



## **Behavioural Economics and Tax Compliance**

The role of identifiability, geographical distance and social norms  
on tax compliance: an experimental study

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**Dissertation Proposal**

**Master in Economics**

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**September 2014**

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## **Acknowledgements**

I would like to start by expressing my deepest appreciation to my supervisors Dr. Carlos Mauro, Dr. Teresa Proença and to Dr. Eva Oliveira for the guidance and precious advices.

I would also like to especially thank Tiago Paiva, researcher on BeoLab, for all the help and support. Without his guidance and persistence this dissertation would not have been possible.

This master dissertation could not have been completed without significant support from the Beolab at the Faculty of Economy and Management, Catholic University of Porto.

I would also like to take the time out to thank God, my family and friends who provided me with kind words of encouragement throughout these two years.

Finally, I would like to express my appreciation to the participants that filled out my survey which was crucial to my dissertation. I could not have completed this dissertation without all of their valuable contributions.

## **Abstract**

The role of behavioural and psychological aspects in compliance behaviour is currently one of the greatest areas of tax compliance research, and, although several accomplishments have been achieved, there is still countless room for development.

This dissertation aims to be an empirical contribution for the development of the behavioural determinants of tax compliance. For that purpose, we use an economic experiment, simulating the process of individual declaration of income, to investigate compliance behaviour under the influence of three factors. identifiability, geographical distance and social norms.

One of the main goals of this dissertation was to develop an experiment that allowed the analysis of how the identifiability of taxes' causes (public good receiving the collected taxes) would influence the tax compliance behaviour, in other words, we aimed at understand if the presentation of a more specific, vivid and salient information about the finality of tax collection to the taxpayers, influences their compliance decision.

This experiment was conducted with 286 Portuguese volunteer participants. The results achieved provided support for some of the conclusions of previous studies and theories. The levels of compliance verified were, on average, considerably high, result in line with the fact, already pointed by several researchers, that effective levels of compliance are much higher than what standard economic theory of compliance predicts.

Another relevant result from this experiment was the significant relation registered between income level and compliance behaviour, suggesting that tax compliance decreases as income increases, this result is in line with the predictions of Allingham and Sandmo's (1972) model.

**Key-words:** Behavioral economics, tax evasion, bounded rationality, Identifiable victim effect, geographical distance, social norms.

**JEL Classifications:** H2, H26, D03, C9

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## Introduction

The provision of public infrastructures and services play a crucial role in the development and growth of economies. The tax revenue is the way by which countries guarantee this provision, and that is the reason why it is so important to ensure that tax collection works in the most efficient way (Fuest and Riedel, 2009).

Between the biggest limitations of tax collection there is one in particular that has been raising a lot of concerns among governments all over the world, which is *tax evasion* (Alm et al., 1992). Finding patterns of tax evasion behaviour and ways to reduce it, is one of the main goals of governments' agenda nowadays, in order to achieve higher levels of compliance.

The statistics have justified the concerns related to tax evasion. In 2010, estimated tax evasion represented approximately 5.1% of world Gross Domestic Product (GDP), exceeding 3.1 trillion dollars. Results from Portugal, proved that tax evasion is a problem worth of serious concerning from the government and tax authorities, representing an average of 2% of GDP in the period 1999-2010. (Schneider and Buehn, 2012).

The economic context of crisis that Portugal has been living in recent years can be an additional motive of distress to the national levels of compliance. The tax burden in Portugal registered, in 2013, a substantial increase of 8,1% due to the political measures of austerity imposed by the economic and political context, reaching to an overall tax burden of 34,9% of GDP. This fact brings greater concerns to the national fiscal system, as a higher tax burden can foster tax evasion behaviour. This is supported by existent literature that showed that an increasing in tax rates can result in higher levels of tax evasion (Veiga, 2013; Alm et al., 1992).

The role of behavioural and psychological aspects in compliance behaviour is currently one of the greatest areas of compliance research, and although several have been achieved, both theoretically and empirically, there is still countless room for development.

This dissertation pretends to be an empirical contribution for that development. For that purpose, we use an economic experiment, based on a public goods game design, to investigate compliance behaviour in Portugal under the influence of three factors: *identifiability*, *geographical distance* and *social norms*.

We investigate in this work, the presence of the identifiable victim effect (IVE) on decision making process of compliance. The goal of this approach, was to understand if the display of the information to the taxpayers about identifiable causes of tax collection (in our experiment we introduce this variable by specifying a hospital receiving the amount of tax revenues), would have a significant influence on compliance behaviour relative to non-identifiable causes.

With the introduction of geographical variance of cities receiving the revenues resulting from tax collection, we pretend to understand if a higher psychological distance, between taxpayers and the cause of tax collection, which is sustained, in this study, by a geographical variance, can influence positively tax evasion decisions.

