranteed payment of £1.8 show-up fee equivalent to £5.4 per hour. On top of the guaranteed payments, in order to incentivize behavior, participants could receive a bonus between 0 and up to £8.71, equivalent to £26,13 per hour, calculated after taxes and fines.[22] The average bonus was £0.54 which is equivalent to a 27,7% increase on the guaranteed income. The average final payment (show-up fee + bonus) was £2.41 this is equivalent to £7,23 per hour

V.6 Results

V.6.1 Summary statistics

We observe a total of 9018 compliance decisions from 501 individuals. Out of these 9018 decisions, 5333 (59,14%) were not audited, 2757 (30,57%) were audited and not overestimated, and 928 were audited and overestimated (10,29%). Regarding the responses of our participants, 4345 decisions were honest reports of income (48,18%). Out of the 501 participants, 86 (17,17%) were always honest.

[21] Prolific requested a minimum wage of £5 per hour, and a suggested wage of £7,50 per hour.

[22] This limit was based on the highest income trial participants obtained, and how they would have answered if fully rational. In reality, income could have gone up to £60,63 if participants would have gotten the highest income in each round and if they had acted rationally, however, this is very unlikely.

TABLE V.3: General characteristics of sample

Variable	Categories	Mean	SD
Dependent Variable			
Compliance rate	Ratio of reported to received income	.79	.31
Experimental Treatment Variables			
Income	Income received in ECU	24933	2870
Audit rate	Probability of being audited	.41	.49
Overestimation	Probability of being overestimated	.10	.30
Overestimation factor	Magnitude of overestimation	.26	.20
Fine	Fine after audit	3486	4333
Relative fine	Fine relative to gross-income	.14	.17
Demographic Variables			
Age	Participant age in years	44.62	15.10
Gender	=1 if female,=2 if male, =3 if other	1.51	.53
Education	=1 if High school, =2 if Vocational training, = 3 if Bachelor, =4 if Master, =5 if PhD	2.66	1.20
Income	Participant monthly income in £: =1 if 0 – 1500£, =2 if 1501– 3000£, =3 if 3001-5000£, =4 if >5000£	1.92	1.09

V.6.2 Hypotheses I: What is the effect of overestimation on taxpayer compliance?

Hypotheses I questions the effect of the probability of overestimation q and its size α of the upcoming audit on taxpayer compliance. Hypothesis **1a** predicts that taxpayers follow the rational extended portfolio model, Table V.1 shows the rational behavioral response for a relative risk averse taxpayer, where an increase in $q * \alpha$ (or q/α separately) increases taxpayer compliance, with a larger response to a change of α. Hypothesis **1b** predicted that behavioral motivations would counteract this increase in taxpayer compliance. The exact outcome of these counter forces depends on the weight given by the taxpayer to both forces, but if we assume equal weights, we will see no behavioral response to a change in q or α. Lastly, hypothesis **1c** predicted a decrease in taxpayer compliance after an increase in q or α, if economic incentives play no role, and only behavioral considerations influence taxpayer compliance. In general, our different estimations provide the most support for hypothesis 1b: although the presence of q increases tax compliance, the extent to which this happens is not in line with our theoretical predictions, furthermore the size of overestimation, α does not seem to impact tax payer behavior.

From a first glance, as we can see in Figure V.1 the mean rate of compliance (y-axis) is the lowest for those individuals who faced a zero probability of an audit with overestimation. Although the rate of compliance increases as the combined $q * \alpha$ increases, the increments in which it does are not proportional. This can be seen when looking at the small increases in the last three columns, compared to a relatively larger increase in compliance is when facing the shift from $q * \alpha = 0$ to $q * \alpha = 0.01$.

Table V.4 provides a breakdown of our different estimations. We ran a standard ordinary least squares regression with clustered standard errors on the individual level. Models 1-2 show the combined effect of $q * \alpha$ as presented in Table V.1, Models 3-6 detach the effects of q and α. Model (1) shows the effect of the different categories of $q * \alpha$ with a benchmark of no possibility of overestimation ($q * \alpha$=0). We can see here that when participants are confronted with a positive probability of overestimation, they increase their compliance by approximately 3 percentage points, which is even more then Table V.1 would predict, this provides support for hypothesis 1a: the

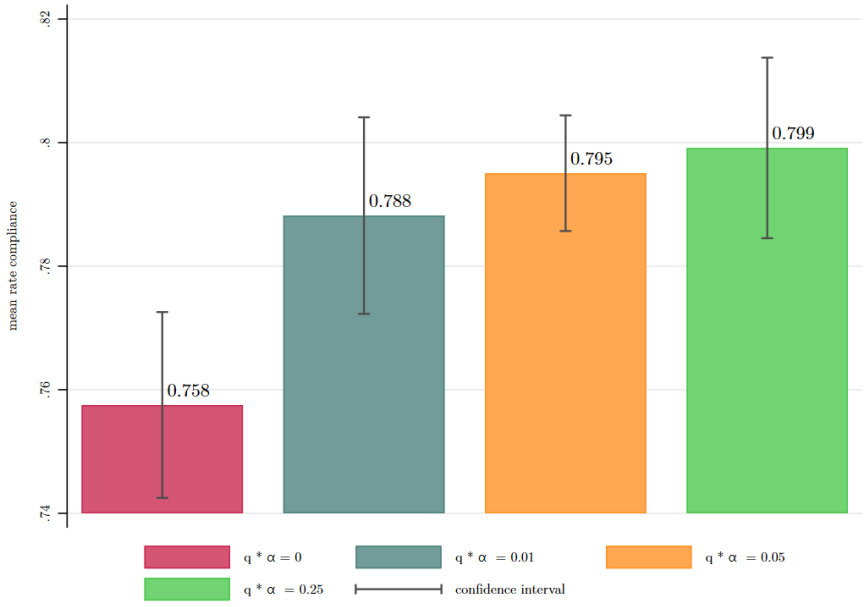


FIGURE V.1: The effect of overestimation on compliance rate

rational model. However, contrary to rational model predictions, we see that there are no significant differences between ($q * \alpha$=.01), ($q * \alpha$=.05), and ($q * \alpha$=.25) in Model 1. To illustrate, with the average income 25000 ECU, with the presence of ($q * \alpha$=.01), the expected overestimation the participant faces is 250 ECU. In this case, average compliance increases by approximately 3 percentage points. Compared to the case of ($q * \alpha$=.25), when she is faced with an expected overestimation of 6250 ECU. However, compliance only increases with 1 percentage point, compared to ($q * \alpha$=.01) and is not significantly higher from ($q * \alpha$=.05) or ($q * \alpha$=.01). The shift of expected overestimation is larger (6000 ECU) between ($q * \alpha$=.01) and ($q * \alpha$=.25), compared to ($q * \alpha$=.01) and ($q * \alpha$=0) with only an increase in expected overestimation of 250. To conclude, the behavioral change of a zero to a positive probability of overestimation seems to support hypothesis 1a. However, the subsequent changes in $q * \alpha$ seem not to affect on taxpayer compliance, supporting hypothesis 1b: where economic incentives and behavioral considerations counteract each other resulting in a null result. We find no support for hypothesis 1c: the model that is predominately driven by behavioral considerations and hardly takes economic incentives into account. The results in model (2) include demographic controls and remain stable.

We ran models (3)-(6) to disentangle the effects of q and α. Models (3) and (4) show the effect of facing a probability of overestimation q of .1 and .5,

taking as a reference facing a zero probability of overestimation. We find an increase in tax compliance of approximately 2.5 percentage points. Additionally, we find that q = .5 is is significantly different (z = 3.16, p = 0.002) from q = .1 and leads to a increase in compliance of 1.6 percentage points. This is less than Table V.1 predicts but is evidently an increase in tax compliance.

In models (5) and (6) we analyze the effect of an increase in $\alpha = .1$ to $\alpha = .5$ controlling for q. Like models (3) and (4) the results suggest that q .5 is significantly different from $q = .1$. However, we find no significant effect of the size of the overestimation (α = .1 versus .5). Our results thus suggest that people (partially) update their compliance behavior when the probability q changes in line with hypothesis 1a, but seem to ignore the size α of overestimation in their compliance decision, even though the rational model predicts a larger behavioral change following α then q. Model (5) and (6) support for hypothesis 1b, where some counter force seems to be at play, diminishing the rational increase of taxpayer compliance. Thus we find most support for hypothesis 1b, it seems that economic incentives predominantly drive taxpayers' behavior, but not to the extent of that of a "fully rational".

TABLE V.4: The effect of the probability (q) and magnitude (α) of overestimation on tax compliance

	(1)	(2)	(3)	(4)	(5)	(6)
q * $\alpha = 0$	ref	ref				
q * $\alpha = .01$	0.0307***	0.0307***				
	(4.27)	(4.27)				
q * $\alpha = .05$	0.0375***	0.0375***				
	(6.51)	(6.51)				
q * $\alpha = .25$	0.0416***	0.0416***				
	(5.79)	(5.79)				
q = 0			ref	ref		
q = .1			0.0278***	0.0278***		
			(4.57)	(4.57)	ref	ref
q = .5			0.0438***	0.0438***	0.0155**	0.0155**
			(7.60)	(7.60)	(3.18)	(3.18)
$\alpha = .1$					ref	ref
$\alpha = .5$					-0.00452	-0.00452
					(-0.93)	(-0.93)
Constant	0.758***	0.762***	0.758***	0.762***	0.788***	0.794***
	(67.01)	(14.56)	(67.01)	(14.56)	(71.35)	(15.32)
Demographics	NO	YES	NO	YES	NO	YES
Observations	9018	9018	9018	9018	7014	7014

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

V.6.3 Hypotheses II: What is the effect of overestimation on post-audit taxpayer compliance?

Hypotheses II researches the effect of audit outcomes on post-audit taxpayer compliance. By post-audit tax compliance, we mean the tax-compliance behavior after a round where the participant experienced an audit. Hypothesis **2a** predicts that audit outcomes of the previous tax declaration have no effect on the behavior of current taxpayer compliance since the rational model states that taxpayer compliance is determined by the audit parameters of the current round rather than past experiences. Hypothesis **2b** predicts that taxpayers adjust their compliance behavior depending on the "practical" outcomes of the experienced audit, it hypothesizes that taxpayers are driven by the need to restore what they have lost and hence are influenced by the amount they paid in fines in the last audit. Lastly, hypothesis **2c** predicts that the process of the experienced audit influences taxpayers. Thus, it predicts that taxpayers will not react in the same way to an audit with overestimated income versus an audit without overestimation, even if the audit outcome (e.g., the amount they have to pay in fines) is identical. In general, we find support for the behavioral predictions focused on the experienced audit process of hypothesis 2c.

Figure V.2 serves as an illustration of our main findings, the y-axis represents the change in the mean rate of compliance. As can be seen in the first column, those that were not audited increase their compliance, whereas those audited decrease their mean rate of compliance. The difference between those audited without overestimation and those audited with, last two columns, is larger. The yellow column (audited and overestimated) results in a significantly larger decrease in compliance than the other two columns. Suggesting that audits with overestimation trigger taxpayers.

Our findings are reported in Table V.5, where the change in tax compliance between the last period and the current period $(\Delta\ tax\ compliance)$ is the dependent variable. Model 1-3 test hypothesis 2a, Model (4) tests hypothesis 2b and hypothesis 2c. In model (1) we show the effects of being audited in the previous round and being audited and overestimated, compared to individuals who were not audited in the previous round. Both significantly decrease tax compliance relative to the previous round. The difference between those who are only audited and those who are audited and overestimated

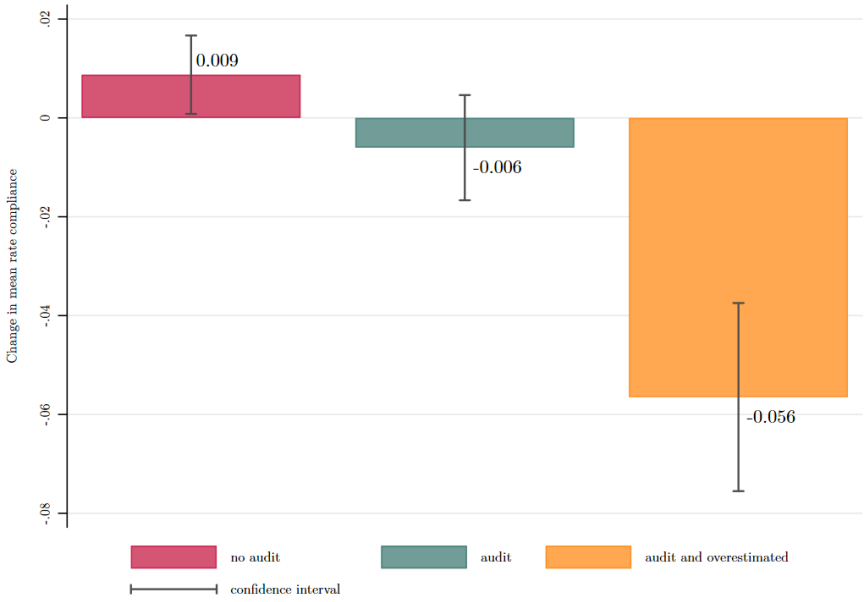


FIGURE V.2: The effect of last round overestimation on evasion rate

is approximately 5 percentage points and significantly different (z = -4.23, p =0.000). In summary, we do not find any support for hypothesis 2a, Model (2) includes demographic controls, the results stay stable. Model (3) controls for received gross income and $q * \alpha$ in the current round in order to prevent any potential "regression to the mean" effects (see Kasper Alm, forthcoming). The results of models (1) and (2) remain stable.

Finally, in Model (4) we also control for the relative fine received from the previous period, we do so to give further insight into the dynamics of overestimation. The effect of the last period fine gives us insight into the behavioral response to the outcome of an experienced audit (H2b). Disentangling audits versus audits with overestimation, when the fine for both is equivalent, gives us insights into the process of an experienced audit, irrespective of the outcome (H2c). We find that the height of the fine in the last tax declaration has a positive effect of 8 percentage points on current time taxpayer compliance. Therefore we reject hypothesis 2b of loss-repair motivations of taxpayers. When we control for the height of the fine, we still see a negative effect of the "type" of audit, this means that irrespective of *how much* the taxpayer has to pay, the *reason why* the taxpayer has to pay influences compliance behavior next period too. The effect of being audited and overestimated versus audited without overestimation is equivalent to

approximately a 14 percentage points decrease in Δ tax compliance. This supports hypothesis 2c, the prediction of the behavioral model that argues that the process (e.g., the reason *why* the taxpayer has to pay) matters, even when controlling for the amount the taxpayer has to pay.

TABLE V.5: Post-audit effect on compliance of different audit types

	(1)	(2)	(3)	(4)
last round no audit	ref	ref	ref	
last round audit	-0.0148*	-0.0148*	-0.0152*	ref
	(-2.15)	(-2.15)	(-2.22)	
last round audit and overestimated	-0.0652***	-0.0653***	-0.0649***	-0.144***
	(-6.27)	(-6.27)	(-6.23)	(-14.02)
received gross income			-0.00180	-0.00172
			(-1.67)	(-1.17)
q * α			0.0634	0.0931
			(1.75)	(1.90)
last period relative fine				0.856***
				(29.49)
Constant	0.00874*	0.0121	0.0530	-0.0185
	(2.19)	(0.77)	(1.70)	(-0.40)
Demographics	NO	YES	YES	YES
Observations	8517	8517	8517	3468

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Demographic impact on tax compliance

When it comes to our control variables, similar to Kastlunger et al. (2010) and Kasper and Alm (2021) we find that women are significantly more tax compliant. This is consistent in both the regression results of hypotheses I and hypotheses II (complete tables are available in Appendix A). We illustrate the gender effect in figure V.3 where we report post-audit mean evasion for men and women when not audited, audited, and audited, and overestimated. On the left of the image, women evade less in all three categories than men on the right. Considering all rounds, 21% of women were honest on all rounds, whereas only 13% of men were always honest. In the same

line and in line with other research (Mittone et al., 2017; Muehlbacher et al., 2017) we find that compliance also increases significantly with age, and with the perception of taxes being something that contributes to the collective versus something that has been taken away from you personally. Lastly, we find that compliance decreases with risk aversion (see Appendix C.1.3, Table C.4).

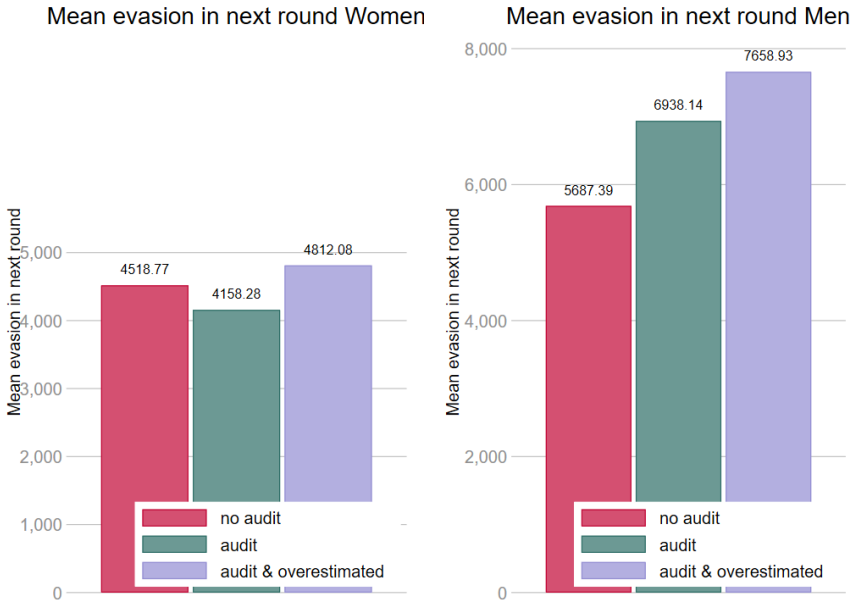


FIGURE V.3: Gender differences in tax compliance

V.6.4 Exploratory results

Our theoretical model makes no assumptions on the behavioral drivers of taxpayer compliance. Even though our main hypotheses only show changes in taxpayer behavior without the motivation thereof, this section gives a first insight into the behavioral drivers of taxpayer compliance choice. Most of the research diving into behavioral motivations behind tax compliance (see for e.g, Kirchler et al., 2008; Torgler, 2007; Mittone et al., 2017; Mascagni, 2018) is a byproduct of the inclusion of social psychology and behavioral economics into the tax literature in recent years. Behavioral drivers connected to our research have been highlighted in section V.4.3. We use survey and qualitative self-reported motivations from participants to have further insight into the answers to a key question: *What motivates tax compliance?*

A *survey* based insight into post-audit tax compliance motivations

Participants were asked a multiple-choice question regarding their main motivation while playing the game. The potential answers and distribution of the self-reported motivations of our sample can be found below in Table V.6. The majority of participants chose "being honest" and "avoiding fines" as their main motivation. We find that there is an important relationship between participants' motivations and their post-audit compliance behavior. Figure V.4 shows the change in tax reporting behavior after a tax declaration with either no-audit, an audit, or an audit with an overestimation of income. We find that participants that have "being honest" as their main motivation hardly respond to the different types of audit outcomes, suggesting that their behavior is not driven by reacting to audit outcomes. On the other hand, those with revenge as their main motivation are strongly driven by audit outcomes, when they are not selected for audit, compliance behavior increases in the next round, while after an audit (with overestimation) it decreases. The participants that choose the other three motivations seem not to change behavior following no audit or audit but do decrease their reporting behavior after an audit with overestimation. This suggests that those who avoid fines, e.g., the 1) *"Alligham Sandmo"* group, 2) those that compensate for earlier rounds the *"loss-repair"* group, and, 3) those who list contributing to the collective as their main motivation, 4) the *"tax morale"* group seem to be affected by overestimation and respond with lower compliance compared to a fully effective audit system without mistakes. More details of the behavioral response of the different groups can be found in Appendix C.1.8 in Table C.14.

A similar pattern can be distinguished if we partition our participants in percentiles of frequency of cheating, as can be seen in Appendix C.1.9. Audit outcomes do not affect those in the least evading percentile. Those in percentiles 25 to 75 seem to have the strongest reaction to audits, suggesting that those taxpayers have what we call a "swingers" behavior pattern, they are compliant if well treated and change their behavior if not. Those in the category of most frequent evaders, have a negative, but less strong reaction to audits, suggesting that they will (always) evade if they have the opportunity and make only minor changes in the amount they cheat. [23]

Whether we account for motivations or by quartiles, the fact is that there

[23] This group evaded on average 17.5 rounds out of the 18

Motivation	**Percent**
Being honest	38.9 %
Avoiding fines	32.9%
Compensating for earlier rounds	15,16%
Revenge	1.1%
Contributing to the collective	6.7%
Other	4.9%
Total	100%

TABLE V.6: Behavioral motivations

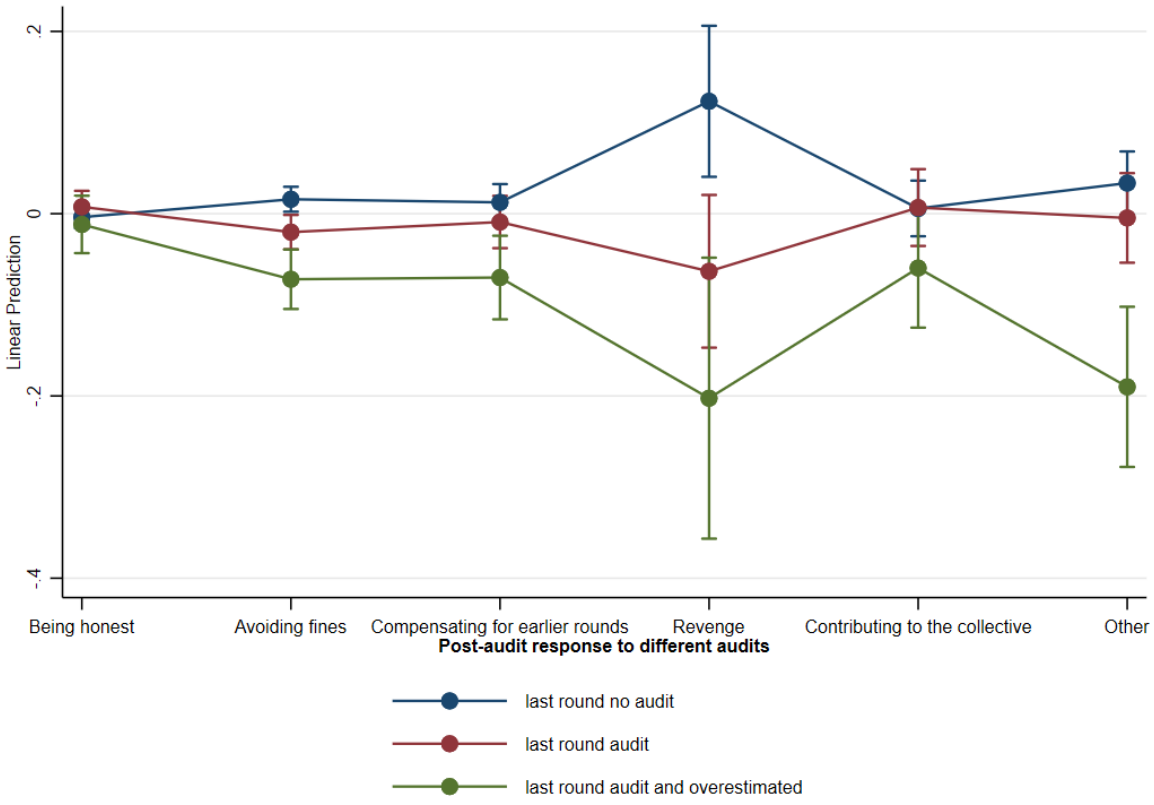


FIGURE V.4: Post-audit change in taxpayer compliance for different audit outcomes

are participants that never cheat, the so called *non*-swingers, as can be seen in figure V.5 below, the data follows a zero-inflated pattern, where many individuals evade 0% of their incomes.