The analysis of the impact of normative context in tax compliance decision making process was also aim of our study. The purpose was to verify if, as expected by the existent literature, the norm has a significant influence in taxpayers' decisions.

This work intends to be a contribution to the literature of compliance behaviour, through an empirical approach based on Portuguese context, which, to our knowledge, has not yet been object of such a study. Therefore, we believe that the lines of this work can be useful and bring valuable insights that can help tax authorities developing efficient actions in order to enhance higher levels of compliance and avoid evasion.

The present work is divided in two main parts.

Part I presents the literature review about the theories of compliance decision making, tax evasion context and concepts and the main theories and determinants of tax evasion. Then we present, behavioural economics approach of individual decision making process, mentioning the work of Kahneman (1979) in the

development of the prospect theory and the dual process mode of decision making - System 1 and System 2 in order to conclude about the influence of those different systems in the compliance behaviour. In this same section, we present the Identifiable Victim Effect (IVE) with the goal to understand its influence in the individual income declaration; some studied causes of this effect were also described in more detail, due to their pertinence in the thematic of tax evasion and in our experiment – psychological distance and social norms.

In Part II we presented the experimental design, beginning with the description of the main goals and hypothesis and continuing with the methodology, sample and procedures used in the experiment. Still in part II is made the description of the results of the study. Finally are presented the conclusions of this research, stating as well its limitations and insights for future investigations.

## **Part I - Literature Review**

### **1. Tax compliance and tax evasion**

The provision of public infrastructures and services play a crucial role in the development and growth of economies. The tax revenue is the way by which countries guarantee this provision, and that is the reason why it is so important to ensure that the tax collection works in the most efficient way (Fuest and Riedel, 2009).

Between the biggest limitations of tax collection there is one in particular that have raised a lot of concerns among governments all over the world, which is the *tax evasion* (Andreoni, Erard and Feinstein, 1998). Finding patterns of tax evasion behaviour and ways to reduce it is one of the main goals of governments, in order to achieve higher levels of compliance.

Tax compliance is of great importance not only to guarantee provision of public goods and services, and economic growth, but it is also a crucial factor to assure equity and efficiency. The increasing economic globalization of the last decades, with free mobilization of capital and assets allowed companies to easily relocate to places with more advantaged fiscal conditions. This has created a larger international fiscal competition between countries, in order to attract the most powerful multinational companies (Needham, 2013; Veiga, 2013).

On the other side, the competition between companies has also increased exponentially, and so, the search for strategies to overcome fiscal obligations is now even more crucial between management decisions. All these aspects combined result in states losing part of the tax revenue due to tax planning and tax evasion from the big companies. Consequently, less informed and most vulnerable taxpayers end up to have increased taxation, and by so, the fiscal justice and equity are compromised (Veiga, 2013).

The evident importance and complexity of this theme have justified an incremental blossomed of literature pursuing a more complete theory of tax

compliance that could better explain taxpayer's decision-making process and, by so, help tax authorities and policy makers to develop more efficient methods to avoid evasion and promote compliance (Hashimzade et al., 2013).

The statistics have justified the concerns related to tax evasion. In 2010, estimated tax evasion represented approximately 5.1% of world Gross Domestic Product (GDP), exceeding 3.1 trillion dollars. In a study conducted by Schneider and Buehn (2012) where they developed a time series analysis of tax evasion in % of GDP, the results founded indicated an average size of tax evasion of 3,2% of GDP in 38 countries of OECD, over the period of 1999-2010. In the same study, results achieved for Portugal proved that tax evasion is a significant problem there as well, representing an average of 2% of GDP in the period 1999-2010 (Schneider and Buehn, 2012).

Richard Murphy in one of his works calculated that tax losses in Portugal, in 2010, were over 12, 3 billion dollars, representing 7, 1 % of GDP (about 23% of total tax revenues), equivalent to 63,1 % of the government healthcare spending (Murphy, 2012). These numbers, although lower than the average of the Europe countries, are still a reason for serious concerns from the Portuguese government.

In this same study, Murphy (2012) concluded that tax evasion costs to the States of European Union are about 1 billion euros every year.

The tax burden in Portugal registered, in 2013, a substantial increase of 8,1%, mostly due to the recent political measures of high austerity implied by the economic context of crisis, reaching to an overall tax burden of 34,9% of GDP. This fact brings greater concerns to the national fiscal system as it can foster tax evasion, according to existent literature increasing tax rates can result in higher levels of tax evasion (Veiga, 2013). This relation between compliance behaviour and tax rates is supported also by Alm et al. (1992), who, using data from laboratory experiments, concluded that tax compliance increases with decreasing tax rates.

One indicator usually used in estimations of tax evasion is the size of the shadow economy. The shadow economy is composed by activities which by their

illegal character, are hidden from the legal fiscal obligations, and also by activities that, although legal, do not report their income to the tax authorities. Several works suggested the existence of a positive correlation between tax evasion and the size of the shadow economy, and, by so, the importance of measuring the size of shadow economy as an indicator of the tax evasion level (e.g., Alm et al., 2004; Schneider and Klinglmair, 2004; Schneider and Enste, 2000). The current context of crises in the financial system and in the world's economy creates an additional stimulus to tax evasion by fostering shadow economy.

In Portugal, available estimates from 2003 to 2012, suggest an average size of the shadow economy of 20.04 % of the GDP (Schneider, 2013). Given its role as a developer of tax evasion, these numbers show that shadow economy, and consequently tax evasion, are a significant problem for public finances in Portugal.

Primarily, it is important to clarify the terminology and concepts here in discussion. According to the theory of rational choice, taxpayers' goal is to maximize their profits, minimizing their fiscal costs. There are different ways to achieve that goal. Individuals can follow a legal path, known as *tax planning* or *tax flight*. These activities consist in choosing, accordingly to the law, the best option in terms of taxation, as, for instance, the relocation of businesses to tax havens. On the other side, there is *tax evasion*, which consists in the illegal avoidance of fiscal obligations, usually related with voluntary actions, for instance by underreporting income or stating higher deduction-rates; finally there is *tax avoidance*, which refers to the use of legal means to reduce the tax burden, by taking advantage of tax-loopholes (Kirchler et al., 2003; Kirchler et al., 2007 ).

In this work we are going to address the problem of tax evasion in particular in what concerns to individual compliance decision-making. The tax compliance behaviour of businesses, which are also of great relevance to this thematic, is out of the scope of this work.

One of the most known indicators of evasion is the *tax gap* which can be defined as the difference between the effective income taxes that families owe and

what they actually pay voluntarily and in time (Andreoni et al., 1998; Franzoni, 1999).

Most of individual evasion's activities are related with one of these situations: taxpayers are not registered in tax system; registered taxpayers do not declare; registered taxpayers, involuntarily, do not report their income correctly; taxpayers do not report part of their income, voluntarily (Ministry of Finance, 2011).

Undoubtedly, the type of evasion that rises more concerns is the one related with voluntary conduct, since the involuntarily form of tax evasion can be prevented by policy makers through the simplification of the procedures required to comply (Kirchler, 2007; Ministry of Finance, 2011).

Tax evasion activities are included in the voluntarily type of evasion, since they are usually related with an intentional behaviour from taxpayer.

The activities related with compliance imply a certain set of knowledge from taxpayers, both on fiscal obligations applied and their correct calculation, and on the procedures necessary to fulfil those obligations (Lopes and Santos, 2013). Therefore it is important to guarantee a simplified fiscal system, in order to promote equity between taxpayers, since less informed taxpayers can be overwhelmed by a complex tax system.

Compliance behaviour, contrary to evasion, corresponds to situations where taxpayers report their income, consumption and wealthy, accurately and in time, i.e., when they fully comply with fiscal obligations to them applied by fiscal law.

## **1.1 Tax Evasion theories**

The bases of economic theory of tax compliance consist mainly in preventing tax evasion through the control of detection levels, tax rates and penalty rates, i.e., through the control of deterrence and economic determinants, as it is shown by the classic model of tax compliance of Allingham and Sandmo (1972). In this model tax evasion is a problem of choice under uncertainty, in which the taxpayer, pursuing

expected utility maximization, has to choose between a safe asset - tax compliance -, and a risky asset - tax evasion. Allingham and Sandmo's (1972) model predicts that an increase in probability of detection and penalty rates leads to higher levels of reported income. Several works were conducted developing extensions of this seminal model. In one of these works, Alm et al. (1992) showed that lower tax fees and higher overall income also lead to higher levels of reported income.

Despite the great contribution to the development of compliance literature, Allingham and Sandmo's (1972) model was object of several critics, since it cannot explain the effective levels of evasion. According to its conclusions, taxpayers choose the amount of income to report in order to maximize their expected utility, however that does not explain why some individuals pay all of their taxes regardless the level of enforcement existent. Furthermore, even with low levels of deterrence some individuals report the totality of their income, contradicting the Allingham and Sandmo's predictions. If taxpayers behaved as the standard model predicts, with the assumption of economic rational behaviour, levels of tax evasion should be much higher than what the effective numbers show, since levels of enforcement worldwide are not high enough to justify the high levels of compliance. (Coricelli et al., 2003).

Taxpayers' decisions about whether to evade or not take place in a complex economic environment; so, it is unlikely, that a simple solution of tax police can address this issue in an effective manner. Several scholars agree that tax evasion cannot be fully explained by financial determinants and economic incentives (see e.g., Graetz and Wilde, 1985; Siqueira and Ramos (2005); Alm et al. 1992; Frey and Feld, 2002). So, a different approach has gained ground in the literature, based mostly on the study of the behavioural aspects related with compliance decision-making process (see e.g. Scholz and Pinney, 1995; Alm et al., 1992;; Pommerehne et al., 1994; Alm et al., 1999; Frey and Torgler, 2007)

Some empirical studies have focused on the development of a more complete model, grounded, on the basis of the classic model of compliance but also including new findings on psychological and social factors, which have been proven to play an important role in taxpayers' decisions (see e.g. Alm et al., 1992; Méder et al., 2012).