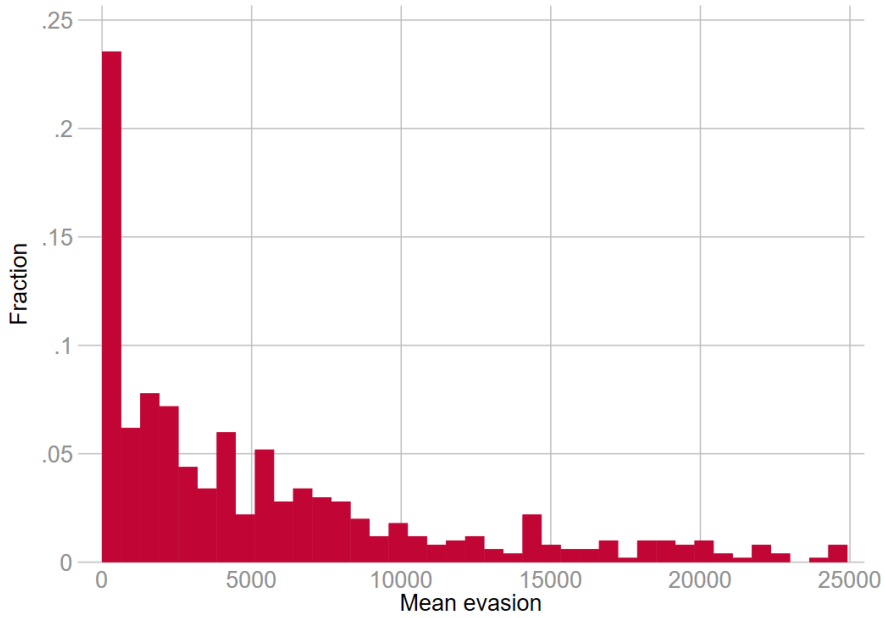


FIGURE V.5: Mean participant evasion across experiment

Qualitative analysis of tax compliance motivations

In the experiment, we also included qualitative questions, as explained in Section V.5.2. Open-ended questions helped us understand the reasoning behind participants' actions. We analyzed the answers systematically and categorized answers that have either similar words or convey similar meanings (Bengtsson, 2016), into four pre-defined categories of tax motivations, based on the literature on tax compliance. [24]

(a) **honest motivations**- individuals classified into this category argued that their main motivation was being honest, not all participants stated that this was the way they acted but rather that honest motivations drove their intentions when participating. The existence of these types of "highly-ethical" individuals have been recognized and studied by the lying research (Gneezy, 2005; Rosenbaum et al., 2014). Answers such as *"I have always declared the income I have received. In my opinion the*

[24] As a reliability check, we asked two coders to classify the same answers, on average they agreed 73% of the time.

over-estimations are unfair, but that does not justify 'cheating'. Being honest is one of my core values!", are coded into this category. We make the deliberate choice to separate answers related to a pure honesty/moral driven behavior from those that make specific mention to a duty towards taxation as their main driver as this could also refer to other motivations such as contributing to the collective rather than being honest for the sake of being honest.

(b) **tax morale motivations**- We classified participants who argued that their main motivation was related to enthusiasm or high value of taxation into this category, the intrinsic motivation to pay taxes has been widely explored under the concept of *tax morale* (Torgler, 2007). The notion of tax morale goes against the popular adage of "nobody likes to pay taxes" by suggesting that its not only deterrence preventing people from cheating but rather an intrinsic motivation to not cheat on their taxes (Alm and Torgler, 2006). In the qualitative answers of our respondents, we find such motivations. As a result, answers such as *"I have always believed that one of the things that is wrong with society is people dodging taxes. If everyone paid what they are liable for services would be better funded. I am also risk-averse to the possibility of being audited and getting penalised. Over all, I sleep better."* are coded into this category.

(c) **compensation motivations**- Already in 1998 Andreoni et al. (1998) suggested that in some instances audits make taxpayers "want to evade more in the future in an attempt to 'get back' at the tax agency" (p.844). Loss repair motivations have been further explored in the tax literature, as taxpayers perceiving audits as a loss and therefore report less in the following rounds in order to compensate (Kastlunger et al., 2009). Based on this literature participants who's main driver was compensating for earlier losses due to overestimation or auditing were classified into this category. An example of an answers is: *"If there is a possibility of overestimation I'm going to attempt to claw back a lot of it purely as a fine for incompetence. As the rounds progressed I felt less and less inclined to give accurate reports as the audits seemed to appear more than 40% of the time it became a situation of how much could I claw back from an unfair system."* were classified as compensating.

(d) **calculating motivations**- The deterrence model (for further detail refer to section V.3) argues that individuals are rational maximizers that choose an optimal strategy based on the probabilities of audit, height

of the fine, etc. presented to them. Although the literature has long found that predictions based on this model are not entirely accurate in predicting tax compliance (B. Frey and Feld, 2002) we do find participants that justify their actions are a result of a calculation of probabilities, albeit these are often not correct. We classified individuals in this category independent if their calculations were right or wrong. Hence, answers such as: *"With no overestimated income to worry about there was a chance to not be hit too hard by declaring only 11500.00 ECU here compared to anything higher. I didn't go lower than 11500 as 40% odds are still likely enough in my head - I didn't want to bet "all or nothing" in this scenario. I wanted some leeway and 11500 was the number I chose for this"* were classified as calculating. Answers where risk preferences were explicit were also classified in the category.

The qualitative categories coincide with the behavior of participants, for example, those who said their main motivation was honest had an average compliance rate of 90%. This also translates into their post-audit behavior when depending on the audit outcome. Table C.15 of Appendix C.1.8 shows the proportion of participants falling in each category. As can be seen in Table C.14 individuals whose main motivation was honesty were significantly more compliant for any audit outcome compared to the others. This is in contrast to individuals whose main motivation was moral duty, they were significantly more compliant compared to the other participants when not audited, or audited. Yet when the moral duty participants were audited and overestimated they no longer complied more than the others. Furthermore, individuals whose main motivation was either calculative or compensatory decrease their compliance significantly when audited and overestimated, but not when solely audited. From this we can conclude that 1) participants have different motives that determine their tax compliance and 2) participants act consistently on their motives across the experiment.

V.7 Robustness checks

In order to ensure the robustness of our results we ran our models under different specifications and samples. [25] In addition, we also checked the quality of our participants' responses by running a qualitative robustness check. The following section is divided into a subsection dedicated to quantitative

[25] See Appendix C.1 for all tables described in this section

robustness checks for hypotheses I and II, and a subsection focused on qualitative robustness checks regarding the quality of responses.

V.7.1 Quantitative robustness checks

The literature has acknowledged that participants in tax experiments are quite honest, they are on the one hand, more honest than the portfolio model would predict and on the other hand, more honest than those participating in lying experiments (Alm and Malézieux, 2020). Hence we first check the robustness of our results by running the analysis of table V.4 and V.5, with a sub-sample, where we exclude participants that were *fully honest* throughout all eighteen rounds, these participants represent approximately 17% of our sample. These *fully honest* participants are similar to those that in real life would be inherently honest taxpayers. According to Erard and Feinstein (1994) these taxpayers are "willing to bear their full tax burden even when faced with financial incentives to under-report their income." Tables C.5 and C.9 in Appendix C.1 show the results of the same OLS regressions of tables V.4 and V.5 without the *fully honest* sub-sample. We find that the direction of the results is stable and that although effect sizes are larger in both cases, they do not differ significantly from the full sample results.

As a second robustness check, we test if the results in tables V.4 and V.5 are robust when using a different estimator. For our estimations in Table V.4 of Hypothesis (1), we re-estimate our average treatment effect with a fractional logit model.[26] With the advantage that 1) it corrects for our zero-inflated (honest responses) data distribution and 2) it fits through quasi maximum likelihood a multinomial logit model, without making strict assumptions about the underlying distribution of the data. To tailor to the fractional logit estimation, we estimate the evasion rate, the opposite of the compliance rate, to approximate the logistic distribution. Our fractional regression results are in Table C.6 of appendix C.1.7 and represent the estimations of Table V.4 with demographic controls added. The coefficients of the OLS estimations and the fractional logit estimations are approximately identical. Therefore we conclude that the results of V.4 are robust. Thus we disregard our worries of the

[26]We thank Josh Dean and Jeffrey Woolridge for their friendly suggestion to use this type of model.

zero-inflated data.[27].

Given that the analysis for hypothesis II is based on the change in tax compliance (Δ *tax compliance*), a fractional model is not suitable since the Δ can be larger than 1 and smaller than 0. We tested the robustness of the results of Table V.5 by transforming tax compliance from a $0-1$ variable to an ordered dependent variable where -1 indicates that relative to the previous round tax compliance went down, 0 means no change relative to the previous round, and $+1$ indicates that relative to the previous round tax compliance increased. The results are in Table C.10, the direction of the results is overall stable, although the effect of an audit without overestimation loses statistical significance in this estimation. The finding that compliance decreases significantly after a round of audit and overestimation is robust for the ordered logit estimation and is still significant on a 0.1% level (t = - 3.98). We thus conclude that the finding of a decrease in compliance after overestimation is robust, however, the results that suggest that compliance also decreases for the case of a sole audit might have to be interpreted with a bit more caution. The difference between audits with and without overestimation in Model (3) are robust, so is the finding of a higher compliance rate when the last-period fine was higher.

V.7.2 Qualitative answers

The qualitative answers explained in V.6.4 do not only serve to shed light on the motivations for tax behavior. But also, similar to Bezalel et al. (2021), it functions as a robustness check for the quality and seriousness of answers. Although, as mentioned in section V.6.4 answers were categorized into four groups based on their motivations, in addition to this we also flagged motivations that reflected a lack of awareness or attention to the experiment. This "unaware" category represents approximately 3% of our sample, suggesting that most participants understood the task and were engaged with the process.

[27] Zero inflated data can cause over-dispersion and biased standard errors, choosing the right model and asking the question why there are many zero's; and if there is a difference between the different zero's is essential for a robust analysis (Zuur et al., 2009, p.270) In our case, we have some participants who are always honest and therefore do not even consider non-compliance, other participants do switch between compliance and non-compliance, we talk more about this in the discussion.

V.8 Discussion

Audits are an essential tool for deterring taxpayers from under-reporting their income. However, audits are not always fully effective, by using an online experiment, in this chapter we analyzed how a type I error in the tax audit - an overestimation of income- influences behavior. With this, we contribute to understanding behavioral dynamics of tax compliance in light of more realistic audit schemes. We propose two lines of hypotheses, the first is regarding the behavior when individuals face a tax declarations with different parameters of the probability and magnitude of overestimation when audited. The second study post-audit behavior, where we study how individuals respond to different audit outcomes in their next tax declaration.

Hypotheses I is focused on the taxpayer response to a change in the probability q of overestimation and its magnitude α. Hypotheses 1a put forward the question of whether the traditional portfolio model was an accurate predictor of compliance behavior in the case of overestimation, the answer, albeit with some nuance, is it is not. We predicted that q x α would increase taxpayer compliance, our results in Table V.4 confirm this for the change from a zero q x α to a positive q x α, but we see no further increase as $q * \alpha$ escalate. Hence, we find that participants do not follow the predictions of the rational *"homo economicus"* model. Hypothesis 1b predicted that behavioral drivers would counteract the increase in taxpayer compliance if the weight to the "rational" and behavioral drivers is equal, we should see no difference in tax payer compliance when $q * \alpha$ changes. If the behavioral drivers are smaller than the economic ones, we should see an increase, but smaller than the rational model in Table V.1 predicts. In the combined effect of $q * \alpha$, we find support for Hypothesis 1b. When we disentangle the effect of the probability q and the magnitude α, we find a significant effect from q, but no effect of α the magnitude of overestimation. Individuals increase compliance when the probability of overestimation increases but seem to ignore the associated extra costs when α increases. This leads to an insufficient increase in taxpayer compliance, especially under high levels of α. Our results are robust when using different modeling techniques, among others, see V.7. To some extent, our results are in line with the tax literature that finds that fines and their size matter less than the probability of audit (Alm and Malézieux, 2020), as the size of the overestimation α acts similar to a fine. A point of observation could be that these results are a reflection of individuals' inability

to correctly assess probabilities (Bernasconi and Bernhofer, 2020), however we correct for the limited processing of individuals by providing a calculator in each round, that shows the outcome and the compound probability of each of the three possible scenarios. In conclusion, our results point towards a rejection of the portfolio model for the case of overestimation, except for the change from zero q x α to a positive q x α. However, as we know from the literature, the change of zero probability to a positive one is often larger (e.g. the coined the "certainty effect" by Kahneman Tversky in 1979) than a rational model would predict. Therefore, the "*certainty effect*" offers an alternative explanation for this finding, next to the portfolio model. We find no evidence supporting hypothesis 1c, which predicts that behavioral considerations overshadow economic ones. We, thus, find most evidence for the case in between extremes, taxpayer behavior is complicated, and both driven by economic incentives as by behavioral ones.

Hypotheses II focuses on how tax compliance behavior is affected by the outcomes and the process of the previous round audit. Hypothesis 2a, in line with the rational expectations, stated that individuals' tax compliance would not be affected by previous experiences. We reject this hypothesis as we find that having experienced an audit (with overestimation) reduces tax compliance post-audit even though the parameters that predict taxpayer compliance according to the rational "homo economicus" model do not change after an audit. Similar to the gamblers' fallacy (Clotfelter and Cook, 1993) we find that even though parameters do not change and chance is random, the experience of being randomly selected can change future behavior. In order to understand what are the driving forces behind post-audit tax compliance, Hypothesis 2b and c aim at disentangling the effect of experienced audit outcomes and the experienced audit process. Hypothesis 2b predicted, based on the "loss-repair" literature, that individuals might be tempted to win back their (perceived) losses after an audit. Seeing a tax-audit as a loss indicates that individuals perceive the auditing process as a gamble, similar to the rational Alligham and Sandmo model. However hypothesis 2b predicts that some behavioral "bias" interferes with the rational response to a loss, quite similar to the gamblers' fallacy. We reject this hypothesis, as we see that an experienced fine actually increases compliance in our study. Hypothesis 2c on the other hand, predicted that not only the audit outcomes, but also the audit process might influence taxpayer compliance. From a *"homo-economicus"* perspective, the process that leads to a certain outcome should

not matter, only the outcome does. Given that a taxpayer has to pay a certain fine should have an independent effect on whether this fine comes from a fully effective audit or an audit with overestimation. However, hypothesis 2c, based on a large stream of literature on tax morale (Kogler et al., 2016) and procedural fairness (K. Murphy, 2007) predicted that the "*why*" might matter as well as the "*what*". When controlling for the height of the fine, we find that the "type" of audit, one with overestimation or without influences the next tax declaration, this fully supports hypothesis 2c. Hence, we find overall support for the literature on tax-morale and procedural fairness. I addition find support for the slippery slope framework, where trust in the government is an alternative to enforcement. Our results on hypothesis (2) are robust when using different modeling techniques, among others, see Section V.7. By studying both fully effective audits and audits with overestimation we also add to the literature on the "bomb-crater" (Mittone et al., 2017), or a decrease in compliance after an audit. The different response to both audits, even when controlling for the fine, indicates that mechanisms other than loss-repair might be at play even under fully effective audits, for example feelings of (procedural)fairness might be the main driver of the bomb-crater effect.

There has been an increased interest in answering the question: *What motivates tax compliance?*, in section V.6.4 we aimed to shed some light on what motivated our participants to comply or not with taxes in the experiment. Although these results offer no causal relationships, they illustrate some interesting dynamics. First, a consistent group of individuals is always or almost always honest when declaring their taxes. Incidentally, these individuals also declare honesty as the motivation behind their behavior. This group does not respond much to the possibility of overestimation, nor do they react to different audit outcomes. It seems that these individuals are driven by other reasons than audit parameters or audit outcomes. Second, we find that different groups of individuals react differently to the experience of an audit with overestimation than to a fully effective audit. For example, we find that those with tax morale as their primary motivation do not decrease their compliance following a fully effective audit but do so for one with a type I error. What is relevant from this result is that the motivations of these groups suggest that different groups of people might react differently to tax policy. When put in the axes of the slippery slope framework (Kirchler et al., 2008) those who aim to avoid fines, what we call the *Allingham-Sandmo*

group might react to policies stemming from power and comply when enforced. Whereas individuals in the tax morale group might be more responsive to comply voluntarily when trusted. Furthermore, there should also be increased attention to the group that we defined as “swingers", those who depending on the circumstances comply or not. As suggested by Alm et al. (2020), policymakers need to take into account “the full-house of individual behaviors" when designing policy or when dealing with the consequences of policy decisions. We deepened the analysis of our survey analysis by analyzing respondents’ qualitative answers. The qualitative motivations expressed by our participants reinforced that the motivations to comply are varied, and coincide with the groups found through the survey. The incorporation of qualitative methods in experimental research is relatively new, yet our results suggest that it is necessary to gain further understanding of the mechanisms behind the compliance decision.

V.8.1 Limitations

Although our data might have certain limitations, we believe the reliability of our responses is high. One of the main criticisms of laboratory experimental tax research is the biased nature of the sample given the overwhelming use of student and economics students (Richardson and Sawyer, 2001). Although we run a laboratory experiment, our representative sample of participants aims to tackle some of the issues when using student samples. Furthermore, the quality of our participants’ answers is evidenced by the qualitative robustness checks and recent research on the quality of Prolific samples. For example, a rising issue with MTurk participants is their “professionalization” and non-naivety (Chandler et al., 2015) reflected in the number of times a participant has done a similar task and their familiarity with a type of study which can significantly change participant responses accordingly (Hillygus et al., 2014). Prolific participants have been found to be more naive compared to those frome Mturk and CrowdFlower (Peer et al., 2017). We also check for naivety by asking participants whether they had previously participated in a tax experiment, only 8 participants had played a tax experiment before (1,5% of our sample). Additionally, to check the understanding after reading the instructions, participants did three trial rounds followed by two comprehension questions, 451 participants answered both correctly (90%). This indicated our participants had high understanding and low-nativity of

the game.

Our robustness checks and Figure V.5 raise a second methodological issue, a high number of participants are honest. If we include those who are mainly honest (honest between 75% and 99% of the time) the total amounts to 74% of our sample. Even though our robustness checks for hypotheses (1) and (2) showed the reliability of our estimations, we additionally propose the inclusion of two-stage "hurdle" models in the experimental tax literature. Where the first stage of the model accounts for the mass at zero by fitting a binary choice model on the probability of observing a 0 or > 0 through a logistic model. The second stage of the model estimates the extent of evasion with a standard linear regression after the decision to evade or not evade has been taken place.

To the best of our knowledge, the zero-inflation issue has not been tackled sufficiently in the experimental tax literature, where OLS estimations are the standard.[28] Especially given the findings of the previous paragraph regarding the different types of people and motivations, this raises the question of the choice to be *fully compliant* versus not fully complying might not be the same decisions as the extent of how much to evade. If this is true, the zero inflation might cause problems for estimation (Zuur et al., 2009). The results of one type of hurdle model, the *-twopm-* (Belotti et al., 2015)[29] are in Table C.11 in Appendix C.1.7, the logistic stage, in general, shows that when the possibility of overestimation is present, participants are more likely to evade part of their income. Once this decision has been made, the possibility and the magnitude of overestimation has a negative effect on the extent of evasion (positive on compliance). The second stage OLS regressions show a comparable pattern than that of Table V.4. However, the first stage logistic regression adds a new dimension that it is not only relevant to analyze the extent of compliance or evasion but rather the decision to evade and separately the extent of the evasion.