Therefore, the main goal of researchers is to identify and explain the determinants of tax evasion, including, the ones which go behind the scope of economic extension.

Hence, behavioural aspects that influence the tax compliance decision-making process have received an increasing attention from researchers in recent years (see e.g. Scholz and Pinney, 1995; Alm et al., 1992;; Pommerehne et al., 1994; Alm et al., 1999; Frey and Torgler, 2007). However, there is still a lot to explore in order to develop a model that can fully explain tax evasion behaviour. This work aims to contribute to this development by creating empirical evidence of behavioural variables on tax compliance.

## **1.2 Determinants of tax evasion**

Tax evasion behaviour is a complex phenomenon involving both, economic determinants, contextual factors, psychological biases and, motivations such as monetary incentives and moral constraints (Alm, Jackson and McKee, 1992).

For simplicity purposes, we divided the determinants in two different categories: the economic determinants, variables related with standard economic models of tax compliance; and the non-economic determinants, which include contextual specificity of income declaration, individual differences and group-related behaviour (Franzoni, 1999).

### ***Economic determinants***

As stated before in this work – section 1 - economic determinants are in the basis of classic models of tax compliance, and a lot was achieved in this area. Some results are consistent between authors and studies. However there are determinants which had led to inconclusive results.

An economic indicator that is instantly associated with tax evasion is the tax rate in law. Some studies of empirical analysis show that higher tax rates lead to lower levels of compliance, which means that a higher tax burden results in an

increase in levels of tax evasion (Clotfelter, 1983; Poterba, 1987; Crane and Nourzard, 1987). This is one of the points where the standard model of compliance of Allingham and Sandmo (1972) has received some critics, since its predictions are not clear about the influence of tax rates in tax evasion<sup>1</sup>.

Another area that deserved the attention of researchers was the analysis of the relation between compliance levels and the level of enforcement actions, which compose the most typical weapon of tax authorities against tax evasion. The majority of those works produced evidence that higher levels of enforcement can foster tax compliance behaviour, since they make tax evasion a riskier option to taxpayers. The variables that are often used in enforcement actions are the probability of audit, the penalty rates and tax fees (Franzoni, 1999).

Other result from the study of economic determinants of compliance is the existence of a positive relation between the probability of a taxpayer being selected for an audit and tax compliance, i.e., a higher probability of audit leads to higher levels of reported income and consequently low levels of evasion. Alm et al. (1992), showed that even a low probability of audit foster compliance, since some individuals are oversensitive and overweight the probability of audit. As seen previous in this work, this result is in accordance with the predictions of Allingham and Sandmo's (1972) model of compliance.

The penalty rates and tax fees applied by tax authorities as a measure of enforcement are another important economic determinant of tax evasion behaviour. Proving the predictions of Allingham and Sandmo's model on this matter, empirical evidence shows that higher penalty rates lead to higher levels of compliance (e. g. Alm et al., 1992; Allingham and Sandmo, 1972).

Another aspect that raised interest among tax compliance's researchers was to understand how the level of tax evasion varies by income level. Christian (1994)

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<sup>1</sup> Allingham and Sandmo's (1972) model proposes that tax rates changes can create two different effects: the *substitution effect*, in which increasing tax rates foster compliance and the *income effect* in which higher tax rates encourages evasion.

reported, based on 1988 Taxpayer Compliance Measurement Program (TCMP)<sup>2</sup>, that lower-income individuals evade more than higher-income individuals, in proportion of their effective income. Alm et al. (1992) also stated that a higher overall income leads to higher levels of reported income. However, there are works that demonstrate a different relation between these two variables, showing that high-income individuals show also the highest levels of unreported income.

Allingham and Sandmo's (1972) model concluded that taxpayers with higher income will increase the percentage of income hidden from tax authorities, since their disposition to hold risky assets increases as income increases. In spite of all the empirical evidence that sustains the importance of economic enforcement determinants to control tax evasion and encourage compliance, a significant part of tax compliance behaviour cannot be explained by these determinants, for instance, the high levels of tax compliance, unpredicted by the classical economic models of tax evasion (Casey and Scholz, 1991).

### *Non-economic determinants*

As stated before the standard models of tax compliance are not capable of explaining the effective levels of tax compliance (Casey and Scholz, 1991; Alm et al., 1992). Compliance is in reality much higher than the predictions made by the traditional theory of compliance. And this is where the psychological determinants take place, as they can help in the explanation of this discrepancy between theory and reality.

There are several studies proving that individual's tax evasion behaviour is affected by social norms and interactions. Erard and Feinstein (1994) stated that sentiments of shame and guilt can play an important role in tax compliance behaviour, since they can reduce the perception of the benefits of evasion and, by so, influence taxpayers' decisions towards more compliance. The perception of the

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<sup>2</sup> Taxpayer Compliance Measurement Program TCMP of the Internal Revenue Service (IRS) is one of the most reliable sources of tax evasion data, and it is a program of intensive audits conducted on random samples (Andreoni et al., 1998)

fairness of the tax burden can also be of significant importance. Spicer and Becker (1980) proved that if taxpayers believe that the tax system is unfair, they are more likely to evade, in order to restore equity.

Individuals have an intrinsic motivation to obey the normative status of tax compliance (Posner, 2000; Traxler, 2010; Halla, 2010). This concept is known as *tax morale* and can help to explain why tax evasion deterrence based on the economic determinants cannot explain effective high levels of compliance.

Stemming from the substantial difference between individual behavior (actual compliance) and an attitude (captured by survey data on tax morale), Halla (2010) explored the causal link between tax morale and compliance behavior by analyzing the relation between tax morale (measured by specific questions of the European and World Values Surveys - WVS) and estimates of Underground Production, assumed as form of non-compliance behavior. They found a weak correlation between both. However there were studies with different conclusions. Torgler and Schneider (2009) found a significant correlation between tax morale and the size of shadow economy based on data from more than fifty countries. Their results propose that tax morale plays an important role in determining the size of shadow economy, i.e., higher tax morale leads to a smaller shadow economy.

### **1.3 Operationalization of tax evasion**

Tax evasion is a complex issue and its investigation requires the use of a variety of methods and data sources.

One of the main problems of tax evasion relates to its measuring. First, data from individual level of tax evasion are not observable, and second, the most accurate source of information on individual compliance is based on direct measurement of evasion through actual audits of individual income, however this approach has several limitations. Namely, sample limitations since it covers an insignificant part of the overall population. Ideally, the best way to measure tax evasion would be to directly ask individuals how much of the earned income have

they reported. However this is a utopic approach, since an individual evading tax payment, will most likely lie about that when asked in a survey or other self-reported measure of tax evasion (Alm, 2012).

Andreoni et al. (1998) summarized the main approaches of measuring tax evasion. First the audit data, resulting from the actions of tax authorities; survey data; tax amnesty data; measurements of discrepancies found in economic statistics, like the tax gap, and finally data generated through laboratory experiments.

Given all the limitations associated with measuring and collecting accurate data on tax evasion, researchers started to develop ways to operationalize tax evasion as a global game in a laboratorial setting, where the expected determinants of actual behaviour could be manipulated and the actual performance of individuals measured (Sánchez-Villalba, 2010). In these experiments participants engage in tax-reporting situations in a controlled environment, where tax parameters and behavioural factors are manipulated in order to assess their influence in compliance decision.

Though limited, this approach provides a global standard and basic model for the analysis of evasion (Baldry, 1986). The main limitation of experimental approaches is the artificiality of the laboratory environment that makes difficult to transpose the results to the real world (Spicer and Hero, 1985). On the other hand, this same characteristic, that is reason of some limitations, is one of the advantages of this approach, since it provides more control than other methods. That is why researchers have been making use of it to study compliance and tax evasion (see e.g. Friedland et al., 1978; Spicer and Becker, 1980). The approach that we propose for this work consists in an experiment in which the participants are placed in a position of choosing whether to evade or to comply.

Therefore the main challenge for research in tax evasion is the definition of the set of variables that guide taxpayers' behaviour, in other words, the definition of the determinants of tax evasion. And this is one of the areas where the behavioural economic approach has been producing several developments. (Alm et al. 1992; Kirchler et al., 2007; Fortin et al. 2007 )

## **2. Behavioural economics and decision-making**

The traditional economic theory that tries to explain human behavior is based on the assumption of unbounded rationality, outcome oriented decision making, selfishness, self-control, and the expected utility maximization (Thaler and Mullainathan, 2000; Hashimzade et al., 2013). Yet the evidence shows that individuals often make decisions economically suboptimal (see e.g., Kahneman, 2011) and are influenced by external factors (Tversky and Kahneman, 1981; Kirchler et al., 2007). Therefore the models of heuristic judgment have gained increasing importance in recent literature (see e.g. Coricelli et al. 2007; Casey and Scholz, 1991). These models claim that decision-making is influenced by several relevant elements which are ignored by traditional economic models, such as individuals' perceptions of the social environment and the tax justice (Méder et al., 2012), individuals' cognitive limitations and sentiments (Coricelli et al. 2007) or framing related effects (Tversky and Kahneman, 1981)

Since the seminal work of Kahneman and Tversky (1979) many studies have been carried out in the field of behavioral economics producing evidence of the existence of a discrepancy between individuals' effective decisions and decisions provided by the rational choice theory, trying to explain, at the same time, those situations in light of individuals' bounded rationality (see e.g. Coricelli et al. 2007; Kirchler et al., 2007 ). The fact that individuals have cognitive limitations leads them to often base their decisions in cognitive biases instead on the rational choice theory.