[28] Feinstein (1991) applied a fractional detection model, consisting of a first stage tobit to model compliance followed by a model of the detection process. However, this is applied on the side of the tax authority's decision and not the taxpayer's compliance decision. Alm and Malézieux (2020) also discuss the intensive (compliance from evaders) and extensive margins (probability of full compliance) in their meta-study

[29] We thank dr. Elena Fumagalli for her suggestions on the use of two-stage models

V.9 Conclusions

This chapter has shown that individuals' tax compliance is affected by overestimation. First, we find that when there is a positive probability of overestimation, changes in tax compliance cannot be fully explained by participants' "rational" behavior. Second, we find that, in the subsequent rounds, conditional on being audited, individuals who were audited and overestimated comply at least 5 percentage points less than those that were only audited, even when controlling for the height of the fine. This supports the view that not only audit outcomes, in terms of fines matter, but so does the auditing process itself. We provide further insight into explaining these behaviors by analyzing the motivations of taxpayers, we find that motivations are a fairly accurate predictor of behavior. Future research should include the different outcomes of more realistic audit types (e.g., overestimation and underestimation) of inefficient tax authorities together to further disentangle the complex relationship between audit effectiveness and compliance. Finally, future research should look further into the behavioral mechanisms and motivations that drive taxpayer behavior and how this interacts with different tax compliance policies.

Chapter VI

Conclusions

It's not what you make, it's what you keep that matters
Anonymous

VI.1 What have we learned?

The quote that starts this chapter is a common way to describe income and income taxes. However, to some extent it is a good way to think about research too. After all, impactful research is not only about the results but rather how these can further science, policy and society. The main goal of this dissertation was to analyze four distinct but complementary stages of tax reform in order to better understand what is required for a reform to be successful.

Chapter II tackled what the first stage of how the announcement of a reform comes to be. Are tax reform announcements influenced by the political business cycle or are there other mechanisms at stake? The data suggests that the existence of a political business cycle where politicians intend to influence voting behavior by announcing tax reductions prior to elections seems less clear. Although reforms are significantly less likely before an election, there is no difference between reforms that are salient and could be used strategically before an election and those that are not. What the results do confirm is the existence of a post-electoral rush, as tax reforms are significantly more likely after an election independent of the type (PIT, CIT, VAT) and direction of reform (decreasing or increasing). We find some indication that the pre-electoral halt is actually more related to capacity constraints before elections. For example because incumbent politicians are occupied with campaigning and getting reelected rather than coming up with tax reforms. But announcing a tax reform is only the first step, reforms need to be implemented, which as we find comes with difficulties of its own.

Chapter III this dissertation dealt with the implementation of reform. Given the relevance that globalization has had on taxation and its governance, we choose to study the implementation of a reform on the European level based on the recommendations of an international organization the FATF. The main conclusion that can be drawn from this chapter is that even when a reform is pushed by an overarching authority such as the EU, it is still subject to be changed by law makers, and these changes are largely affected by a countries' legal history and culture. Chapter IV complements this analysis by studying the stage that comes after "putting something in the books", when legal principles and norms are put into practice. We analyze the implementation of the 4th AMLD from a practical perspective by complementing the legal analysis from the previous chapter with a survey of public officers (i.e. tax authority employees, public prosecutors, investigators, lawyers) that interact and use said regulation. We find that countries that have higher government quality are less punitive than their counterparts and lean on on administrative and tax prosecution when tackling tax offenses. In addition, countries with more "secretive" profiles limit their judicial structure by giving judges less discretionary power and giving investigators and prosecutors less time to investigate and prosecute crimes.

The results of Chapter III and IV illustrate a key issue, tax reform doesn't end when it gets announced. The ideas that get put forth when a reform is announced don't necessarily end up the same once they have to be put on paper and even less when it is used in practice. This is even more salient when reforms don't necessarily stem from national initiatives.

Finally Chapter V of this dissertation dealt with the other side of the coin that needs to be considered when thinking of the human factor in tax reform, that of the tax payer. Through an online experiment we analyze how an unfair audit that overestimates a taxpayers' income can have a negative effect on tax compliance. We find that although there is a substantial group of "taxpayers" that are always honest, there are participants that reduce their compliance after they have been unfairly audited. Taking into consideration that different individuals have different reactions to tax policy is something that policymakers must do when designing policy or when dealing with the consequences of policy decisions. This result is even more relevant when putting it in light of IV where we see that on the authority side the way reforms are

applied does not only differ from country to country but also within a country.

VI.2 Main takeaways

I could say that the core result of this dissertation is that tax reform is complex and needs many things to align to be successful. However, this conclusion would shed very little light on what what can be done in order to make tax reform successful. From Chapter II we can take away that successful reform does not only need an idea but the right political setting in order to happen, this includes having a working bureaucracy that can push policy forward. What we see in Chapter III is that the same bureaucracy that pushes forward announcements into policy needs to be taken into consideration, as its culture and structure will affect the way the intended reform looks on paper when its implemented as law. Next, in Chapter IV we see another side of government, the side that is in charge of using and applying the law, and how they apply this law differently. In Chapter V we see how individuals, in this case tax payers change their tax compliance behavior as a result of the actions of an authority. Understanding this chain of reactions, from politicians announcing a reform, to a bureaucracy that implements it and applies it, to individuals responding to the actions of authority is relevant to understand policy. Aspects that can be highlighted is that there are intrinsic aspects to either a country such as their level of corruption or to an individual like how honest they are that influences how they will "take" the reform.

Another main takeaway from the dissertation is the increasing impact of globalization on tax reform, this is particularly evident in Chapters II, III, and IV. Where the trend is that tax policy is less and less dependent on national structures, on the one hand we see that tax reform is not entirely vulnerable to the political business cycle, on the other hand a global trend in reform such as the inclusion of tax reforms as a predicate crime for money laundering can have huge effect in national regulation. The internationalization of tax reform and how this is reshaping the nature of the relationship between taxes and the nation state is a topic that must be researched further.

VI.3 Challenges and research going forward

One limitation of this research is that we do not analyze a single policy throughout the four stages. Future research should analyze one single reform from its announcement to its "reception" from tax payers. A pitfall of this approach is that it is almost impossible to it on an international comparative way. Another challenge is data, obtaining reform data and mainly legal data is extremely challenging due to language and technical barriers. Getting public employees to actually respond to a survey and participate in in-depth interviews also requires links to public institutions which is not always straightforward. As an example, many of the interviews that were used in IV took over 6 months to be arranged.

An additional limitation of this dissertation is the sample of countries that were taken into account, as a result the conclusions are mainly applicable to developed countries. Although the data used in Chapter II includes countries such as: India, Brazil, Mexico, and South Korea, the majority of the countries analyzed are European. Further research should be done on how countries in the global south and other regions of the world are adapting to the globalization of tax reforms.

Finally, this dissertation strived to take from several disciplines both in terms of theory and methodology. Although there is a growing body of interdisciplinary and multidisciplinary work on taxation I believe it still needs to increase, especially when it comes to connecting the legal discipline to economics, psychology and political science.

Chapter VII

Samenvatting

"Taxation, in reality, is life. If you know the position a person takes on taxes, you can tell their whole philosophy. The tax code, once you get to know it, embodies all the essence of life: greed, politics, power, goodness, charity."
Sheldon S. Cohen[1]

Waarom belastingen?

Er zijn niet veel gebruiken uit de oudheid die nog steeds een onderdeel uitmaken van ons dagelijkse leven. Van de paar gebruiken die zijn overgebleven, is de meest relevante waarschijnlijk het heffen van belastingen. Ondanks dat het precieze moment in de tijd dat belastingen werden geïntroduceerd onbekend is, traceert archeologisch bewijs het heffen van belastingen helemaal terug naar Koning Scorpion I in het oude Egypte rond 3000 voor Christus (Samson, 2002). Vergelijkbaar bewijs voor het heffen van belastingen is gevonden voor Mesopotamië en Babylonië en zelfs aan de andere kant van de wereld, voor het rijk van de Inca's en Azteken (Webber and Wildavsky, 1986). De reden *waarom* overheden belasting heffen is relatief voor de hand liggend: overheden heffen belastigen om hun uitgaven te bekostigen. Vanaf het begin van de geschiedenis hebben belastingen vanalles bekostigd, van oorlogen en legers tot scholen en ziekenhuizen. Als gevolg hiervan spelen belastingen niet alleen een sleutelrol in de publieke financiën, maar ook in onze dagelijkse levens.

Andere vragen, zoals *hoe* belastigen geheven dienen te worden, zijn ook het onderwerp van debat geweest. In het vijfde boek van zijn beroemde werk "The Wealth of Nations" (1776), beschreef Adam Smit vier pijlers voor goede

[1]Sheldon S. Cohen was hoofd van de Amerikaanse Belastingdienst (IRS) van 1965 tot 1969. Dit citaat, en andere vergelijkbare citaten in deze thesis, komen uit Yablon (2010).

belastingheffing. Belastingen dienen **eerlijk** te zijn wat betreft hun hoogte en de frequentie waarom ze geheven worden, **zeker** zodat de belastingbetaler van tevoren weet wat hem of haar te wachten staat en de impact van de belastingen kan bepalen op een economische beslissing voordat die genomen wordt, **gemakkelijk** om te begrijpen en te betalen en tenslotte **efficient** in de zin dat ze gemakkelijk en goedkoop te beheren zijn.

245 jaar later zijn belastingen nog steeds onderhevig aan hervormingen, enerzijds om ze aan te passen aan een steeds veranderende wereld en anderzijds omdat belastinghervorming complex is. Belastinghervorming is immers niet alleen het resultaat van een optimale belastingtheorie ontworpen door economische operatoren[2], maar eigenlijk meer het resultaat van een politiek proces. In de woorden van Radaelli (2004): "*belastingheffing is politiek*", omdat belasting zowel de kern vormt van het sociale contract, als belastinghervorming alleen plaatsvindt als gevolg van politieke overeenstemming. Zoals Holcombe (1998) stelt: "*belastingbeleid is het resultaat van politiek*". Aangezien belastinghervorming het resultaat is van zowel economische als politieke overwegingen, is het niet verwonderlijk dat de vraag van *hoe* belastinghervorming tot stand komt, nog niet is opgelost en nog steeds wordt onderzocht (zie bijvoorbeeld Alesina and Paradisi, 2017 en Chang et al., 2020).

Hoe belastinghervormingen tot stand komen, is echter maar één van de cruciale elementen van belastingheffing. Belastingen maken al eeuwenlang deel uit van overheidsstructuren en dat geldt net zo goed voor diegenen die namens de overheid belastingen innen. Toen koning Hammurabi bijvoorbeeld over de Babyloniërs heerste, werden belastingen lokaal betaald aan stamoudsten en later geïnd door zogenaamde *maskim* (belastingdirecteuren) (Webber and Wildavsky, 1986). Belastinginning is van oudsher een controversieel onderwerp. Het gedicht dat hieronder aan de linkerkant is weergegeven dateert uit de Chou-dynastie (1046-771 voor Christus)[3] en schildert belastinginners af als ratten. Duizenden jaren later schilderden de Beatles op hun beurt de Belastingdienst af als hebzuchtig, zoals valt op te maken uit de songtekst weergegeven hieronder aan de rechterkant. Beide voorbeelden vertegenwoordigen duidelijk het zwartmaken van de belastingdienst door

[2]Optimale belastingtheorie is de studie van hoe belastingen *optimaal* ontworpen en geïmplementeerd kunnen worden om de sociale welvaart te maximaliseren, rekening houdend met de bestaande economische beperkingen.

[3]Gedicht vertaald door Arthur Waley en geciteerd in Webber and Wildavsky, 1986

de geschiedenis heen.

"Big rat big rat
Do not gobble our millet
Three years we have slaved for you
Yet you take no notice of us"

Chou Dinasty poem

"Should 5% appear too small
Be thankful I don't take it all
'Cause I'm the taxman
Yeah, I'm the taxman"

Taxman by *The Beatles*

Gezien het bovenstaande en gezien het feit dat het innen van belastingen noodzakelijk is om adequate openbare diensten te kunnen verlenen, is het van cruciaal belang om het gedrag van degenen die belast zijn met het innen en beheren van belastingen beter te begrijpen. De keerzijde van de bijbehorende medaille wordt gevormd door het antwoord van de belastingbetaler wanneer hem of haar om zijn bijdrage wordt gevraagd, ook wel belastingnaleving ("*tax compliance*" in het Engels) genoemd, en deze keerzijde is net zo relevant. De behoefte om menselijke reacties op belastingheffing te begrijpen heeft geleid tot onderzoek dat inzichten uit de psychologie gebruikt om te begrijpen hoe individuen reageren op belastingveranderingen (zie: Alm and Malézieux (2020) voor een overzicht van de literatuur en Kirchler and Wahl(2010) voor meer informatie over de psychologie van belastingnaleving). Begrijpen hoe individuen op belastingen reageren, wordt vooral relevant wanneer we ons beseffen dat een veelvoorkomende menselijke reactie is: niet betalen.

Het niet-naleven van belastingen[4] is waarschijnlijk al een uitdaging geweest voor regeringen zolang als er belastingen worden geheven. In het Romeinse Rijk begroeven rijken bijvoorbeeld juwelen en goudvoorraden om belasting te ontwijken[5] Complexere vormen van belastingontduiking werden ontwikkeld in het Ottomaanse rijk toen lokale edelen een vorm van "trustfonds" creëerden door hun land te schenken aan zogenaamde *vakifs* (religieuze stichtingen) om belastingen opgelegd door de heersende Sultan te vermijden (Burg, 2004). Een soortgelijk patroon deed zich voor in Florence in

[4]Ik gebruik de term "*niet-naleven van belastingen*" ("*tax non-compliance*" in het Engels) om de juridische discussie te vermijden die belastingontwijking en belastingontduiking onvermijdelijk oproepen. De term die ik gebruikt wordt ook gebruikt in de literatuur (zie bijvoorbeeld Hanlon et al., 2005 en Saad, 2012) om alle activiteiten te groeperen die belastinginkomsten verminderen en het belastingstelsel schaden.

[5]Er wordt zelfs gezegd dat belastingontduiking een belangrijke rol heeft gespeeld in de crisis van het Romeinse rijk in 5 voor Christus (Williams Friell, 1999), aangezien de inkomsten die vereist waren om militaire initiatieven te steunen toen de Hunnen aanvielen, niet beschikbaar waren door belastingontduiking.

het midden van de dertiende eeuw, toen rijke mannen onroerend goed doneerden aan kloosters om geen grondbelasting te hoeven betalen. Onroerend goed is in feite een sector die tot op zekere hoogte wordt gedefinieerd door belastingen. Een voorbeeld is de smalheid van de huizen in Amsterdam, die zo ontworpen zijn om de belastingen die werden geheven op basis van de breedte van een huis te minimaliseren.

Een recenter voorbeeld komt van de Europese Unie dat inschat (Vellutini et al.) dat het alleen al in 2016 46 miljard euro aan belastinginkomsten heeft misgelopen. Aan de andere kant van de oceaan, schat de Amerikaanse belastingdienst in dat belastingfrauders de Verenigde Staten tot wel 3 biljoen dollar per jaar zouden kunnen kosten.[6] Op wereldwijde schaal, tenslotte, schatten Tørsløv et al. (2018) dat 40% van de bedrijfswinsten wordt doorgesluisd naar belastingparadijzen. Volgens het Tax Justice Network verliest Nederland jaarlijks ongeveer 11 miljard euro aan inkomsten door wereldwijd belastingmisbruik, een equivalent van ongeveer 600 euro per inwoner. Gezien de omvang en de impact van de inkomsten die verloren gaan als gevolg van het niet betalen van belastingen, zoals de genoemde voorbeelden illustreren, is het geen verrassing dat regeringen voortdurend op zoek zijn naar beleid dat hen in staat stelt verliezen te minimaliseren door belastingnaleving aan te moedigen en degenen die niet voldoen, te straffen.

De historische anekdotes en hedendaagse gegevens die hierboven besproken zijn, probeerden de relevantie van het bevorderen van het begrip van belastingen te illustreren. Ondanks dat we dankzij onderzoek al veel weten, zijn er nog steeds vragen die beantwoord moeten worden als het gaat om een beter begrip van belastinghervorming. Met dit proefschrift probeer ik een aantal van deze vragen te beantwoorden, met name de vragen met betrekking tot hoe belastinghervormingen tot stand komen, hoe ze worden geïmplementeerd en welke reacties ze oproepen bij belastingbetalers. Gezien de aard van het vakgebied zelf, leek het mij evident om te trachten dit onderzoek vanuit een multidisciplinaire benadering te benaderen. De noodzaak om een dergelijke aanpak te volgen werd bevestigd toen ik meer onderzoek

[6]Deze schatting werd in april 2021 door het hoofd van de Amerikaanse Belastingdienst, Chuck Rettig, aan een Senaatscommissie voorgelegd

deed naar belastingheffing, zowel "in de boeken" tijdens academisch onderzoek, als ook "in de praktijk" toen ik sprak met onderzoekers van alle disciplines via het Horizon 2020-project COFFERS[7] en met echte belastingadviseurs als onderdeel van het project[8]. Deze ervaringen benadrukten voor mij ook het belang van het toevoegen en analyseren van juridische bronnen. Naast de drie kerndisciplines van dit proefschrift: economie, politicologie en recht, heb ik ook inspiratie gevonden in bronnen en methodes uit andere sociale wetenschappen, zoals de psychologie, geschiedenis en sociologie. Echter, aangezien multidisciplinair werk zelden leidt tot veranderingen in bestaande disciplines (Lamb et al., 2004), zowel praktisch als theoretisch, zijn de verschillende hoofdstukken van het proefschrift bedoeld om samen te worden gelezen, zodat de verschillende disciplines met elkaar praten.

Overzicht van de scriptie

Hoofdstuk II —Mijn koninkrijk voor een stem

Hervormingen van belastingbeleid en de verkiezingscyclus
Dit hoofdstuk poogt bij te dragen aan een beter begrip van de eerste fase van hervorming, dat wil zeggen, onder welke omstandigheden (hoe) hervormingen tot stand komen. Gebaseerd op het idee dat belastinghervorming een bijproduct is van economische overwegingen en politieke motivaties, test dit hoofdstuk drie lijnen van theoretische verwachtingen. De eerste is dat belastingverlagingen waarschijnlijker zijn vóór verkiezingen. De belangrijkste verklaring voor deze verwachting is dat belastingverlagingen fungeren als een signaal van bevoegdheid voor het electoraat. De tweede verwachting is dat er na verkiezingen vaak een vlaag van momentum is, die ertoe leidt dat het waarschijnlijker is dat hervormingen direct na een verkiezing worden doorgevoerd. De derde theoretische verwachting die getest wordt is dat politiek meer zichtbare belastingen eerder zullen worden gewijzigd voorafgaand aan een verkiezing. Theoretisch gezien zou een rationele politicus er namelijk voor kiezen om opvallende belastingen zoals de BTW of de inkomstenbelasting te gebruiken om meer electorale steun te krijgen.

[7] De website van dit project is: coffers.eu en een overzicht van het gedane onderzoek in het kader van dit project is gebundeld in het boek: Unger, B., Rossel, L., Ferwerda, J. (2021). *Combating Fiscal Fraud and Empowering Regulators: Bringing tax money back into the COFFERS*. Oxford University Press

[8] Deze interviews werden ook gebruikt als data voor Hoofdstuk IV

We testen deze theorieën door echte aankondigingen van hervorming van belastingbeleid te analyseren, met behulp van de zogenaamde *Tax Policy Reform Database* (Amaglobeli et al., 2018). Dit is een nieuwe dataset van het IMF en de IBFD die belastinghervormingen volgt in drieëntwintig ontwikkelde landen en ontwikkelingslanden in de periode 1975-2012. We richten ons in het bijzonder op aankondigingen van hervormingen en daarom gebruiken we, in tegenstelling tot eerder onderzoek, geen proxy voor belastingbeleid, maar het beleid zelf. Een extra empirische bijdrage is het gebruik van maandelijkse in plaats van jaarlijkse data, hetgeen vooral relevant is omdat een verkiezingsjaar in werkelijkheid bestaat uit maanden vóór de verkiezingen, een verkiezingsmaand en maanden ná de verkiezingen. Het gebruik van maandelijkse gegevens geeft een gedetailleerder beeld van de werkelijke dynamiek van verkiezingen en hervormingsvoorstellen en geeft ook inzicht in de lengte van de politieke cyclus.

Hoofdstuk III —En hervorming die alle andere zal overheersen?

Implicaties van het maken van belastingmisdrijven tot een predicaatmisdrijf voor het witwassen van geld

Dit hoofdstuk probeert licht te werpen op de verschillen tussen fiscale misdrijven en witwaswetgeving in Europa na de implementatie van de 4e anti-witwasrichtlijn (AMLD). We zien de 4e AMLD als een schok die de witwasregelgeving binnen het fiscale ecosysteem heeft geplaatst, en de manier waarop landen dit in hun regelgeving implementeren is het antwoord op deze schok. Deze reactie zal bepalend zijn voor het succes van dit beleid. We gebruiken een innovatieve vergelijkende benadering waarbij belastingontduiking wordt geanalyseerd door een empirische juridische lens. We hebben een dataset opgebouwd met de wetgeving van alle lidstaten van de Europese Unie met betrekking tot belastingmisdrijven en witwassen en analyseren deze in het licht van andere relevante juridische variabelen, zoals de juridische oorsprong van de wetgeving van elk rechtsgebied en hun EU-toetredingsdatum.

Hoofdstuk 4 —Heel veel blaffen, maar wie bijt er?

Licht werpen op de zwarte doos van het implementeren van hervormingen
Zelfs perfecte transpositie van EU richtlijnen resulteert niet altijd in homogene regels of toepassing van regels in de gehele Europese Unie. De literatuur van Europeanisering heeft zich vooral geconcentreerd op de formele transpositie van EU richtlijnen. Nieuwere studies suggereren om te kijken in de zwarte doos van hoe dit vertaald wordt in wetgeving in de praktijk. Het vierde AMLD nam belastingen op als een predicaatmisdrijf voor het witwassen van geld. Met behulp van een nieuwe data set, onderzoeken we hoe en waarom deze Richtlijn op zo'n verschillende wijze geïmplementeerd is in de verschillende EU landen, zowel in de boeken als in de praktijk. Ten eerste vinden we dat kenmerken van landen formele transpositiepatronen kunnen verklaren en de binnenlandse aanpassing van regelgeving kunnen beïnvloeden, evenals hoe praktijkbeoefenaars, die de tweede frontlinie van implementatie vormen, deze regels in actie gebruiken. Daarnaast vinden we dat corruptie, effectiviteit van de overheid, kwaliteit van regelgeving, belastingsmoraal en adminstratieve capaciteit van de belastingdienst belangrijke factoren zijn die de slepende verschillende verklaren tussen de boeken en de acties tussen de verschillende EU landen.