The model of heuristic judgment developed by Tversky and Kahneman (1974), from the work of the pioneer Herbert Simon (1955), takes in account these cognitive biases. It states that many of the decisions are taken using cognitive shortcuts - heuristics - which speed up and simplify the process of problem solving, despite not providing an optimal result. It can be said that the demand for the typical maximization of standard models is replaced by the search for a satisfactory result.

Several works have been developed in the study of heuristics, including in its formalization, and soon emerged results that put this theory of decision making alongside the models of rational cognition (Gigerenzer and Gaissmaier, 2011).

Tversky and Kahneman (1974), present different types of heuristics and refer that these simplified rules, often lead individuals to commit errors of judgment due to the existence of cognitive biases, that involuntarily, cause a deviation in judgment from the rational decision making.

The existence of cognitive short-cuts can be related with the way by which individuals process the information in a decision-making process. Accordingly to Kahneman's work, there are two modes of reasoning that are present in the process of individual making decisions. We are going to present now this two modes of thinking introduced by Kahneman (2011) and sustained by several other works.

### **2.1 Dual process thinking: system 1 and system 2**

One of the main themes in *Thinking, Fast and Slow*, work in which Kahneman (2011) gathers his main researches, is the dual process theory, in which he distinguishes two systems that operate in the process of making decisions.

Kahneman characterized System 1 (S1) as operating automatically, taking intuitive and often involuntary decisions based on the knowledge "stored in memory and accessed without intention and without effort" (Kahneman, 2011). Often this system works efficiently; however, due to the use of heuristics, it has some systematic biases, particularly when it addresses easier questions than the original ones.

On the other hand, System 2 (S2) operates deliberately, addressing complex situations, taking in account alternative interpretations and gathering information until get to the conclusions. S2 can control S1 and avoid some of the biases. Despite that, according to Kahneman (2011), S2 requires self-control and effort which is unpleasant, making this system lazy and often obeying to the law of least effort, failing to intervene when would be beneficial as is the case of S1 biases.

Kahneman was not the only one presenting the existence of two systems of thinking. Several studies analyzed the cognitive processes and proved the

coexistence of these two types of reasoning: the ones that are automatic and effortless and the ones that are slow, controlled and effortful. They are defined in different ways according to the authors: implicit/explicit (Evans, 2003), unconscious/conscious or Type 1/Type 2 (Evans, 2008). In this study we are going to use Kahneman's terminology of S1 and S2 to designate the two modes of thinking and reasoning.

The existence of heuristics that are proved to be part of the decision-making process, and which are associated with the use of S1, are one of the reasons that make the standard economic theories incapable of explaining several situations, and can also be an explanation in failures of standard economic theory of compliance behavior.

Tax evasion decisions are also influenced by the existence of heuristics associated with the use of S1, such as the perception of the fairness of the fiscal system, the perception of the levels of evasion of others (social norms) or the perception of the audit probability. Variables like these influence taxpayers decision in an automatic and involuntary way deviating it from the consideration of the rational economic benefits and costs of compliance.

Spicer and Hero (1985) conducted one experiment that analysed the presence of some heuristics in tax compliance decision making process. They were able to conclude that taxpayers who have been audited perceived the audit probability as higher and so, their level of evasion decrease.

## **2.2 Expected utility theory and Prospect Theory**

One of the failures of standard economic theories that have been studied is its reliance on expected utility theory. The theory of expected utility states that the decision' makers based their decisions on the expected utility of each uncertain prospect, i.e., they compare the expected utility values of each choice by summing the utility of every possible outcome weighted by their respective probabilities (Mongin, 1997)

As we referred previous in this work, there are several circumstances in which the standard economic theory of rational choice fails and the axioms of expected utility theory are not verified (Hashimzade et al., 2013). Loss aversion is one of those cases, since it consists in individuals' preference to avoiding losses rather than obtaining gains, even if they have the same expected utility value, which means that the expected utility theory is violated. This concept was demonstrated by Kahneman et al. (1990) in order to explain the fact that people attribute higher value to a good that they own than a similar good that they do not own<sup>3</sup>. Kahneman and Tversky (1979) address this other failures of expected utility theory and developed the prospect theory as its substitute.

The prospect theory, by combining the existence of heuristics and biases with the standard optimization approach, is a more complete model which can, thus, accomplish better results for the understanding of the effective process of decision making (Kahneman and Tversky, 1979).

### **3. Identifiable Victim Effect**

The literature has been showing increasingly evidence of the existence of cognitive biases in the decision-making process, which proved already the importance of behavioral and psychological aspects on individuals' decisions contemplating for that tax compliance decision. As previously seen in chapter 2 several recent works have been developed in the field of compliance theory in order to determine these cognitive biases and include them in the utility function of the models of compliance behavior.

In this work one of the our aims of study is one specific cognitive bias that recent literature has been developing mostly in the scope of explaining the behavior related with donations, which is the Identifiable Victim Effect (IVE). Despite recent developments, this theme has not yet been explored deeply enough which justified, in part, this work. However the main motivation of our focus in the IVE is our

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<sup>3</sup> Endowment Effect (see Kahneman et al., 1990)

believe that this effect can play an important role, outside the boundaries of donation subject, in the understanding of taxpayers' behaviour, by bringing insights to the development of some of the failures of the standard economic theory of individual decision making.

Schelling was the first to identify this effect in his work about the worth of preventing human death (Schelling, 1968). He noted the distinction between individual lives and statistical lives and instilled the first concerns about the differences in reactions toward identified and non-identified victims. Since the work of Schelling many studies have been conducted regarding the IVE and its specificities, mostly of them following Schelling's scope, that is why in this chapter we will be addressing the theme using his terms, "identifiable victim", "unidentifiable victim" and "donor".

The IVE could be described as the discrepancy between the bigger efforts made by people to save an identified victim than to save unidentified or abstract victims (Jenni and Loewenstein, 1997). When a victim (person in need) is identified by name, age, picture or any other specific information the empathy triggered on donors (person who helps) increases compared to the cases where the target of the donations are unidentified victims (also called statistical victims) (Ein-Gar and Levontin, 2012).

The IVE by its definition clearly violates the expected utility theory, since it proves that there are situations in which the lives in the same situations are valued in a different way simply for their characteristics of identifiability, being, accordingly to this effect, given higher value to save an identifiable life than saving an non-identifiable life in the exactly same situation. This can even go further, as Slovic (2007) demonstrates in one of his works: a single identifiable life can be valued higher than 10 lives in the same situation of need but with no identifiability. Accordingly to the expected utility theory the value of ten lives is equal to ten times the value of one single life. Therefore, the study of IVE could help understand some of the situations in which standard assumptions of traditional economic theory are disobeyed, which is also the case of the standard theory of tax compliance.

The IVE brings with it the importance of the definition of the concept of *identifiability*. There are several different aspects that can be responsible for the identification of the victim. The most common are the personal characteristics where are included aspects like the name, age, gender, profession, nationality, picture, etc. One question that emerged in the study of IVE was the possibility that this specific characteristics, used to identified the victim, were the reason for the differences in responses from the donors rather than the identifiability of the victim *per se*. Small and Lowenstein (2003) answered this question and proved that even if no information about the victims is given, determined victims will still evoke greater donations than undetermined victims. The example used in their work was a donation to a family in need in which the identifiable hypothesis was helping the “family x” and the non-identifiable hypothesis to help one of the families in need. They proved that the simple pre determination of the victim - “family x” -, without any other information presented is enough to trigger a stronger reaction on the donor, resulting in higher donations, than in cases when the victims are not determined previously.

Despite being a violation of a standard economic theory, several studies produced robust evidence of the existence of the identifiable victim effect and reached some interesting conclusions. The general conclusions of these studies is that information about the victim invokes empathy on donors and, by so, leads to a higher response to saving the victim (see e.g. Ein-Gar and Levontin, 2012; Small and Lowenstein, 2003), furthermore it was demonstrated that this effect is stronger when the identifiable victim is a single individual (Slovic, 2007).

After the clear evidence of IVE existence, researchers started to focus on the manipulation of different variables in order to better understand and explain this effect.

One interesting result was achieved by Small et al. (2007), shows that teaching people to recognize the effect originates less donations to identifiable victims but, unexpectedly, do not increase the donations toward statistical victims, so, it appears, in this case, that a more deliberately (S2) way of thinking results in an overall reduction on donations.

Small and Loewenstein (2005) showed that the identifiability effect is also verified in cases of punitiveness rather than donation. They called it the “*equivalent effect for punitiveness*” and can be defined as the fact that “people are more punitive toward identified wrongdoers than toward equivalent, but unidentified, wrongdoers” (Small and Loewenstein, 2005).

Hence, the IVE can be seen as a special case of a more general phenomenon pointed for Small and Loewenstein (2005) as the identifiable other effect – the tendency to an identifiable target evoke a stronger emotional reaction than a non-identifiable one.

Small et al. (2007) analyzed the importance of feelings in the IVE. They concluded that if people were induced with feeling-base thinking or with an analytic thinking, before the decision took place, the donations will be bigger in the first case for the identifiable victim and no difference will be shown on statistical victims. This may suggest that the identifiable victim effect occur mainly when decisions are based on intuition (S1) rather than deliberative thinking (S2).