Hoofdstuk V —Wees blij dat ik het niet allemaal pak...

Gedragsreacties op de belastingdienst in een online experiment
Het standard portfoliomodel neemt aan dat belastingcontroles altijd effectief zijn in het detecteren van het niet naleven van belastingregels. Recent empirisch en theoretisch werk heeft echter aangetoond dat dit niet altijd het geval is. In dit hoofdstuk onderzoeken we hoe een foutieve controle, waarbij inkomen wordt overschat door de belastingdienst, belastingnaleving beïnvloedt. Onze bevindingen dragen bij aan het begrip van de gedragsreacties van belastingsbetalers op Belastingdiensten die er niet in slagen de inkomsten van de belastingbetaler correct te bepalen. We maken hiervoor gebruik van een online belastingexperiment met een representatieve steekproef uit het Verenigd Koninkrijk, waarmee we het effect testen van verschillende waarschijnlijkheden en groottes van overschatting op belastingnaleving en naleving ná de controle.

Ten eerste weerleggen we de voorspellingen die gemaakt worden door het traditionele portfoliomodel voor de aanwezigheid van overschatting en stellen we een alternief model voor dat ook niet-monetaire utiliteit bevat om

gedrag te verklaren. Ten tweede vinden we dat de uitkomst van controles het post-controle gedrag beïnvloedt en dat het “type" van de uitkomst van de controle van belang is voor de mate van naleving door de belastingbetaler, zelfs als we corrigeren voor de hoogte van de boete.

Appendix A

My kingdom for a vote: *Tax Policy Reforms and the Electoral Cycle*

A.1 Data description

TABLE A.1: Total number of reforms by type

Country	Nº reforms	CIT	CIT /%	PIT	PIT /%	VAT	VAT %
AUS	129	47	36,4	68	52,7	14	10,85
AUT	60	26	43,3	30	50,0	4	6,67
BRA	32	13	40,6	8	25,0	11	34,38
CAN	139	49	35,3	74	53,2	16	11,51
CZE	46	17	37,0	19	41,3	10	21,74
DEU	143	55	38,5	72	50,3	16	11,19
DNK	103	41	39,8	54	52,4	8	7,77
ESP	126	32	25,4	81	64,3	13	10,32
FRA	132	64	48,5	47	35,6	21	15,91
GBR	152	65	42,8	70	46,1	17	11,18
GRC	89	32	36,0	45	50,6	12	13,48
IND	104	51	49,0	36	34,6	17	16,35
IRL	104	28	26,9	64	61,5	12	11,54
ITA	159	66	41,5	73	45,9	20	12,58
JPN	74	31	41,9	36	48,6	7	9,46
KOR	60	27	45,0	24	40,0	9	15,00
LUX	54	21	38,9	29	53,7	4	7,41
MEX	70	28	40,0	35	50,0	7	10,00
POL	72	25	34,7	23	31,9	24	33,33
PRT	88	32	36,4	43	48,9	13	14,77
TUR	58	15	25,9	23	39,7	20	34,48
USA	119	50	42,0	69	58,0	0	0,00
Total Reforms	2113	815		1023		275	

TABLE A.2: Number and percentage of reforms by type and direction

Country	CIT+	CIT+	CIT-g	CIT-	PIT+	PIT+	PIT-	PIT-	VAT +	VAT+	VAT-	VAT-
		%		%		%		%		%		%
AUS	18	38,30	29	61,70	19	36,04	49	72,06	7	50,00	7	50,00
AUT	16	61,54	10	38,46	11	22,00	19	63,33	2	50,00	2	50,00
BRA	1	7,69	12	92,31	1	4,00	7	87,50	4	36,36	7	63,64
CAN	20	40,82	29	59,18	19	35,69	55	74,32	8	50,00	8	50,00
CZE	6	35,29	11	64,71	5	12,11	14	73,68	7	70,00	3	30,00
DEU	22	40,00	33	60,00	23	45,68	49	68,06	14	87,50	2	12,50
DNK	17	41,46	24	58,54	19	36,24	35	64,81	7	87,50	1	12,50
ESP	7	21,88	25	78,13	28	43,56	53	65,43	6	46,15	7	53,85
FRA	17	26,56	47	73,44	12	33,70	35	74,47	5	23,81	16	76,19
GBR	18	27,69	47	72,31	8	17,37	62	88,57	10	58,82	7	41,18
GRC	17	53,13	15	46,88	20	39,56	25	55,56	9	75,00	3	25,00
IND	14	27,45	37	72,55	13	37,56	23	63,89	9	52,94	8	47,06
IRL	9	32,14	19	67,86	22	35,75	42	65,63	6	50,00	6	50,00
ITA	21	31,82	45	68,18	29	63,16	44	60,27	18	90,00	2	10,00
JPN	8	25,81	23	74,19	12	24,67	24	66,67	5	71,43	2	28,57
KOR	8	29,63	19	70,37	7	17,50	17	70,83	3	33,33	6	66,67
LUX	3	14,29	18	85,71	7	13,03	22	75,86	3	75,00	1	25,00
MEX	9	32,14	19	67,86	14	28,00	21	60,00	2	28,57	5	71,43
POL	7	28,00	18	72,00	11	34,43	12	52,17	18	75,00	6	25,00
PRT	13	40,63	19	59,38	22	45,02	21	48,84	9	69,23	4	30,77
TUR	8	53,33	7	46,67	11	27,74	12	52,17	14	70,00	6	30,00
USA	19	38,00	31	62,00	16	27,59	53	76,81	0		0	
Total Reforms	278		537		329		694		166		109	

A.2 Electoral cycle

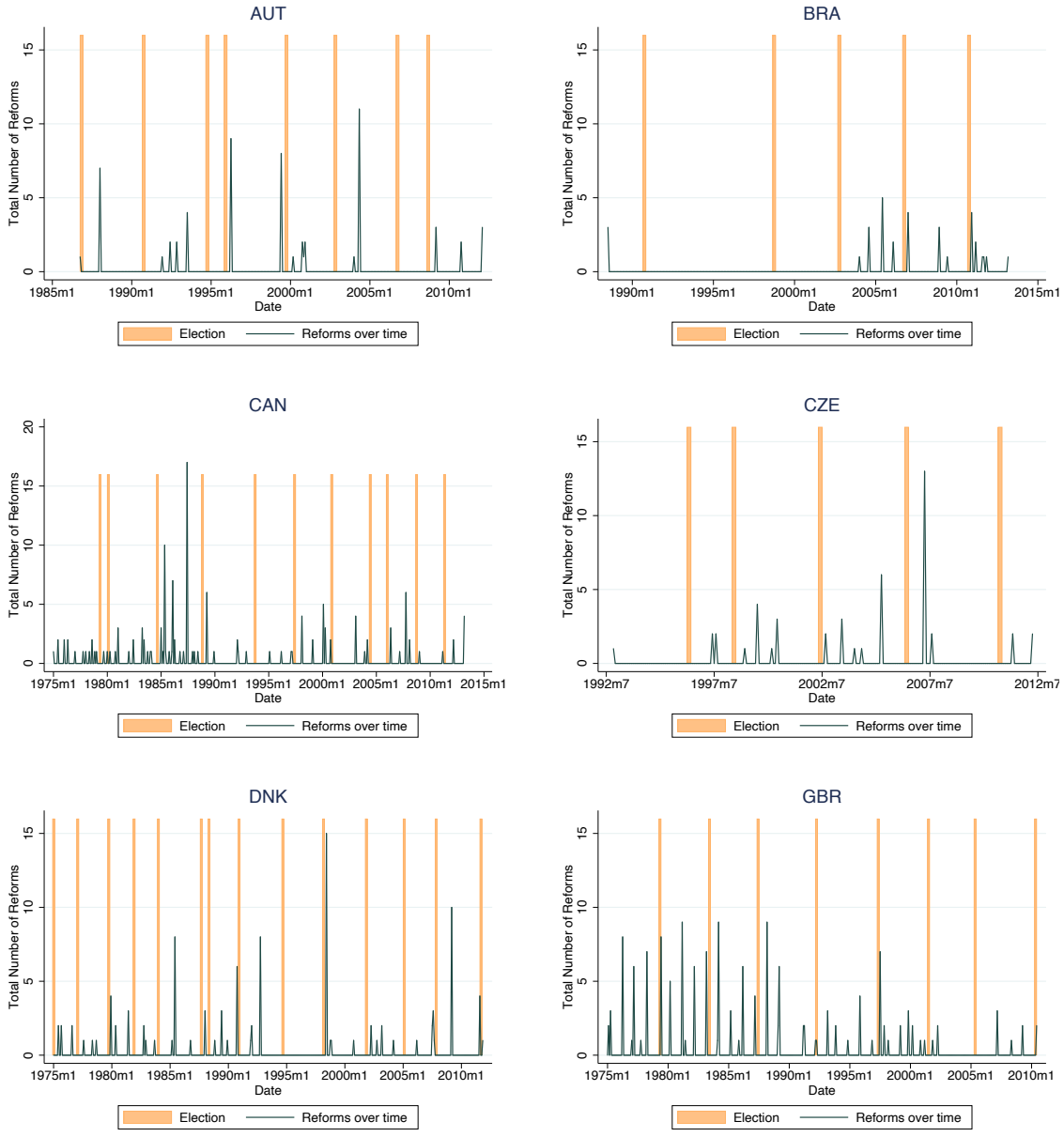


FIGURE A.1: Total number of reforms and the electoral cycle for selected countries. A

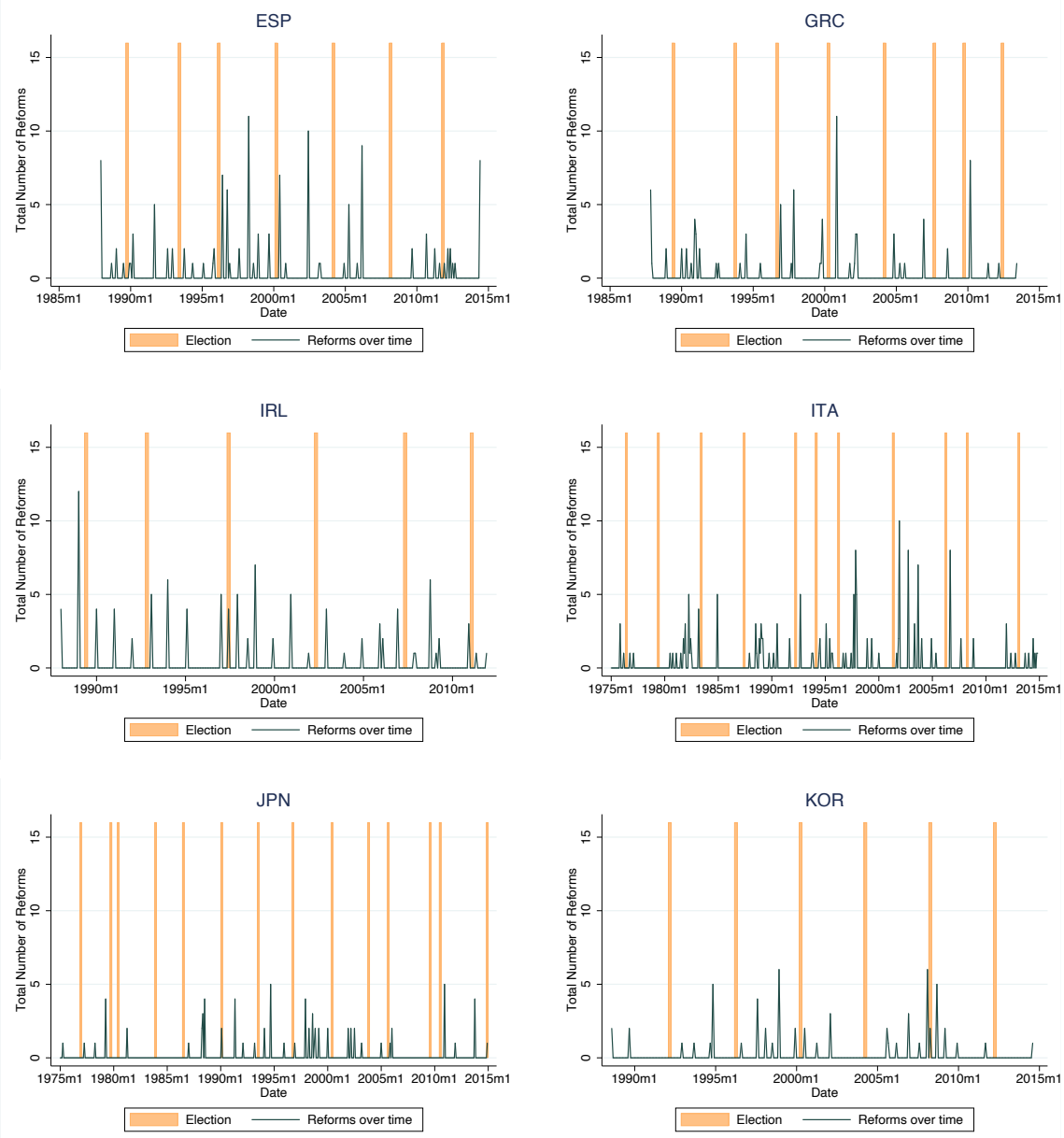


FIGURE A.2: Total number of reforms and the electoral cycle for selected countries. B

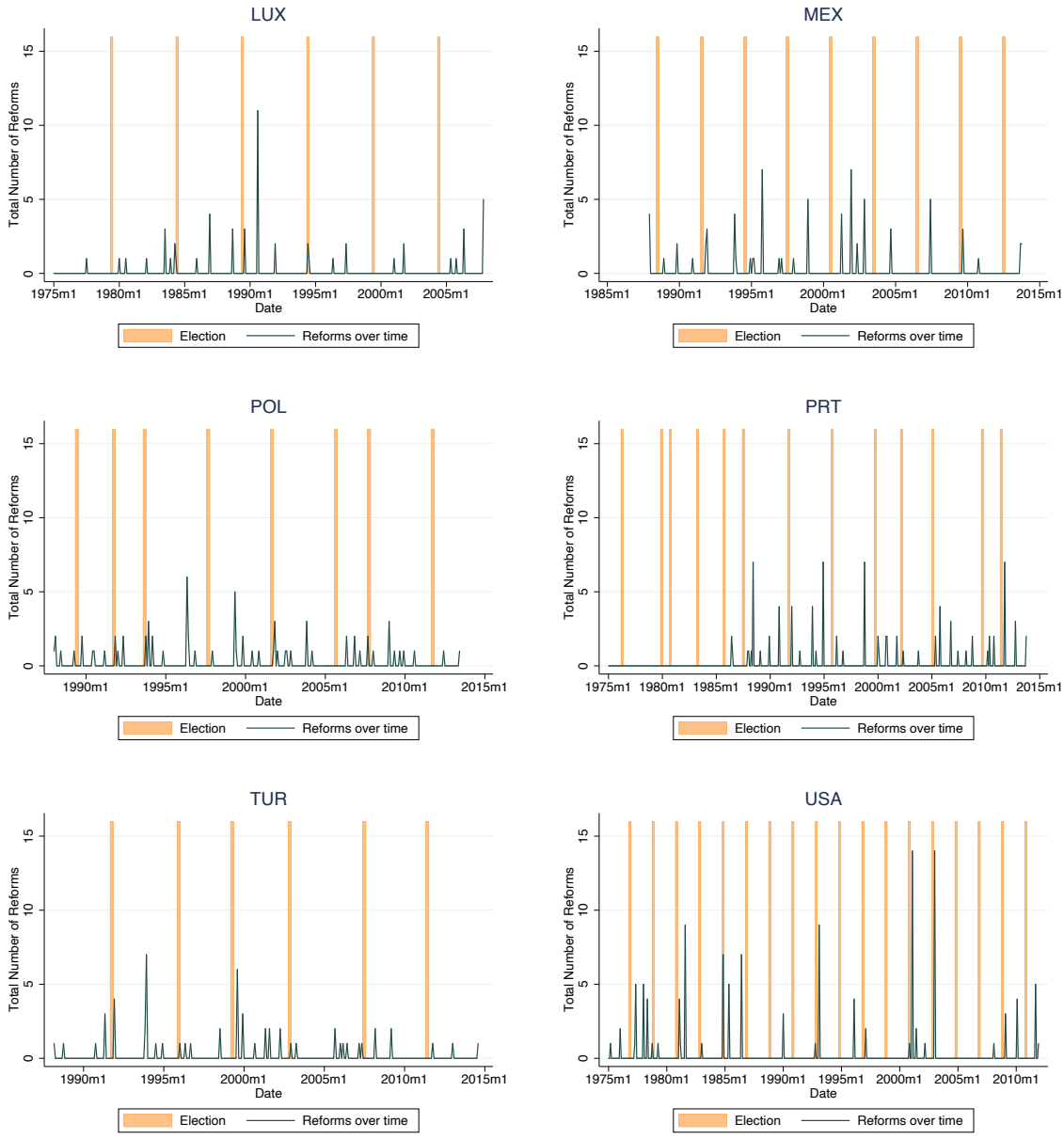


FIGURE A.3: Total number of reforms and the electoral cycle for selected countries. D

A.3 Complete regression output

TABLE A.3: Likelihood of tax reform 6 months before and after an election

VARIABLES	(1)	(2)	(3)	(4)
lead_elec6	-0.298**	-0.324**	-0.329**	-0.331**
	(0.125)	(0.133)	(0.145)	(0.147)
lag_elec6	0.314***	0.276***	0.270**	0.271**
	(0.100)	(0.104)	(0.113)	(0.115)
rightex		-0.0642	-0.0287	-0.0253
		(0.0816)	(0.0875)	(0.0894)
allhouse		-0.187	-0.268	-0.248
		(0.195)	(0.238)	(0.235)
herfgov		-0.0983	-0.0512	-0.0163
		(0.197)	(0.258)	(0.262)
maj		0.780	0.655	0.671
		(0.476)	(0.557)	(0.547)
lagdebt_gdp			6.10e-05	-0.000527
			(0.00239)	(0.00223)
laginflation_gdp			-0.000684	-0.000875
			(0.00366)	(0.00364)
lagrev_gdp			0.00651	0.00495
			(0.00798)	(0.00739)
lagbankcrisis				0.184**
				(0.0759)
Observations	8,588	8,215	7,309	7,309
Country FE	YES	YES	YES	YES

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

TABLE A.4: Likelihood of tax reform 12 months before and after an election

VARIABLES	(1)	(2)	(3)	(4)
lead_elec12	-0.268***	-0.299***	-0.306***	-0.309***
	(0.102)	(0.107)	(0.0991)	(0.100)
lag_elec12	0.142	0.0949	0.108	0.110
	(0.0939)	(0.0922)	(0.101)	(0.103)
rightex		-0.0675	-0.0290	-0.0256
		(0.0819)	(0.0874)	(0.0896)
allhouse		-0.188	-0.271	-0.250
		(0.195)	(0.238)	(0.235)
herfgov		-0.110	-0.0480	-0.0120
		(0.192)	(0.255)	(0.258)
maj		0.808*	0.703	0.724
		(0.466)	(0.553)	(0.543)
lagdebt_gdp			-9.81e-05	-0.000700
			(0.00236)	(0.00219)
laginflation_gdp			-0.000374	-0.000543
			(0.00361)	(0.00361)
lagrev_gdp			0.00693	0.00532
			(0.00792)	(0.00735)
lagbankcrisis				0.189***
				(0.0724)
Observations	8,588	8,215	7,309	7,309
Country FE	YES	YES	YES	YES

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

TABLE A.5: Likelihood of increasing and decreasing tax reform
6 & 12 months before and after an election

	(1)	(2)	(3)	(4)
VARIABLES	Tax Increase 6	Tax Decrease 6	Tax Increase 12	Tax Decrease 12
lead_elec6	-0.814***	-0.164		
	(0.236)	(0.146)		
lag_elec6	0.328***	0.290**		
	(0.120)	(0.137)		
rightex	-0.0253	-0.0480	-0.0233	-0.0524
	(0.141)	(0.0932)	(0.144)	(0.0915)
allhouse	-0.327	-0.218	-0.322	-0.222
	(0.243)	(0.268)	(0.243)	(0.268)
herfgov	-0.483	0.132	-0.482	0.130
	(0.390)	(0.191)	(0.386)	(0.188)
maj	0.823	0.706	0.947	0.725
	(0.667)	(0.529)	(0.696)	(0.524)
lagdebt_gdp	0.00377*	-0.00166	0.00342*	-0.00184
	(0.00208)	(0.00259)	(0.00205)	(0.00257)
laginflation_gdp	0.00359	-0.00723	0.00379	-0.00675
	(0.00520)	(0.00486)	(0.00531)	(0.00476)
lagrev_gdp	-0.0184*	0.0142*	-0.0182*	0.0145*
	(0.0107)	(0.00865)	(0.0109)	(0.00851)
lagbankcrisis	0.0490	0.236**	0.0635	0.237**
	(0.121)	(0.102)	(0.115)	(0.101)
lead_elec12			-0.668***	-0.242**
			(0.158)	(0.108)
lag_elec12			0.247*	-0.00326
			(0.129)	(0.103)
Observations	7,309	7,309	7,309	7,309
Country FE	YES	YES	YES	YES

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

TABLE A.6: Likelihood of tax reform 6 months before and after an election by type of election *CIT, PIT & VAT*

	(1)	(2)	(3)
VARIABLES	CIT	PIT	VAT
lead_elec6	-0.570***	-0.137	-0.612*
	(0.183)	(0.162)	(0.338)
lag_elec6	0.285*	0.332**	0.412***
	(0.160)	(0.143)	(0.145)
rightex	-0.113	0.00538	0.0653
	(0.118)	(0.0956)	(0.181)
allhouse	-0.209	-0.373	-0.379
	(0.296)	(0.283)	(0.243)
herfgov	0.149	-0.241	0.0307
	(0.229)	(0.267)	(0.503)
maj	-0.0736	0.890*	0.767
	(0.769)	(0.538)	(0.803)
lagdebt_gdp	0.000652	-0.000523	-0.00339
	(0.00347)	(0.00210)	(0.00416)
laginflation_gdp	-0.00552	0.00643*	-0.00425
	(0.00692)	(0.00379)	(0.00542)
lagrev_gdp	0.0159	0.0211*	-0.0316*
	(0.0108)	(0.0118)	(0.0190)
lagbankcrisis	0.103	0.157	0.299*
	(0.138)	(0.121)	(0.163)
Observations	7,309	7,309	6,905
Country FE	YES	YES	YES

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

TABLE A.7: Likelihood of tax reform 6 months before and after an election by type of election *CIT, PIT & VAT* and direction

VARIABLES	(1) CIT-	(2) CIT+	(3) PIT-	(4) PIT+	(5) VAT-	(6) VAT+
lead_elec6	-0.500***	-1.023***	0.0502	-0.618**	0.0621	-1.359**
	(0.169)	(0.348)	(0.172)	(0.259)	(0.393)	(0.545)
lag_elec6	0.263*	0.331	0.324*	0.338**	0.0523	0.564***
	(0.145)	(0.209)	(0.168)	(0.150)	(0.245)	(0.184)
rightex	-0.0791	-0.0717	0.0358	-0.109	-0.155	0.111
	(0.137)	(0.205)	(0.111)	(0.157)	(0.312)	(0.182)
allhouse	-0.135	-0.0499	-0.283	-0.431	-0.360	-0.341
	(0.326)	(0.375)	(0.311)	(0.343)	(0.266)	(0.261)
herfgov	0.238	-0.692	-0.130	-0.706**	-0.0251	0.106
	(0.288)	(0.442)	(0.317)	(0.328)	(0.559)	(0.666)
maj	-0.896	0.578	0.570	1.714**	2.103*	0.529
	(0.765)	(0.804)	(0.815)	(0.795)	(1.177)	(0.869)
lagdebt_gdp	0.000901	0.000658	-0.00378	0.00795***	-0.00104	-0.00171
	(0.00375)	(0.00393)	(0.00344)	(0.00240)	(0.00498)	(0.00466)
laginflation_gdp	-0.0150*	0.00196	0.00530	0.00564	-0.0210	0.00631
	(0.00882)	(0.00580)	(0.00675)	(0.00719)	(0.0136)	(0.00601)
lagrev_gdp	0.0249**	-0.00692	0.0307**	0.00647	-0.0412	-0.0400**
	(0.0112)	(0.0185)	(0.0132)	(0.0176)	(0.0269)	(0.0162)
lagbankcrisis	-0.00831	0.129	0.218	-0.0288	0.351	0.207
	(0.172)	(0.187)	(0.164)	(0.176)	(0.227)	(0.220)
Observations	7,309	7,309	7,309	7,153	6,905	6,905
Country FE	YES	YES	YES	YES	YES	YES

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

A.4 Robustness checks

A.4.1 "Snap" elections

TABLE A.8: Likelihood of tax reform 6 & 12 months before and after an election controlling for snap elections

	(1)	(2)
VARIABLES	likreform	likreform
lead_elec6	-0.331**	
	(0.147)	
lag_elec6	0.271**	
	(0.115)	
finterm	0.0626	0.103
	(1.018)	(0.973)
lead_elec12		-0.309***
		(0.100)
lag_elec12		0.110
		(0.103)
Observations	7,309	7,309
Country FE	YES	YES
Political	YES	YES
Economic	YES	YES
Crisis	YES	YES

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

TABLE A.9: Likelihood of increasing and decreasing tax reform 6 12 months before and after an election controlling for snap elections

	(1)	(2)	(3)	(4)
VARIABLES	Tax Increase 6	Tax Decrease 6	Tax Increase 12	Tax Decrease 12
lead_elec6	-0.816***	-0.164		
	(0.237)	(0.146)		
lag_elec6	0.327***	0.290**		
	(0.120)	(0.137)		
finterm	12.50***	-0.439	12.52***	-0.377
	(0.784)	(0.858)	(0.776)	(0.822)
lead_elec12			-0.671***	-0.241**
			(0.159)	(0.108)
lag_elec12			0.245*	-0.00270
			(0.129)	(0.103)
Observations	7,309	7,309	7,309	7,309
Country FE	YES	YES	YES	YES
Political	YES	YES	YES	YES
Economic	YES	YES	YES	YES
Crisis	YES	YES	YES	YES

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

TABLE A.10: Likelihood of tax reform 6 months before and after an election by type of election *CIT, PIT & VAT* controlling for snap elections

	(1)	(2)	(3)
VARIABLES	CIT	PIT	VAT
lead_elec6	-0.570***	-0.137	-0.615*
	(0.183)	(0.162)	(0.338)
lag_elec6	0.284*	0.333**	0.412***
	(0.161)	(0.143)	(0.145)
finterm	11.48***	-0.844	12.16***
	(0.699)	(0.749)	(0.867)
Observations	7,309	7,309	6,905
Country FE	YES	YES	YES
Political	YES	YES	YES
Economic	YES	YES	YES
Crisis	YES	YES	YES

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

TABLE A.11: Likelihood of tax reform 6 months before and after an election by type and direction of election *CIT, PIT & VAT* controlling for snap elections

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	CIT-	CIT+	PIT-	PIT+	VAT-	VAT+
lead_elec6	-0.501***	-1.024***	0.0509	-0.619**	0.0617	-1.363**
	(0.169)	(0.349)	(0.173)	(0.259)	(0.393)	(0.546)
lag_elec6	0.262*	0.330	0.327*	0.337**	0.0510	0.563***
	(0.146)	(0.209)	(0.168)	(0.150)	(0.244)	(0.184)
finterm	11.47***	11.36***	-1.151	11.63***	10.25***	12.79***
	(0.716)	(0.723)	(0.754)	(0.712)	(0.681)	(0.926)
Observations	7,309	7,309	7,309	7,153	6,905	6,905
Country FE	YES	YES	YES	YES	YES	YES
Political	YES	YES	YES	YES	YES	YES
Economic	YES	YES	YES	YES	YES	YES
Crisis	YES	YES	YES	YES	YES	YES

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

A.4.2 Legislative elections

TABLE A.12: Likelihood of tax reform 6 months before and after an election - legislative elections

VARIABLES	(1)	(2)	(3)	(4)
lead6	-0.336**	-0.364**	-0.365**	-0.366**
	(0.146)	(0.156)	(0.166)	(0.167)
lag6	0.321***	0.292***	0.277**	0.280**
	(0.105)	(0.108)	(0.116)	(0.118)
Observations	8,588	8,215	7,309	7,309
Country FE	YES	YES	YES	YES
Political	NO	YES	YES	YES
Economic	NO	NO	YES	YES
Crisis	NO	NO	NO	YES

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

TABLE A.13: Likelihood of tax reform 12 months before and after an election - legislative elections

VARIABLES	(1)	(2)	(3)	(4)
lead12	-0.294***	-0.326***	-0.333***	-0.333***
	(0.107)	(0.112)	(0.0983)	(0.0992)
lag12	0.138	0.0939	0.0965	0.101
	(0.0979)	(0.0958)	(0.105)	(0.106)
Observations	8,588	8,215	7,309	7,309
Country FE	YES	YES	YES	YES
Political	NO	YES	YES	YES
Economic	NO	NO	YES	YES
Crisis	NO	NO	NO	YES

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

TABLE A.14: Likelihood of increasing and decreasing tax reform 6 & 12 months before and after an election - legislative elections

	(1)	(2)	(3)	(4)
VARIABLES	Tax Increase 6	Tax Decrease 6	Tax Increase 12	Tax Decrease 12
lead6	-0.869***	-0.208		
	(0.268)	(0.158)		
lag6	0.347**	0.285**		
	(0.135)	(0.143)		
lead12			-0.744***	-0.264**
			(0.147)	(0.104)
lag12			0.215*	-0.00919
			(0.130)	(0.104)
Observations	7,309	7,309	7,309	7,309
Country FE	YES	YES	YES	YES
Political	YES	YES	YES	YES
Economic	YES	YES	YES	YES
Crisis	YES	YES	YES	YES

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

TABLE A.15: Likelihood of tax reform 6 months before and after an election by type of election *CIT, PIT & VAT* - legislative elections

	(1)	(2)	(3)
VARIABLES	CIT	PIT	VAT
lead6	-0.661***	-0.159	-0.455
	(0.219)	(0.184)	(0.322)
lag6	0.247	0.345**	0.511***
	(0.176)	(0.148)	(0.175)
Observations	7,309	7,309	6,905
Country FE	YES	YES	YES
Political	YES	YES	YES
Economic	YES	YES	YES
Crisis	YES	YES	YES

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

TABLE A.16: Likelihood of tax reform 6 months before and after an election by type of election *CIT, PIT & VAT* and direction - legislative elections

VARIABLES	(1) CIT-	(2) CIT+	(3) PIT-	(4) PIT+	(5) VAT-	(6) VAT+
lead6	-0.599***	-1.156***	0.0270	-0.666**	0.209	-1.199**
	(0.190)	(0.404)	(0.189)	(0.293)	(0.390)	(0.519)
lag6	0.190	0.320	0.331*	0.343**	0.195	0.644***
	(0.172)	(0.215)	(0.174)	(0.160)	(0.276)	(0.208)
Observations	7,309	7,309	7,309	7,153	6,905	6,905
Country FE	YES	YES	YES	YES	YES	YES
Political	YES	YES	YES	YES	YES	YES
Economic	YES	YES	YES	YES	YES	YES
Crisis	YES	YES	YES	YES	YES	YES

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

A.4.3 Executive elections

TABLE A.17: Likelihood of tax reform 6 months before and after an election - executive elections

VARIABLES	(1) likreform	(2) likreform	(3) likreform	(4) likreform
lead_elec6	-0.210*	-0.228*	-0.248	-0.250
	(0.128)	(0.136)	(0.154)	(0.155)
lag_elec6	0.271**	0.230*	0.240*	0.241*
	(0.119)	(0.124)	(0.133)	(0.136)
Observations	8,588	8,215	7,309	7,309
Country FE	YES	YES	YES	YES
Political	NO	YES	YES	YES
Economic	NO	NO	YES	YES
Crisis	NO	NO	NO	YES

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

TABLE A.18: Likelihood of tax reform 12 months before and after an election - executive elections

VARIABLES	(1) likreform	(2) likreform	(3) likreform	(4) likreform
lead_elec12	-0.215**	-0.238**	-0.268**	-0.271**
	(0.107)	(0.113)	(0.110)	(0.111)
lag_elec12	0.159*	0.117	0.129	0.130
	(0.0930)	(0.0926)	(0.0986)	(0.101)
Observations	8,588	8,215	7,309	7,309
Country FE	YES	YES	YES	YES
Political	NO	YES	YES	YES
Economic	NO	NO	YES	YES
Crisis	NO	NO	NO	YES

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

TABLE A.19: Likelihood of increasing and decreasing tax reform 6 12 months before and after an election - executive elections

VARIABLES	(1) Tax Increase 6	(2) Tax Decrease 6	(3) Tax Increase 12	(4) Tax Decrease 12
lead_elec6	-0.743***	-0.0722		
	(0.236)	(0.147)		
lag_elec6	0.223	0.359**		
	(0.159)	(0.151)		
lead_elec12			-0.587***	-0.233**
			(0.155)	(0.112)
lag_elec12			0.226*	0.0718
			(0.122)	(0.109)
Observations	7,309	7,309	7,309	7,309
Country FE	YES	YES	YES	YES
Political	YES	YES	YES	YES
Economic	YES	YES	YES	YES
Crisis	YES	YES	YES	YES

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

TABLE A.20: Likelihood of tax reform 6 months before and after an election by type of election *CIT, PIT & VAT* - executive elections

VARIABLES	(1) CIT	(2) PIT	(3) VAT
lead_elec6	-0.531**	-0.0749	-0.620*
	(0.212)	(0.183)	(0.368)
lag_elec6	0.382**	0.324**	0.0655
	(0.168)	(0.164)	(0.180)
Observations	7,309	7,309	6,905
Country FE	YES	YES	YES
Political	YES	YES	YES
Economic	YES	YES	YES
Crisis	YES	YES	YES

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

TABLE A.21: Likelihood of tax reform 6 months before and after an election by type of election *CIT, PIT & VAT* and direction - executive elections

VARIABLES	(1) CIT-	(2) CIT+	(3) PIT-	(4) PIT+	(5) VAT-	(6) VAT+
lead_elec6	-0.454**	-1.025***	0.126	-0.573**	0.00416	-1.221**
	(0.193)	(0.380)	(0.179)	(0.292)	(0.445)	(0.518)
lag_elec6	0.416***	0.393*	0.397**	0.259	-0.376	0.211
	(0.146)	(0.229)	(0.181)	(0.173)	(0.266)	(0.241)
Observations	7,309	7,309	7,309	7,153	6,905	6,905
Country FE	YES	YES	YES	YES	YES	YES
Political	YES	YES	YES	YES	YES	YES
Economic	YES	YES	YES	YES	YES	YES
Crisis	YES	YES	YES	YES	YES	YES

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

A.4.4 Total number of reforms

TABLE A.22: OLS total number of tax reform 6 and 12 months before and after an election

VARIABLES	(1) totalreform	(2) likreform
lead6	-0.0878**	
	(0.0363)	
lag6	0.117***	
	(0.0358)	
lead12		-0.0277***
		(0.00866)
lag12		0.00960
		(0.00861)
Constant	0.0811	0.0654
	(0.161)	(0.0459)
Observations	7,309	7,309
R-squared	0.003	0.004
Number of ISO	23	23
Country FE	YES	YES
Political	YES	YES
Economic	YES	YES
Crisis	YES	YES

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Appendix B

One reform to rule them all? *The Implications of Making Tax Crimes a Predicate Crime for Money Laundering in the EU*

B.1 Database Overview

TABLE B.1: Summary of variables in database

Country	Native Terminology	Translation	Tax Crime	Money Laundering Law
Austria	a) Abgaben-hinterziehung b) Grob fahrlässige Abgaben-verkürzung c) Abgabenbetrug	a) Tax evasion b) Gross negligent tax reduction c) Tax fraud	Fiscal Offences Act: Articles 33, 35 & 39	Criminal Code: Article 165
Belgium	a) Inbreuk wetboek inkomstenbelasting b) Valsheid in fiscale geschriften	a) Fraud code income tax b) Forgery of tax documents	Code des impots sur les revenus 1992: Articles 449 & 450	Criminal Code Article 505
Bulgaria	a) избегне установяване или плащане на данъчни задължения	a) Avoid the payment of tax obligations	Criminal Code: Articles 93, 234, 255a, 256, 258, 259 & 260	Criminal Code: Articles 253, 253a & 253b
Croatia	a) Utaja poreza ili carine	a) Tax or customs evasion	Criminal Code: Article 256	Criminal Code: Article 265
Cyprus	a) Ψενδής δήλωσις κ.λ.π	a) False statements, etc (regarding taxation) b) Defrauding the public revenue	Assessment and Collection of Taxes Law: Sections 49 & 51A Criminal Code: Sections 297 & 298	Prevention and Supression of Money Laundering Activities Act: Section 4

TABLE B.1: Summary of variables in database

Country	Native Terminology	Translation	Tax Crime	Money Laundering Law
Czech Republic	a) Zkrácení daně, poplatku a podobné povinné platby b) Neodvedení daně, pojistného na sociální zabezpečení a podobné povinné platby	a) Reduction of tax, fee and similar mandatory payments - b) Non-payment of taxes, social security contributions and similar mandatory payments	Criminal code: Division 2 - Tax, Fees and Foreign Currency Criminal Offences: Sections 240 & 241	Criminal Code: Section 216 & 217
Denmark	a) Skattesvig	a) Tax evasion b) Tax fraud	Criminal code: Sections 289 & 289a Tax control act: Sections 82 & 83	Criminal Code: Sections 290 & 290a
Estonia	a) Maksukohu-stuse varjamine	a) Concealment of tax liability	Criminal Code: Section 389-1	Criminal Code: Sections 394 & 394-1
Finland	a) Veropetos b) Törkeä veropetos c) Lievä veropetos d) Verorikkomus	a) Tax evasion or fraud b) Aggravated tax fraud c) Petty tax fraud d) Tax violation	Criminal Code Chapter 29 (769/1990): Sections 1, 2, 3 & 4	Criminal Code Chapter 32: Section 6, 7, 8, 9 & 10

TABLE B.1: Summary of variables in database

Country	Native Terminology	Translation	Tax Crime	Money Laundering Law
France	a) Soustraire frauduleusement à l'établissement ou au paiement total ou partiel des impôts	a) Fraudulently subtract from the establishment or payment of taxes in whole or in part	Tax Code: Article 1741 Criminal Code: Articles 313-1, 313-2 & 313-3	Criminal Code: Article 324-1 to 324-9
Germany	a) Steuerhin-terziehung	a) Tax evasion	Tax Code: Section 370	Criminal Code: Section 261
Greece	a) Εγκλήματα φοροδιαφυγής	a) Tax evasion Crimes	Code of Tax Procedures-LAW 4174/2013: Article 66	Legislation Law 4557/30.07.2018: Article 2
Hungary	a) Költségvetési csalás	a) Budget fraud	Criminal Code: Section 396 Budget Fraud	Criminal Code: Sections 399, 401 & 402
Ireland	a) Revenue Offences b) Tax evasion	a) Revenue Offences b) Tax evasion	Taxes Consolidation Act 1997: Section 1078	Criminal Justice (money laundering and terrorist financing) Act 2010: Sections 6 & 7

TABLE B.1: Summary of variables in database

Country	Native Terminology	Translation	Tax Crime	Money Laundering Law
Italy	a) Evasione delle imposte	a) Tax evasion	Penal Code Title II - CRIMES: Chapter I - Articles 2, 3, 4 & 5 Chapter II - Articles 8, 10, 10-bis, 10-ter, 10-quater & 11	Criminal Code Articles 648-bis, 648-ter, 648-ter1 & 648-quarter
Latvia	a) Izvairīšanās no nodokļu b) Krāpšana	a) Tax evasion b) Fraud	Criminal Code: Sections 218 & 219	Criminal Code: Section 185 Law on the Prevention of Money Laundering and Terrorism Financing Section 5
Lithuania	a) Sukčiavimas b) Mokesčių nesumokėjimas	a) Fraud b) Failure to pay taxes	Criminal Code: Article 219	Laundering of Crime Related Property: Article 216
Luxembourg	a) Steuerhin-terziehung	a) Tax evasion	Tax Code: Sections 396 & 397 Penal Code: Articles 505 & 506	Penal Code Article 506-1 to Article 506-8

TABLE B.1: Summary of variables in database

Country	Native Terminology	Translation	Tax Crime	Money Laundering Law
Malta	a) Tax evasion	a) Tax evasion	Income Management Act: Article 52	Prevention of Money Laundering Act: Articles 2 & 3
Netherlands	a) Belastingontduiking b) Belastingontwijking c) Belastingfraude	a) Tax evasion b) Tax avoidance c) Tax fraude	General Tax Law: Articles 68, 69 & 69a	Criminal Code: Article 420
Poland	a) uchylając się od opodatkowania	a) Evading taxation	Tax Criminal Code SECTION II - Chapter 6: Articles 54, 55, 56, 56a, 56c, 56d, 60, 61, 76 & 77	Criminal Code: Article 299
Portugal	a) Fraude Fiscal b) Infracções Tributárias	a) Tax Fraud b) Tax Infringement	General Regime of Tax Infractions (GRTI) TITLE I - CHAPTER I: Articles 87, 88, 103, 104 & 105	Penal Code Article 368
Romania	a) evaziunii fiscale	a) Tax evasion	Law no. 241 of 15 July 2005 on the prevention and combating of tax evasion: Article 9	Law no. 656/2002 regarding the prevention and sanctioning of money laundering: Article 29

TABLE B.1: Summary of variables in database

Country	Native Terminology	Translation	Tax Crime	Money Laundering Law
Slovakia	a) Skrátenie dane b) Daňový podvod	a) Tax evasion b) Tax fraud	Criminal Code: Sections 276, 277, 277a, 278 & 278a	Criminal Code: Sections 231, 232, 233 & 234
Slovenia	a) Davčna zatajitev	a) Tax evasion	Criminal Code Criminal offences against the Economy - Tax evasion: Articles 249, 394, 395, 396 & 397	Criminal Code: Article 245
Spain	a) Defraudación de Hacienda Pública	a) Offences against public finances	Criminal Code: TITLE XIV: Of the crimes against the Public Treasury and against the Social Security: Articles 305, 305 bis, 310 & 310 bis	Criminal Code: Articles 301, 302, 303 & 304
Sweden	a) Skattebrott	a) Tax crime	Tax Crime Act (1971: 69): Sections 2, 3, 4, 5, 6, 7 & 8	Act on penalties for money laundering offences: Sections 3, 4, 5, 6, 7 & 8

TABLE B.1: Summary of variables in database

Country	Native Terminology	Translation	Tax Crime	Money Laundering Law
UK	a) Cheating the public revenue b) Fraudulent Evasion of tax	a) Cheating the public revenue b) Fraudulent Evasion of tax	Cheating the public revenue - common law offence Tax Management Act: Sections 45, 94, 95 & 106A	Proceeds of Crime Act 2002 Sections 327, 334 & 340
USA	a) Evade Tax b) Defeat tax	a) Evade Tax b) Defeat tax	US Code - Title 26 section: Sections 7201, 7202 & 7521	US Code Title 18: Sections 1956 & 1957
Liechtenstein	a) Defeat tax	a) Tax Fraud b) Misappropriation of tax to be deducted at source	National and Municipal Taxes Act (Tax Act; SteG): Articles 140, 141 & 142	Criminal Code: Section 165

TABLE B.2: Law in the books. All variables in years.

Country	**Max Punishment Tax**	**Tax Crime Prescription**	**Max Possible Criminal Sentence**	**Money Laundering Prescription Number**
Austria	10	5	10	99
Belgium	5	99	5	10
Bulgaria	8	10	15	15
Croatia	10	20	8	20
Cyprus	5	99	14	99
Czech Republic	10	15	8	15
Denmark	8	10	8	10
Estonia	7	10	10	10
Finland	4	10	6	10
France	7	6	10	6
Germany	10	10	5	5
Greece	10	15	10	15
Hungary	10	10	8	8
Ireland	5	10	14	99
Italy	6	6	12	12
Latvia	5	15	12	5
Lithuania	6	15	7	15
Luxembourg	5	5	5	10
Malta	0.5	2	18	15
Netherlands	6	12	8	20
Poland	5	10	8	15
Portugal	8	5	12	15
Romania	15	10	10	8
Slovakia	12	20	20	20
Slovenia	12	30	8	20
Spain	6	10	6	10
Sweden	6	10	6	10
UK	99	99	14	99
USA	5	6	20	5
Liechtenstein	2	5	5	5

Appendix C

Be thankfull I don't take it all: *Behavioral responses to tax authority unfairness in an online experiment*

C.1 Tables

C.1.1 Summary statistics

TABLE C.1: Summary statistics

	mean	sd	min	max
compliance rate	0.79	0.31	0.00	1.00
received gross income	24.93	2.87	20.00	29.90
probability of overestimation	0.26	0.22	0.00	0.50
magnitude of overestimation	0.21	0.21	0.00	0.50
audit	0.41	0.49	0.00	1.00
age	44.63	15.11	18.00	76.00
gender	1.51	0.53	1.00	3.00
education	2.66	1.20	1.00	6.00
experience	2.45	0.60	1.00	3.00
risk aversion	4.07	2.23	1.00	9.00
tax morale	1.98	1.65	1.00	9.00
perception of fairness	5.39	2.08	1.00	9.00

C.1.2 Participant characteristics

Variable	Categories	Nº	Percent
Ethnicity	Asian	43	8,74%
	Black	25	5,08%
	Mixed	16	3,25%
	White	395	80,28%
	Other[1]	13	2,64%

TABLE C.2: General characteristics of sample

C.1.3 Extended models H1

TABLE C.3: The effect of the probability and magnitude of over-estimation on tax compliance – demographic variables

	(1)	(2)	(3)	(4)	(5)	(6)
q * $\alpha = 0$	ref	ref				
q * $\alpha = .01$	0.0307***	0.0307***				
	(4.27)	(4.27)				
q * $\alpha = .05$	0.0375***	0.0375***				
	(6.51)	(6.51)				
q * $\alpha = .25$	0.0416***	0.0416***				
	(5.79)	(5.79)				
gender		-0.0573**		-0.0573**		-0.0587**
		(-2.87)		(-2.87)		(-2.97)
education		0.00915		0.00915		0.0106
		(1.04)		(1.04)		(1.22)
income		-0.0115		-0.0115		-0.00899
		(-1.17)		(-1.17)		(-0.92)
age		0.00180**		0.00180**		0.00161*
		(2.61)		(2.61)		(2.36)
q = 0			ref	ref		
q = .1			0.0278***	0.0278***		
			(4.57)	(4.57)		
q = .5			0.0438***	0.0438***	0.0155**	0.0155**
			(7.60)	(7.60)	(3.18)	(3.18)
$\alpha = .1$					ref	ref
$\alpha = .5$					-0.00452	-0.00452
					(-0.93)	(-0.93)
Constant	0.758***	0.762***	0.758***	0.762***	0.788***	0.794***
	(67.01)	(14.56)	(67.01)	(14.56)	(71.35)	(15.32)
Observations	9018	9018	9018	9018	7014	7014

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

TABLE C.4: The effect of the probability and magnitude of over-estimation on tax compliance – survey variables

	(1)	(2)	(3)
q * $\alpha = 0$	ref		
q * $\alpha = .01$	0.0307***		
	(4.27)		
q * $\alpha = .05$	0.0375***		
	(6.51)		
q * $\alpha = .25$	0.0416***		
	(5.79)		
q = 0		ref	
q = .1		0.0278***	
		(4.57)	
q = .5		0.0438***	0.0155**
		(7.60)	(3.18)
$\alpha = .1$			ref
$\alpha = .5$			-0.00452
			(-0.93)
experience	0.0150	0.0150	0.0149
	(0.85)	(0.85)	(0.85)
perception of fairness	0.000200	0.000200	0.000114
	(0.04)	(0.04)	(0.02)
risk aversion	-0.0187***	-0.0187***	-0.0170***
	(-3.83)	(-3.83)	(-3.50)
tax morale	0.00271	0.00271	0.000134
	(0.35)	(0.35)	(0.02)
propensity to cheat	-0.00674	-0.00674	-0.00493
	(-0.95)	(-0.95)	(-0.70)
perception of HMRC	-0.00626	-0.00626	-0.00621
	(-1.38)	(-1.38)	(-1.38)
perception of value contribution to society	0.00911	0.00911	0.00837
	(1.91)	(1.91)	(1.76)
Constant	0.783***	0.783***	0.813***
	(11.69)	(11.69)	(12.21)
Observations	9018	9018	7014

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

C.1.4 Robustness H1

TABLE C.5: The effect of the probability and magnitude of over-estimation on tax compliance – without honest subsample

	(1)	(2)	(3)
q * $\alpha = 0$	ref		
q * $\alpha = .01$	0.0370***		
	(4.27)		
q * $\alpha = .05$	0.0453***		
	(6.51)		
q * $\alpha = .25$	0.0502***		
	(5.79)		
q = 0		ref	
q = .1		0.0335***	
		(4.58)	
q = .5		0.0529***	0.0187**
		(7.61)	(3.18)
$\alpha = .1$			ref
$\alpha = .5$			-0.00546
			(-0.93)
Constant	0.723***	0.723***	0.762***
	(12.77)	(12.77)	(13.52)
Demographics	YES	YES	YES
Observations	7470	7470	5810

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

TABLE C.6: The effect of the probability and magnitude of over-estimation on tax compliance - fractional logit

	(1)	(2)	(3)
ATE			
$\alpha * q = .01$	-0.0307***		
	(-4.09)		
$\alpha * q = .05$	-0.0375***		
	(-4.22)		
$\alpha * q = .25$	-0.0416**		
	(-3.27)		
q = .1		-0.0278***	
		(-3.60)	
q = .5		-0.0438***	
		(-4.26)	
q = .5 vs q .1			-0.0154*
			(-2.18)
POmean			
q * $\alpha = 0$	0.242***		
	(18.28)		
q = 0		0.242***	
		(18.28)	
q = .5 vs q .1			0.214***
			(18.67)
OME1			
$\alpha = .1$			ref
$\alpha = .5$			0.0222
			(0.45)
OME0			
$\alpha = .1$			ref
$\alpha = .5$			0.0349
			(0.80)
Observations	9018	9018	7014

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

C.1.5 Extended models H2

TABLE C.7: Post-audit effect on compliance of different audit types – demographics

	(1)	(2)	(3)	(4)
last round audit	-0.0148*	-0.0148*	-0.0152*	
	(-2.15)	(-2.15)	(-2.22)	
last round audit	-0.0652***	-0.0653***	-0.0649***	-0.144***
and overestimated	(-6.27)	(-6.27)	(-6.23)	(-14.02)
gender		0.000430	0.000420	-0.0568***
		(0.07)	(0.07)	(-5.36)
education		-0.000248	-0.000328	0.00253
		(-0.10)	(-0.13)	(0.54)
income		-0.000203	-0.000129	-0.0115*
		(-0.07)	(-0.04)	(-2.20)
age		-0.0000660	-0.0000690	0.00121***
		(-0.32)	(-0.34)	(3.35)
received gross			-0.00180	-0.00172
income			(-1.67)	(-1.17)
q * α			0.0634	0.0931
			(1.75)	(1.90)
last period				0.856***
relative fine				(29.49)
Constant	0.00874*	0.0121	0.0530	-0.0185
	(2.19)	(0.77)	(1.70)	(-0.40)
Observations	8517	8517	8517	3468

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

TABLE C.8: Post-audit effect on compliance of different audit types – survey variables

	(1)	(2)	(3)	(4)
last round audit	-0.0148*	-0.0148*	-0.0152*	
	(-2.15)	(-2.15)	(-2.22)	
last round audit and overestimated	-0.0652***	-0.0653***	-0.0649***	-0.147***
	(-6.27)	(-6.27)	(-6.23)	(-14.29)
experience		0.0000198	0.0000487	0.00516
		(0.00)	(0.01)	(0.54)
perception of fairness		0.0000631	0.0000406	0.00116
		(0.04)	(0.03)	(0.43)
risk aversion		-0.000770	-0.000738	-0.0136***
		(-0.53)	(-0.50)	(-5.13)
tax morale		0.000633	0.000689	0.00239
		(0.27)	(0.29)	(0.56)
propensity to cheat		0.000323	0.000282	-0.00546
		(0.15)	(0.13)	(-1.43)
perception of HMRC		0.000118	0.000100	-0.00251
		(0.09)	(0.07)	(-1.01)
perception of value contribution to society		-0.000170	-0.000145	0.00375
		(-0.12)	(-0.10)	(1.43)
received gross income			-0.00178	-0.00180
			(-1.66)	(-1.21)
q * α			0.0635	0.103*
			(1.75)	(2.10)
last period relative fine				0.874***
				(29.72)
Constant	0.00874*	0.0100	0.0503	-0.0324
	(2.19)	(0.49)	(1.50)	(-0.63)
Observations	8517	8517	8517	3468

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

C.1.6 Robustness H2

TABLE C.9: Post-audit effect on compliance of different audit types – without honest subsample

	(1)	(2)	(3)	(4)
last round audit	-0.0178*	-0.0178*	-0.0185*	
	(-2.15)	(-2.15)	(-2.22)	
last round audit and overestimated	-0.0787***	-0.0789***	-0.0783***	-0.161***
	(-6.27)	(-6.28)	(-6.23)	(-13.20)
received gross income			-0.00213	-0.00176
			(-1.65)	(-1.00)
q * α			0.0772	0.116*
			(1.77)	(1.98)
last period relative fine				0.935***
				(28.54)
Constant	0.0105*	0.0148	0.0632	-0.0382
	(2.19)	(0.80)	(1.69)	(-0.70)
Demographics	NO	YES	YES	YES
Observations	7055	7055	7055	2865

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

TABLE C.10: Post-audit effect on compliance of different audit types – ordered logit

	(1)	(2)	(3)
delta rate of complience			
last round audit	-0.0188	-0.0216	
	(-0.42)	(-0.49)	
last round audit	-0.269***	-0.269***	-0.800***
and overestimated	(-3.97)	(-3.97)	(-9.12)
received gross		-0.0180**	-0.0162
income		(-2.59)	(-1.38)
q * α		-0.00203	0.0990
		(-0.01)	(0.26)
last period			4.662***
relative fine			(13.79)
cut1			
Constant	-0.846***	-1.297***	-1.259***
	(-8.07)	(-6.35)	(-3.40)
cut2			
Constant	0.714***	0.264	0.540
	(6.82)	(1.29)	(1.46)
sigma2_u			
Constant	5.28e-36	1.43e-34	0.414***
	(0.00)	(0.00)	(4.51)
Demographics	YES	YES	YES
Observations	8517	8517	3468

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

C.1.7 Methodological discussion

TABLE C.11: The effect of the probability and magnitude of overestimation on tax evasion – twopm

	(1)	(2)	(3)
logit			
q * $\alpha = 0$	ref		
q * $\alpha = .01$	0.181**		
	(2.62)		
q * $\alpha = .05$	0.165**		
	(3.00)		
q * $\alpha = .25$	0.0534		
	(0.78)		
q = 0		ref	
q = .1		0.217***	
		(3.73)	
q = .5		0.0902	-0.127**
		(1.64)	(-2.59)
$\alpha = .1$			ref
$\alpha = .5$			-0.000301
			(-0.01)
Constant	-0.00514	-0.00513	0.249*
	(-0.05)	(-0.05)	(1.96)
regress			
q * $\alpha = 0$	ref		
q * $\alpha = .01$	-0.0971***		
	(-6.37)		
q * $\alpha = .05$	-0.106***		
	(-8.60)		
q * $\alpha = .25$	-0.0940***		
	(-6.06)		
q = 0		ref	
q = .1		-0.0981***	
		(-7.58)	
q = .5		-0.105***	-0.00556
		(-8.43)	(-0.53)
$\alpha = .1$			ref
$\alpha = .5$			0.00813
			(0.77)
Constant	0.478***	0.478***	0.365***
	(19.46)	(19.46)	(13.81)
Demographics	YES	YES	YES
Observations	9018	9018	7014

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

C.1.8 Behavioral motivators discussion

TABLE C.12: Sample composition by selfselected motivations

motive	Freq.
Being honest	38.92
Avoiding fines	32.93
Compensating for earlier rounds	15.17
Revenge	1.20
Contributing to the collective	6.79
Other	4.99
Total	100.00

TABLE C.13: Post-audit effect on compliance of different audit types – interaction effect

Avoiding fines	0.0197*	(2.08)
Compensating for earlier rounds	0.0163	(1.35)
Revenge	0.127**	(2.97)
Contributing to the collective	0.00957	(0.57)
Other	0.0374*	(1.99)
last round audit	0.0114	(1.04)
last round audit and overestimated	-0.00799	(-0.46)
Avoiding fines X last round audit	-0.0474**	(-2.93)
Avoiding fines X last round audit and overestimated	-0.0798**	(-3.19)
Compensating for earlier rounds X last round audit	-0.0330	(-1.57)
Compensating for earlier rounds X last round audit and overestimated	-0.0745*	(-2.42)
Revenge X last round audit	-0.198**	(-3.24)
Revenge X last round audit and overestimated	-0.318***	(-3.49)
Contributing to the collective X last round audit	-0.0104	(-0.36)
Contributing to the collective X last round audit and overestimated	-0.0573	(-1.41)
Other X last round audit	-0.0496	(-1.52)
Other X last round audit and overestimated	-0.216***	(-4.21)
Constant	-0.00382	(-0.60)
Observations	8517	

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

TABLE C.14: Behavioral motivators margins

	no audit	audit	audit and overestimation
honest	0.142***	0.138***	0.130**
	(4.42)	(4.07)	(3.11)
moral duty	0.0994***	0.107***	0.0629
	(4.82)	(4.78)	(1.73)
compensating	0.0268	-0.0133	-0.0809*
	(0.79)	(-0.32)	(-1.98)
calculating	0.00139	-0.0375	-0.100*
	(0.04)	(-1.06)	(-2.50)
Constant	0.722***	0.725***	0.752***
	(23.53)	(21.50)	(19.77)
Observations	5049	2594	874

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

TABLE C.15: Proportion of participants in each of the coded categories of motives

	mean
composition sample types honest	0.40
moral duty	0.13
compensating	0.19
calculating	0.42

C.1.9 Behavioral motivators by compliance quartile

TABLE C.16: Summary statistics core variables - per percentile

	mean	sd	mean	sd	mean	sd	mean	sd
compliance rate	0.99	0.10	0.86	0.26	0.74	0.31	0.51	0.32
received gross income	24.93	2.87	24.92	2.88	24.92	2.87	24.96	2.85
probability of overestimation	0.26	0.22	0.26	0.22	0.26	0.22	0.26	0.22
magnitude of overestimation	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21
audit	0.41	0.49	0.41	0.49	0.40	0.49	0.41	0.49
age	48.20	14.93	43.65	14.57	41.46	15.39	45.46	14.72
gender	1.41	0.51	1.47	0.53	1.60	0.54	1.57	0.53
education	2.69	1.09	2.68	1.17	2.76	1.29	2.51	1.22
experience	2.60	0.59	2.43	0.60	2.35	0.58	2.41	0.59
risk aversion	3.29	2.06	3.81	2.16	4.53	2.17	4.81	2.21
tax morale	1.33	0.94	1.96	1.48	2.39	1.95	2.28	1.88
perception of fairness	5.49	2.41	5.16	1.99	5.39	1.83	5.57	2.03

TABLE C.17: The effect of the probability and magnitude of overestimation on tax compliance - per percentile

	0-25	26-50	51-75	76-100
q * $\alpha = .01$	0.00942	0.0412**	0.0451*	0.0248
	(1.40)	(2.65)	(2.48)	(1.83)
q * $\alpha = .05$	0.0126*	0.0334**	0.0633***	0.0415***
	(2.33)	(2.68)	(4.34)	(3.83)
q * $\alpha = .25$	0.0101	0.0226	0.0603***	0.0811***
	(1.49)	(1.45)	(3.32)	(5.99)
Constant	0.988***	0.888***	0.696***	0.342**
	(61.88)	(18.19)	(9.72)	(2.60)
Demographics	YES	YES	YES	YES
Observations	2268	2520	2286	1944

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

TABLE C.18: The effect of the probability and magnitude of overestimation on tax compliance - per percentile

	0-25		26-50		51-75		76-100	
q = .1	0.0120*		0.0269*		0.0444**		0.0278*	
	(2.10)		(2.04)		(2.89)		(2.43)	
q = .5	0.0110*	-0.000826	0.0372**	0.00714	0.0695***	0.0240*	0.0604***	0.0353***
	(2.02)	(-0.20)	(2.98)	(0.67)	(4.77)	(1.97)	(5.56)	(3.79)
$\alpha = .5$		0.00149		-0.0258*		-0.00882		0.0211*
		(0.35)		(-2.42)		(-0.72)		(2.27)
Constant	0.988***	0.999***	0.888***	0.925***	0.696***	0.737***	0.342**	0.384**
	(61.88)	(70.37)	(18.19)	(17.80)	(9.72)	(10.66)	(2.60)	(2.92)
Demographics	YES	YES	YES	YES	YES	YES	YES	YES
Observations	2268	1764	2520	1960	2286	1778	1944	1512

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

TABLE C.19: Post-audit effect on compliance of different audit types - per percentile

	0-25	26-50	51-75	76-100
last round audit	0.00623	-0.0450***	-0.0371**	-0.0234*
	(1.27)	(-3.97)	(-2.78)	(-2.35)
last round audit	-0.00285	-0.0731***	-0.0525**	-0.0459**
and overestimated	(-0.37)	(-4.33)	(-2.59)	(-3.06)
Constant	0.995***	0.943***	0.754***	0.388**
	(60.24)	(19.35)	(10.49)	(2.95)
Demographics	YES	YES	YES	YES
Observations	2142	2380	2159	1836

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

C.1.10 Lagged effects

TABLE C.20: Two period post-audit effect on compliance of different audit types – interaction effects for different types

	(1)	
Avoiding fines	-0.0222**	(-2.90)
Compensating for earlier rounds	-0.0259**	(-2.74)
Revenge	-0.0436***	(-3.83)
Contributing to the collective	0.00461	(0.39)
Other	-0.00750	(-0.52)
1bL.last_category	0	(.)
2L.last_category	0.00116	(0.17)
3L.last_category	-0.00947	(-0.83)
Avoiding fines X 1bL.last_category	0	(.)
Avoiding fines X 2L.last_category	0.0439*	(2.33)
Avoiding fines X 3L.last_category	0.0773**	(3.13)
Compensating for earlier rounds X 1bL.last_category	0	(.)
Compensating for earlier rounds X 2L.last_category	0.0659*	(2.56)
Compensating for earlier rounds X 3L.last_category	0.0237	(0.87)
Revenge X 1bL.last_category	0	(.)
Revenge X 2L.last_category	0.0360	(0.79)
Revenge X 3L.last_category	0.251***	(4.44)
Contributing to the collective X 1bL.last_category	0	(.)
Contributing to the collective X 2L.last_category	-0.00968	(-0.34)
Contributing to the collective X 3L.last_category	0.0248	(0.66)
Other X 1bL.last_category	0	(.)
Other X 2L.last_category	-0.00991	(-0.23)
Other X 3L.last_category	0.0614	(0.86)
q * α	0.0628	(1.24)
received gross income	-0.00184	(-1.53)
Constant	0.0400	(1.32)
Observations	8016	

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

TABLE C.21: Three period post-audit effect on compliance of different audit types – interaction effects for different types

	(1)	
Avoiding fines	-0.00787	(-1.12)
Compensating for earlier rounds	0.00184	(0.20)
Revenge	-0.0864**	(-3.11)
Contributing to the collective	-0.000365	(-0.03)
Other	-0.0158	(-0.78)
1bL2.last_category	0	(.)
2L2.last_category	-0.000497	(-0.07)
3L2.last_category	-0.00911	(-0.84)
Avoiding fines X 1bL2.last_category	0	(.)
Avoiding fines X 2L2.last_category	0.0109	(0.59)
Avoiding fines X 3L2.last_category	0.0276	(1.10)
Compensating for earlier rounds X 1bL2.last_category	0	(.)
Compensating for earlier rounds X 2L2.last_category	-0.0288	(-1.24)
Compensating for earlier rounds X 3L2.last_category	0.0211	(0.69)
Revenge X 1bL2.last_category	0	(.)
Revenge X 2L2.last_category	0.158***	(3.74)
Revenge X 3L2.last_category	0.147**	(3.07)
Contributing to the collective X 1bL2.last_category	0	(.)
Contributing to the collective X 2L2.last_category	0.00476	(0.15)
Contributing to the collective X 3L2.last_category	-0.0154	(-0.51)
Other X 1bL2.last_category	0	(.)
Other X 2L2.last_category	0.0349	(0.75)
Other X 3L2.last_category	0.00892	(0.14)
q * α	0.0592	(1.14)
received gross income	-0.00228	(-1.86)
Constant	0.0531	(1.73)
Observations	7515	

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

C.2 Online experiment

The following appendix contains the instructions of the experiment written out, the flow of the experiment and screenshots of how it looked for the participants.

Welcome

The experiment starts once participants have pressed the link through the Prolific website, then they are redirected to a welcome slide in order to provide their informed consent.

Instructions

The instructions were separated and displayed in two screens, the first screen focused on the facts of the study that remained constant, the second on those that change in every round. At the end we invite participants to practice in three trial rounds.
This study looks at tax reporting behavior and consists of several rounds of tax declarations. Before you start declaring your taxes, please go over the following instructions carefully. After reading the instructions you will play 3 practice rounds that do not count towards your payoff. First we will explain the conditions that stay the same over the entire study (in all tax declarations):

- In every round you receive a gross income of on average 25000 ECU (Experimental Currency Units), only you know your gross income.
- For your final reward the first 300000 ECU equal £1,80 (guaranteed reward). All ECU's earned above 300000 will be converted into pounds with a rate of 65134,3 ECU = 1£ (bonus reward).
- In each round you must file a tax declaration in which you declare your income to a virtual tax authority. You can declare any share of your gross income between 0 ECU and the actual amount you received.
- The income you declare is taxed at a rate of 25% (This means that for every 1000 ECU you declare, you pay 250 ECU in tax). The tax will be deducted from your income. Thus, if you declare 1000 ECU, you are left with 750 ECU.
- The virtual tax authority will randomly audit 40% (40 out of 100) of the tax declarations of taxpayers, to inspect their tax declarations.

Below we explain the conditions that change in every round of tax declarations.

- If you are audited, the virtual tax authority independently estimates your income and compares it with the amount in your declaration. If your reported income does not match the estimation of the tax authority, you will pay a fine.
- However, the tax authority sometimes makes a mistake and overestimates your true gross-income by a certain percentage. For example, if your true gross-income is 20000 ECU and the tax authority overestimates your income by 10%, then your estimated income is 22000 ECU.
- You will always be informed of the probability of the tax authority overestimating your income.

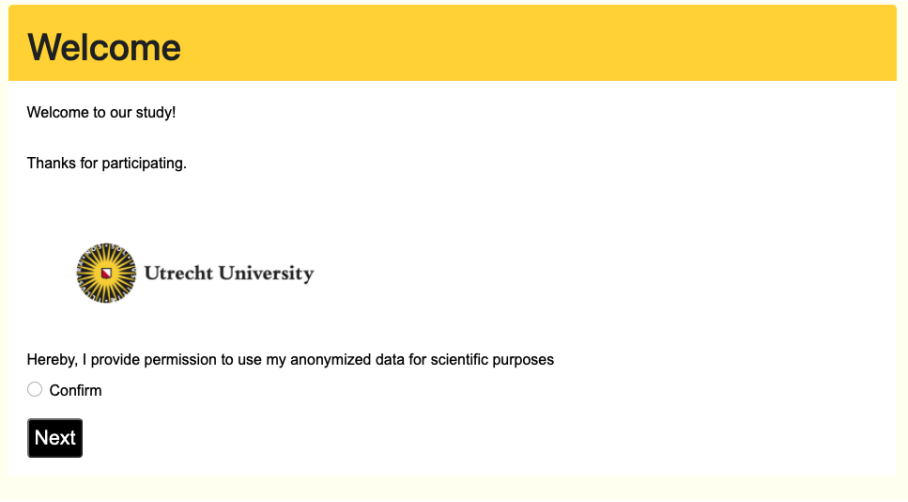


FIGURE C.1: Welcome to the study

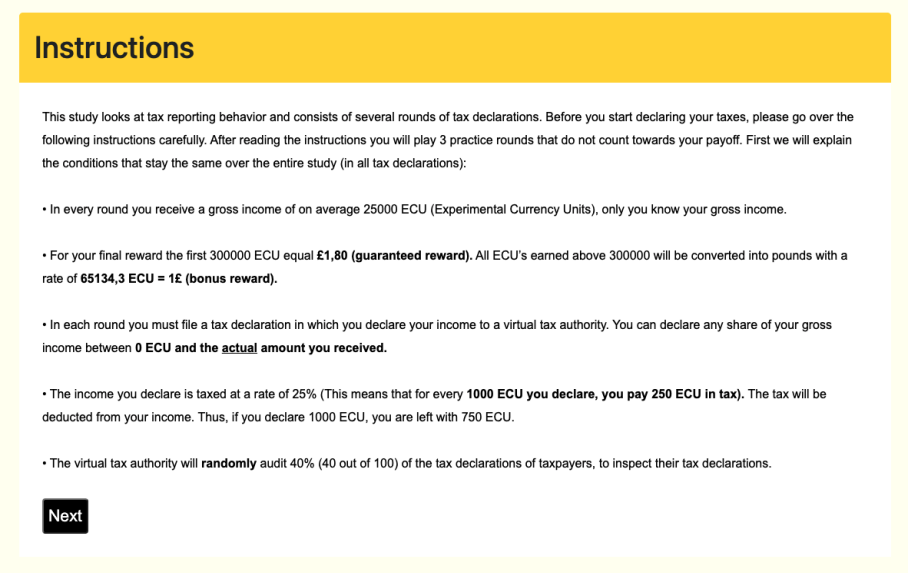


FIGURE C.2: Instructions 1

- The tax authority will make you pay the taxes on your unreported income. Plus a fine of 1 ECU for each ECU of underpaid tax. If you did not report 1000 ECU, you will have to pay 250 ECU in tax for the 1000 you did not report, plus (+) a fine of the same (250 ECU) amount.
- If your income is overestimated, the additional tax payment and fine will be based on the income that the tax authority estimates.
- If you are not audited, your earnings will be equal to the amount of income minus the tax on the income you declared (25
- What you earn in each round will be added to your final reward. Your final payment is the sum of the income earned in each round plus (+) the guaranteed reward .

To start the 3 practice rounds, click "next". These rounds do not count towards your final payoff!

Tax Declarations

The tax declarations and their results were identical in form through out the study. Participants first encountered them in the practice rounds. The tax declaration starts by explaining the elements that are specific to the round followed by those that are constant in lighter grey. The slider and the calculator table below it are dynamic and allow the participant to see the changes in ECU for all the different scenarios *(audit, audit and over-estimation, no audit)* depending on how many ECU she declares.

In this tax declaration:

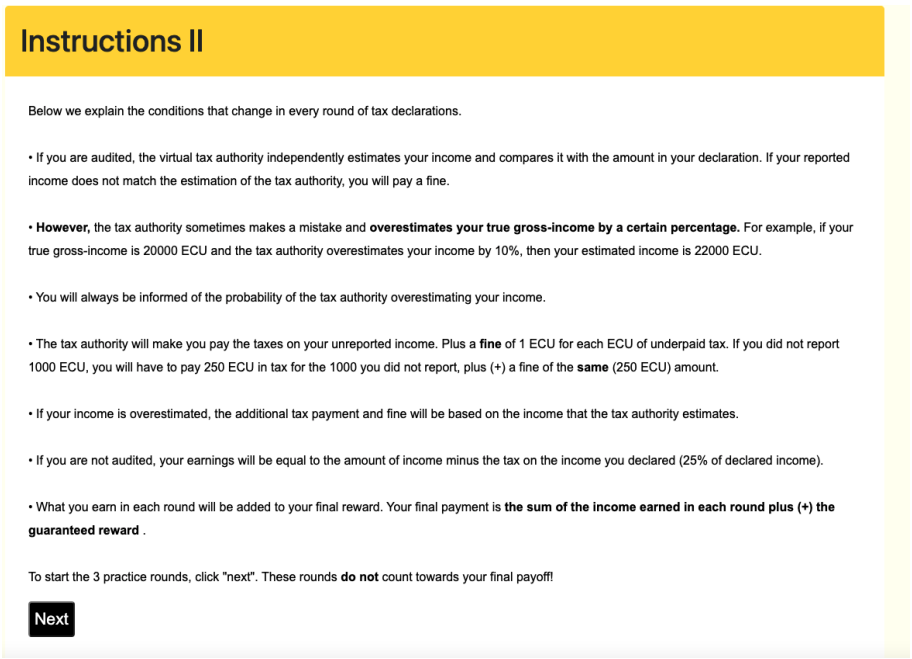
- Your gross-income is 20500 ECU.
- Probability that tax authority will overestimate income: 10
- The size of the overestimation: 50

Move the slider below to choose the amount of income (ECU) you want to report to the virtual tax authority. The income you declare makes a difference for your bonus payment. The calculation table bellow tells you the possible outcomes of your decision and how likely they are to happen. When you're done, click "Next". Recall that in every tax declaration:

- Tax rate: 25
- Probability you are audited: 40
- Fine if audited: taxes owed + 1 ECU fine per undeclared ECU

Audit Wait

After filling a tax declaration a participant must wait 5 seconds in the trial rounds and 3 seconds in the eighteen incentivized rounds before they get the results of the audit. The wait screen shows the time of filling in a similar language to that of HMRC and mentions the virtual tax authority explicitly. Time left to complete this page mm:ss The (practice) tax declaration was successfully submitted and was received by the virtual tax authority on yyyy-mm-dd hh:mm



Instructions II

Below we explain the conditions that change in every round of tax declarations.

• If you are audited, the virtual tax authority independently estimates your income and compares it with the amount in your declaration. If your reported income does not match the estimation of the tax authority, you will pay a fine.

• **However,** the tax authority sometimes makes a mistake and **overestimates your true gross-income by a certain percentage.** For example, if your true gross-income is 20000 ECU and the tax authority overestimates your income by 10%, then your estimated income is 22000 ECU.

• You will always be informed of the probability of the tax authority overestimating your income.

• The tax authority will make you pay the taxes on your unreported income. Plus a **fine** of 1 ECU for each ECU of underpaid tax. If you did not report 1000 ECU, you will have to pay 250 ECU in tax for the 1000 you did not report, plus (+) a fine of the **same** (250 ECU) amount.

• If your income is overestimated, the additional tax payment and fine will be based on the income that the tax authority estimates.

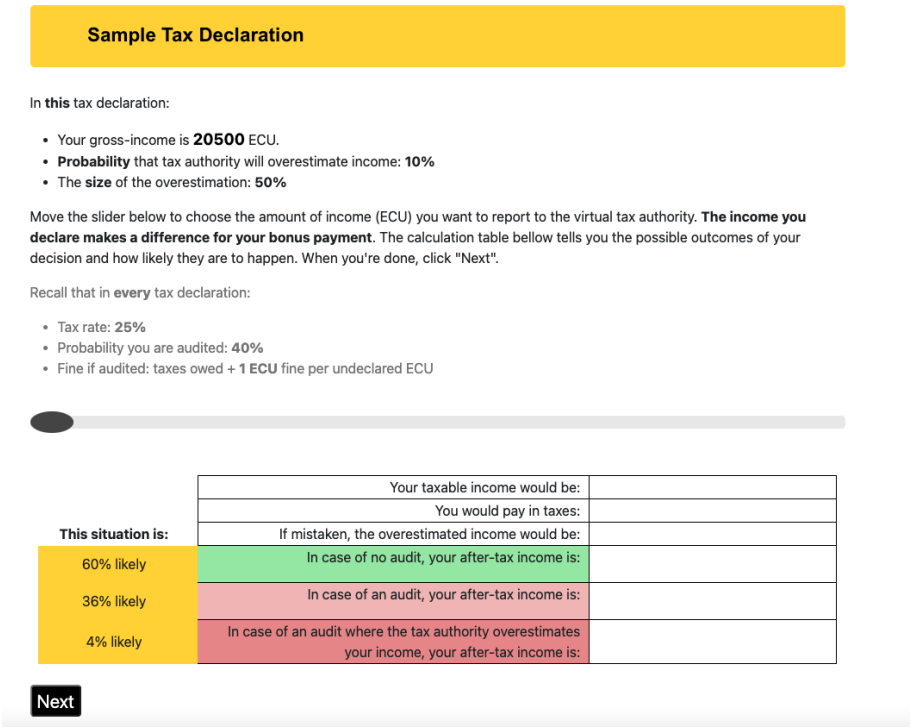
• If you are not audited, your earnings will be equal to the amount of income minus the tax on the income you declared (25% of declared income).

• What you earn in each round will be added to your final reward. Your final payment is **the sum of the income earned in each round plus (+) the guaranteed reward** .

To start the 3 practice rounds, click "next". These rounds **do not** count towards your final payoff!

Next

FIGURE C.3: Instructions 2



Sample Tax Declaration

In **this** tax declaration:

- Your gross-income is **20500** ECU.
- **Probability** that tax authority will overestimate income: **10%**
- The **size** of the overestimation: **50%**

Move the slider below to choose the amount of income (ECU) you want to report to the virtual tax authority. **The income you declare makes a difference for your bonus payment**. The calculation table bellow tells you the possible outcomes of your decision and how likely they are to happen. When you're done, click "Next".

Recall that in **every** tax declaration:

- Tax rate: **25%**
- Probability you are audited: **40%**
- Fine if audited: taxes owed + **1 ECU** fine per undeclared ECU

This situation is:		
	Your taxable income would be:	
	You would pay in taxes:	
	If mistaken, the overestimated income would be:	
60% likely	In case of no audit, your after-tax income is:	
36% likely	In case of an audit, your after-tax income is:	
4% likely	In case of an audit where the tax authority overestimates your income, your after-tax income is:	

Next

FIGURE C.4: Sample Tax Declaration

Audit Results

After the participants fill their tax declarations and have waited 3-5 seconds they get the results of their audit. In these results participants get informed if they were audited, audited and overestimated, or audited and not overestimated. They also get a detailed chart with their gross income, the income estimated by the tax authority, the overestimation if it applies, the taxes paid and their reason, the fines paid and their reason, and finally the end of round income. Below we show the three possible results. You were audited in this round.

- The tax authority did not overestimated your income.
- Income you declared: 10800 ECU
- Income in this round after filed taxes: 12950.00 ECU.

Checking Understanding

After the trial rounds, we checked if participants understood the game setup by asking them two questions, if participants failed to answer correctly they were pointed to a fourth practice round. All participants had a "fresh-up" of the instructions before starting the official rounds. Please answer the questions below to proceed to the paid rounds of tax declarations in the study.

1. If the audit probability is 40% .... [pick number in dropdown menu] in 100 declarations are expected to be audited.
   Correct Answer: 40
2. If you earned an income of 1000 and the tax authority says you made 1050 they overestimated your income [Drpdown: true, false]
   Correct Answer: true

Unfortunately you answered question 1 and 2 incorrect.

The correct answer to question 1) is 40. If there is a 40% chance that you will be audited, it means that 40 out of 100 tax returns are audited by the tax authority.
The correct answer to question 2) is True. To estimate means to try to accurately guess a value or quantity. When the tax authority estimates your income it is trying to accurately determine YOUR income based on their own information. Overestimation refers to the tax authority thinking you made more money than you actually did. For example, if you made 10000 ECU, the tax authority can by mistake think you made 10500.
Before you move forward we ask you to do another practice round below. The practice rounds are now finalized. Please read the following summary of the instructions, to proceed to the paid rounds of tax declarations.

- The tax rate of 25% and the audit rate of 40% are the same in all rounds. This means that for every 1000 ECU you declare, you pay 250 ECU in tax, and that 40 out of 100 tax declarations will be audited.
- Remember: there are 3 possible outcomes for each round: (1) No audit, (2) Audit without overestimation, (3) Audit with overestimation.
- Your income, the probability of the tax authority overestimating your income and the extent to which this happens can vary every round of tax declarations and will

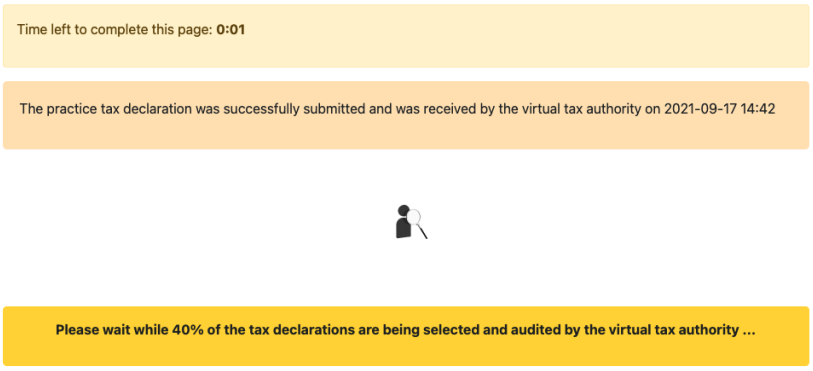


FIGURE C.5: Waiting screen

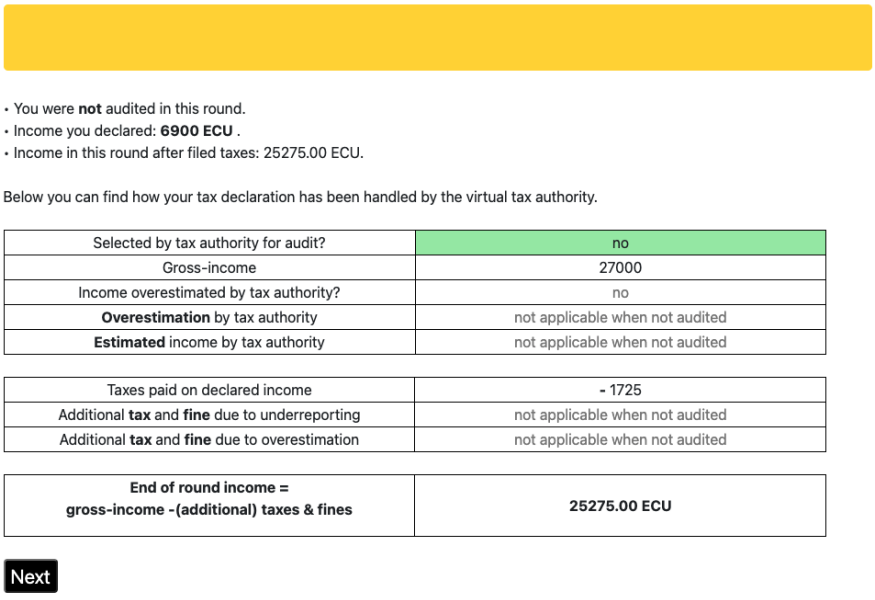
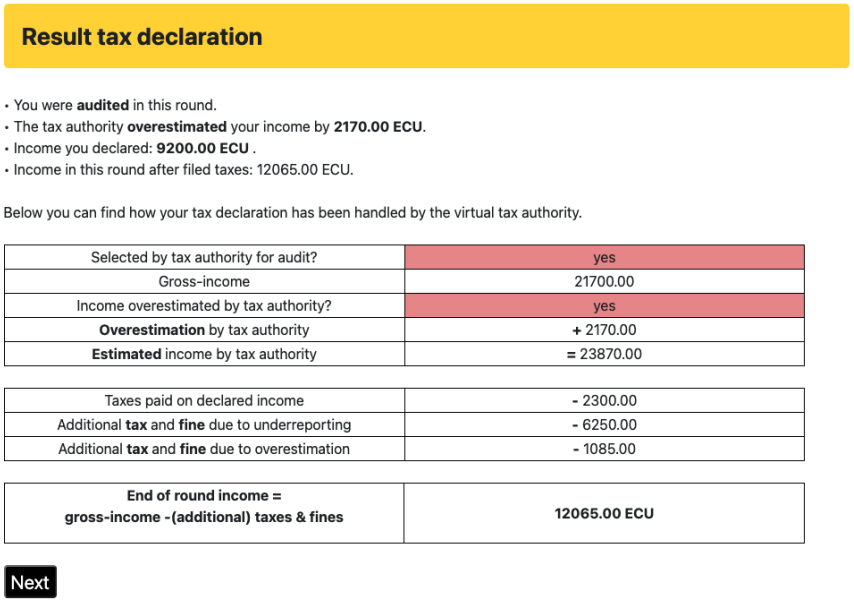


FIGURE C.6: Results when not audited



Result tax declaration

- You were **audited** in this round.
- The tax authority **overestimated** your income by **2170.00 ECU**.
- Income you declared: **9200.00 ECU** .
- Income in this round after filed taxes: 12065.00 ECU.

Below you can find how your tax declaration has been handled by the virtual tax authority.

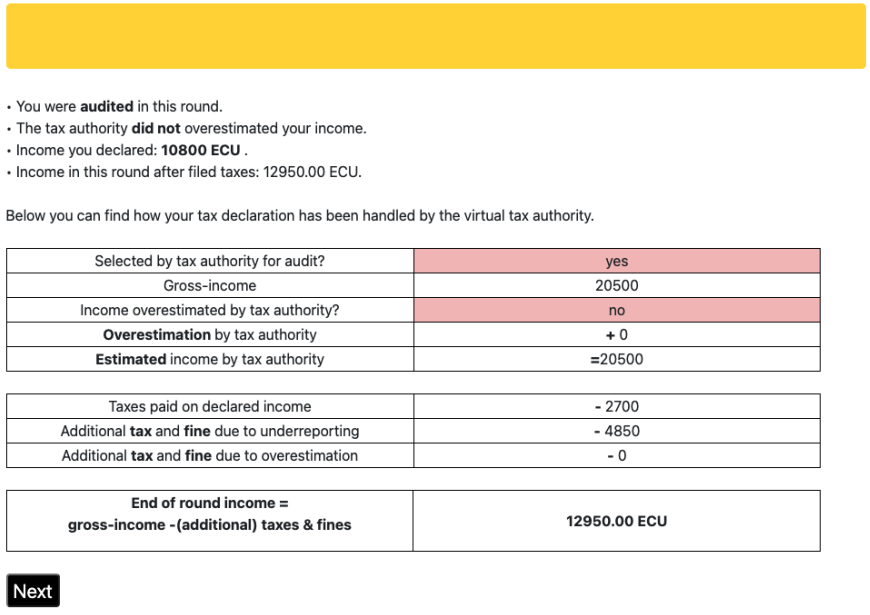
Selected by tax authority for audit?	yes
Gross-income	21700.00
Income overestimated by tax authority?	yes
Overestimation by tax authority	**+** 2170.00
Estimated income by tax authority	**=** 23870.00

Taxes paid on declared income	- 2300.00
Additional **tax** and **fine** due to underreporting	- 6250.00
Additional **tax** and **fine** due to overestimation	- 1085.00

End of round income = gross-income -(additional) taxes & fines	**12065.00 ECU**

Next

FIGURE C.7: Results when audited and overestimated



- You were **audited** in this round.
- The tax authority **did not** overestimated your income.
- Income you declared: **10800 ECU** .
- Income in this round after filed taxes: 12950.00 ECU.

Below you can find how your tax declaration has been handled by the virtual tax authority.

Selected by tax authority for audit?	yes
Gross-income	20500
Income overestimated by tax authority?	no
Overestimation by tax authority	**+** 0
Estimated income by tax authority	**=**20500

Taxes paid on declared income	- 2700
Additional **tax** and **fine** due to underreporting	- 4850
Additional **tax** and **fine** due to overestimation	- 0

End of round income = gross-income -(additional) taxes & fines	**12950.00 ECU**

Next

FIGURE C.8: Result when audited and not overestimated

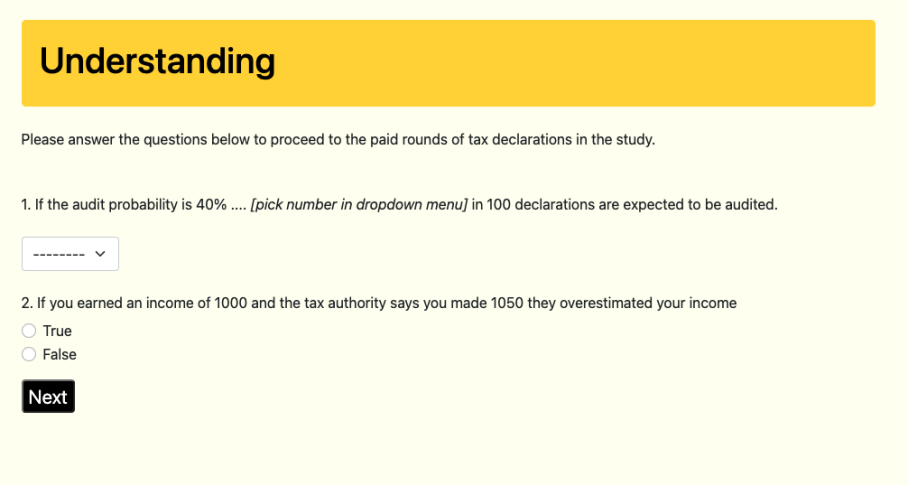


FIGURE C.9: Comprehension/Understanding of the experiment

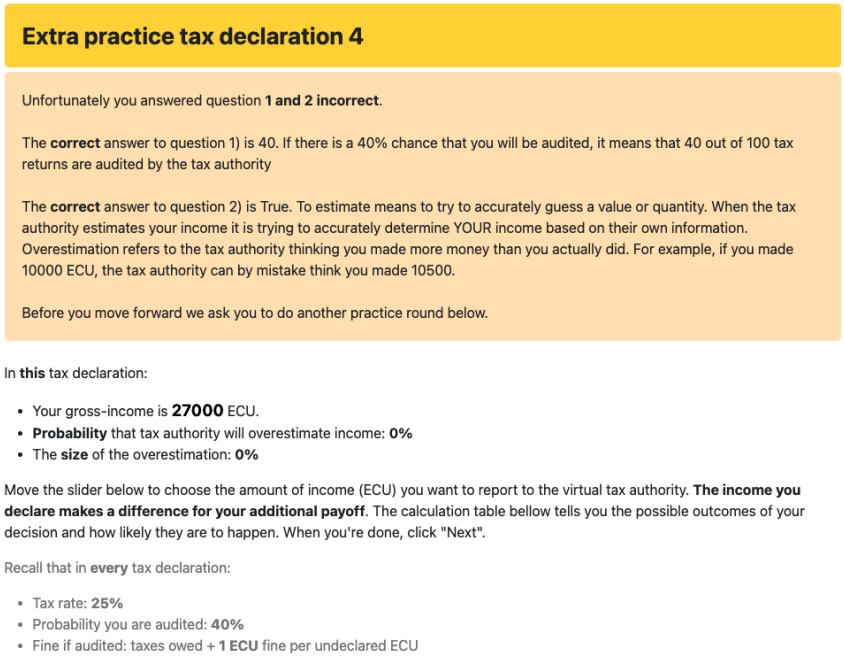


FIGURE C.10: Additional practice round

always be communicated. After every round you will be informed whether your tax declaration has been audited and what the result of this audit is.

- If at any moment you want to reread the instructions, you can find them by clicking on a button at the bottom of each page.
- The official study will take between 15 and 21 rounds of tax declarations, followed by a short questionnaire.

End of Experiment

Once participants have completed eighteen rounds of declarations they are forwarded to the demographics and final questionnaire.

Retrieval

The first part of the questionnaire consisted in retrieving the last round where the participant had been overestimated if this was applicable, if not we retrieved the last round (fill), we later asked participants what motivated their answer and if they followed the same strategy throughout the experiment. And we also include a likkert scale on the fairness perception of the round. This is the result of your tax declaration 16 earlier in the experiment. Please answer the questions below regarding this declaration. Please explain why you declared 0.00 ECU in round 16, max 500 characters.
The procedure used in this round of the experiment was fair. (Please choose a number on a scale from 1 to 9). Where 1 is "very unfair" and 9 is "very fair"

Is the strategy you used for this round (16) different or similar to the one used in other rounds? If so, explain how, max 500 characters. explanation

Demographics

We asked generic demographic questions to complement the data already obtained by Prolific. -Gender [Dropdown: male, female]
-Year of birth [Dropdown: year list]
-Highest completed level of education [Dropdown: Primary School, High school, Vocational training, Bachelor, Master, PhD, Other]
-Current occupation [Dropdown: Student, Employed, Self-employed, Unemployed, Other]
-My personal monthly income before taxes is [Dropdown:0 – 1500 GBP, 1501-3000 GBP, 3001-5000 GBP, 5000, I do not know]
-Have you ever reported your income (either from employment or from self-employment) to a tax authority, either personally or through a tax advisor? [Dropdown: Yes,No, I do not know]
-Country of residence [Open field]

Tax Attitude Questionnaire

We asked participants questions about their tax perceptions and attitudes. -Have you participated in a study on tax compliance before? [Dropdown: yes, no]

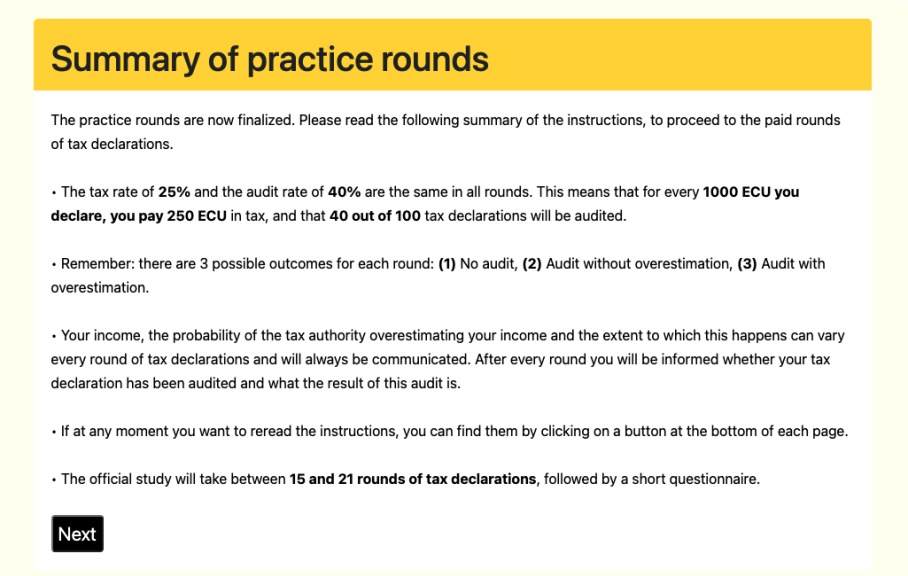


FIGURE C.11: Summary of practice rounds

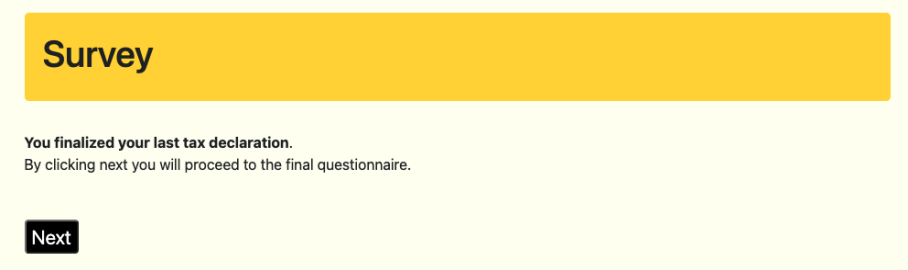
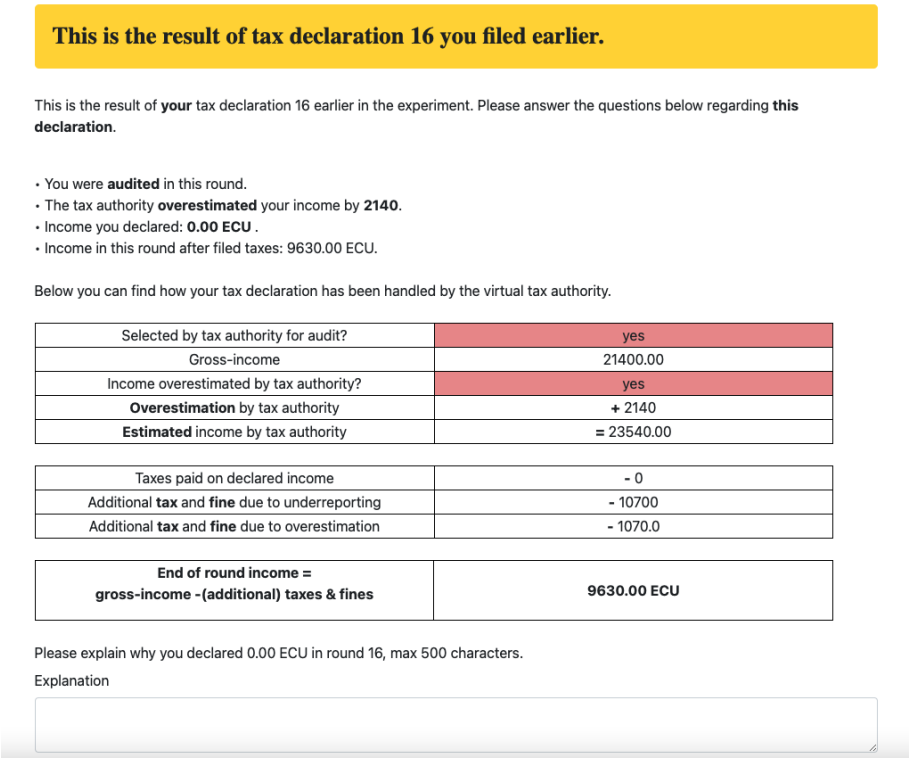


FIGURE C.12: Summary of practice rounds



This is the result of tax declaration 16 you filed earlier.

This is the result of **your** tax declaration 16 earlier in the experiment. Please answer the questions below regarding **this declaration**.

- You were **audited** in this round.
- The tax authority **overestimated** your income by **2140**.
- Income you declared: **0.00 ECU** .
- Income in this round after filed taxes: 9630.00 ECU.

Below you can find how your tax declaration has been handled by the virtual tax authority.

Selected by tax authority for audit?	yes
Gross-income	21400.00
Income overestimated by tax authority?	yes
Overestimation by tax authority	+ 2140
Estimated income by tax authority	= 23540.00

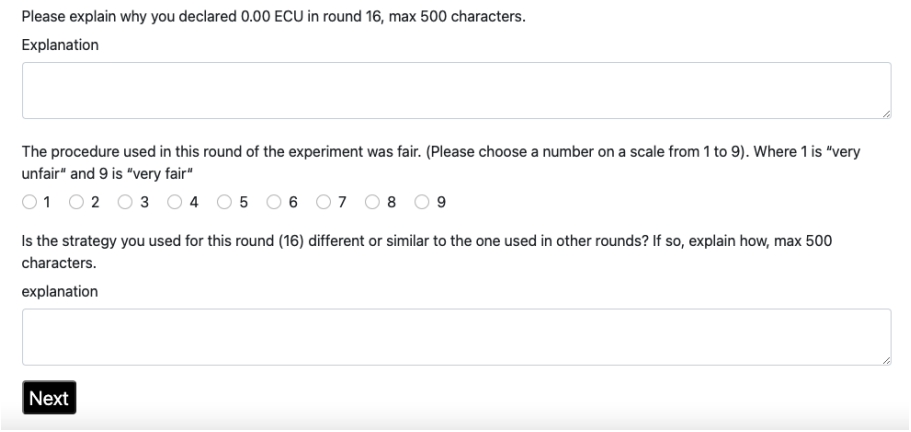
Taxes paid on declared income	- 0
Additional **tax** and **fine** due to underreporting	- 10700
Additional **tax** and **fine** due to overestimation	- 1070.0

End of round income = gross-income -(additional) taxes & fines	**9630.00 ECU**

Please explain why you declared 0.00 ECU in round 16, max 500 characters.

Explanation

FIGURE C.13: Retrieval of round



Please explain why you declared 0.00 ECU in round 16, max 500 characters.

Explanation

The procedure used in this round of the experiment was fair. (Please choose a number on a scale from 1 to 9). Where 1 is "very unfair" and 9 is "very fair"

○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ 6 ○ 7 ○ 8 ○ 9

Is the strategy you used for this round (16) different or similar to the one used in other rounds? If so, explain how, max 500 characters.

explanation

Next

FIGURE C.14: Questions on strategy

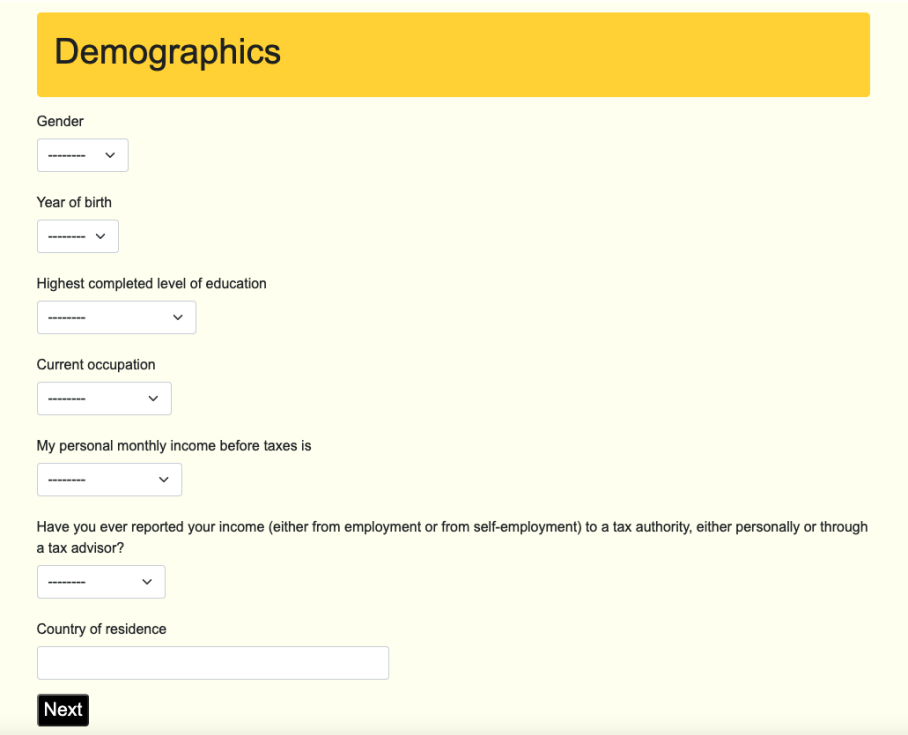


FIGURE C.15: Demographics

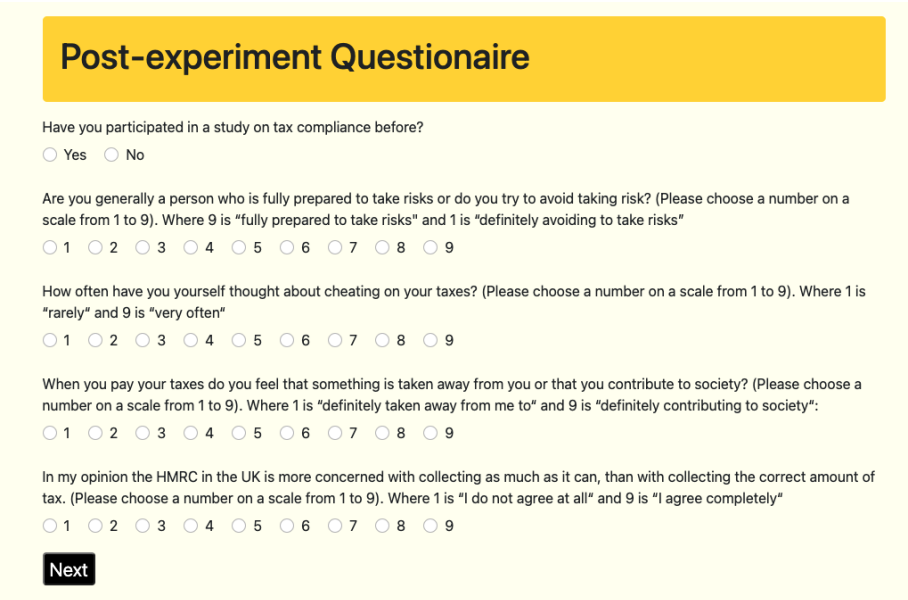


FIGURE C.16: Demographics

-Are you generally a person who is fully prepared to take risks or do you try to avoid taking risk? (Please choose a number on a scale from 1 to 9). Where 9 is “fully prepared to take risks" and 1 is “definitely avoiding to take risks”
-How often have you yourself thought about cheating on your taxes? (Please choose a number on a scale from 1 to 9). Where 1 is “rarely“ and 9 is “very often“
-When you pay your taxes do you feel that something is taken away from you or that you contribute to society? (Please choose a number on a scale from 1 to 9). Where 1 is “definitely taken away from me to“ and 9 is “definitely contributing to society“:
-In my opinion the HMRC in the UK is more concerned with collecting as much as it can, than with collecting the correct amount of tax. (Please choose a number on a scale from 1 to 9). Where 1 is “I do not agree at all“ and 9 is “I agree completely“

-To what extent do you agree or disagree with the following statements on a scale from:(1) I do not agree at all - (9) I agree completely
-The procedure used in this tax experiment was fair:
-The audit outcomes of my tax declarations were appropriate:
-In my opinion the virtual tax authority of this study is trustworthy:
-What was your main objective while participating? [Dropdown: Being honest, Avoiding fines, -Compensating for earlier rounds, Revenge, Contributing to the collective, Other]
-‘Cheating on taxes if you have a chance is always justified:
-If you have anything else you want to let us know please fill in here (max 300 words?)

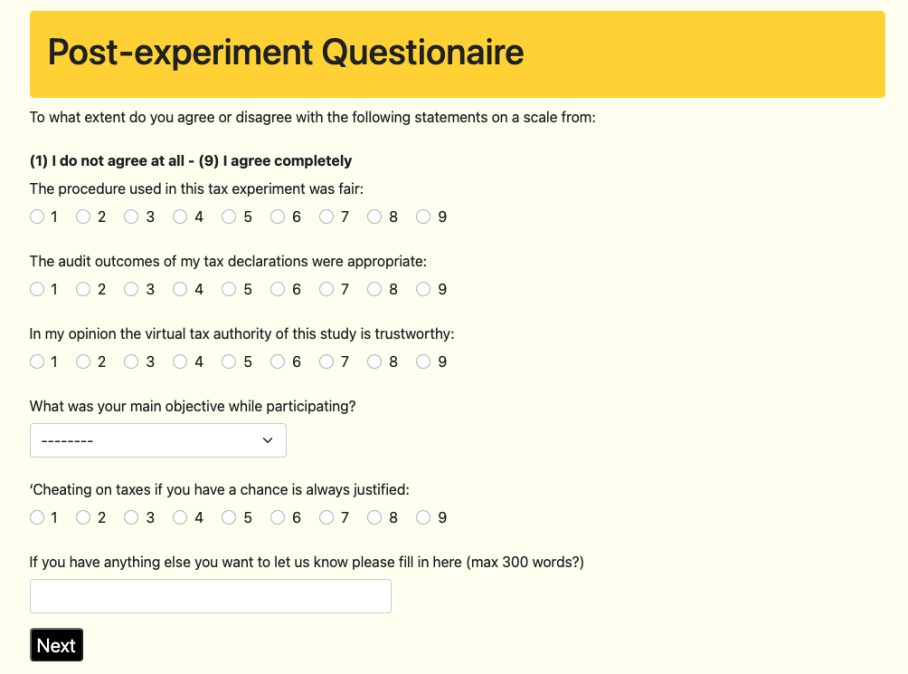


FIGURE C.17: Demographics

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Curriculum Vitae

Lucia Rossel was born in La Paz (Bolivia) in 1991. She graduated summa cum laude from Universidad del Desarrollo (Chile) with a Bachelor in Political Science and Public Policy. Following her bachelor she obtained the Holland Scholarship in order to follow an MSc in Economics of Public Policy and Management at Utrecht University School of Economics (U.S.E.). After graduating from the program in 2016, Lucia became a PhD Candidate at U.S.E. During her PhD, she was a visiting researcher at the Economic Pscyhology group at the University of Vienna and the INEQ institute at the Wirschaftsuniversität Wien (Austria). Lucia has presented her research at various international conferences,seminars, and institutions including the European Parliament during the TAX3 public hearings. As part of her appointment at U.S.E., Lucia taught the course Policy Competition in the International World (graduate level) and supervised a total of 17 theses in Economics (graduate and undergraduate level).

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