Some other studies have been focusing in possible causes of IVE. Jenni and Loewenstein (1997) discussed four possible causes of this effect; vividness - the IVE results from the existence of situations that are characterized by being concrete and detailed (identifiability) and which are proved to have a greater influence in people’s judgments rather than situations with less vivid information; certainty and uncertainty - identifiable victims are usually associated with certainty of occurrence whereas statistical victims are associated with probabilities; ex-post versus ex-ante evaluation – identifiable victims already exist, so the evaluation is made ex-post whereas statistical victims evaluation is usually made before the event occur; proportion of the reference group that can be saved - an increase in the proportion of the reference group saved increases the motivation to help, i. e. identifiable victims become their own reference group which means that if the victim is saved, 100% of the reference group would be saved.

In their study, Jenni and Loewenstein (1997) concluded that the most significant of the effects they analyzed is the proportion of the reference group saved,

this means that one of the main reasons that make the identifiable victims produce greater empathic response than non-identifiable victims is the fact that in the first case the proportion of the reference group at risk is higher, i.e. the probability of fatality is higher.

This effect has been subject of several studies proving its existence. In recent literature, is also known as the proportion dominance effect (PDE), and can be defined as a greater tendency to help victims when they are part of a small group (saving 20 of 100) than when their reference group is larger (saving 20 of 500) (Finucane, Peters and Slovic, 2002). Individuals choose to save a greater proportion even if that means saving fewer lives (Bartels and Burnett, 2011). This means that an increase in the proportion of the reference group saved increases the motivation to help. This effect implies that the value of a life decreases when the reference group increases, this violates the theory of expected utility- is a cognitive bias associated with the IVE.

Being the IVE evidence of a violation of the expected utility theory, its study is of great relevance in order to bring insights to the understanding of some of the standard economic theory's failures and find possible explanations that can contribute to develop theories of human decision-making, through the identification and understanding of its determinants. The goal is to achieve more accurate and complete models of decision making.

In the specific case here in study, tax evasion, the analyses of IVE and its influence in taxpayer's decisions can be of great interest. The presence of this effect in compliance behaviour would suggest that manipulation of information available to taxpayers about taxes' causes, can play an important role in influencing their level of compliance, and thus, policy makers must be aware of this information in order to find out the better way to use it in favor of compliance.

Hereupon one of our goals in this study is to analyze if IVE is one determinant of taxpayers' behavior in compliance decision.

### 3.1 Psychological distance

The identification of the victim required by the IVE is more likely to happen when there is some level of proximity between donors and victims. A study concluded that the more information donors have about the victims and their environment the more they identify themselves with the victims, which, in turn, has a positive impact on the willingness to aid (Zagefka et al., 2012).

This proximity can be related with different aspects from knowledge or even geography or cultural characteristics (Ein-Gar and Levontin, 2012).

This phenomenon is associated with a concept addressed in several studies, the *psychological distance*. A target/victim/object is distant if it is perceived as different and distant from the state/identity of the decision maker. Psychological distant objects are those that can be constructed or reconstructed but they cannot be experienced directly (Lieberman et al., 2007).

The relation between psychological distance and IVE has been proved by several works. Kogut and Ritov (2007) showed that the IVE is stronger when the donors perceived the victims (or the beneficiaries of the donation, in our case the taxes' beneficiaries) as part of their in-group, this is the same thing of saying that the IVE gets stronger as smaller the psychological distance between the donors and the donation's target gets.

Some studies suggest that psychological distance is one of the causes for the identifiable victim effect, which means, that the preference to donate to a specific person in need, occurs when people feel psychologically close to the donation target (Loewenstein & Small, 2007; Small et al., 2007; Ein-Gar. and Levontin, 2012).

There are different dimensions of psychological distance - time, geographical, social distance, and hypothetical - that affect the way individuals process the information, and by so, their choices and behaviors. However in this experiment the main dimension observed is geographical distance, as the decision's targets change in the region aspect, and by so the distance, i.e., the level of construal varies between

treatments, as one gets closer to an object, the information becomes more accurate and detailed (Lieberman et al., 2007).

Besides the geographical factor there is an important social factor too, that can affect the compliance decision in specific cases, and that is related to the fact that individuals perceive the out-groups using more abstract concepts, they do not identify themselves with them as much, compared with in-groups. For instance, if we are talking about a contribution to a public investment in the south of Portugal the population from north of country will not feel as much empathy with the cause of contribution as if the investment was made in the north or center of Portugal, this fact is due to the existence of a social distance between individuals, related with customs, traditions, or accent of a certain place. A person from Lisbon does not identify himself so easily with someone from Porto then with someone from Lisbon or Leiria.

Hereupon the inclusion of psychological distance as one of the variables in our study is clearly justified. First, its importance as one of the identified causes of IVE and, furthermore, its practical applicability to the tax evasion issue, as the population's perception about taxes' targets can influence their willingness to comply. If a taxpayer perceived that his taxes beneficiates mostly population that is social/geographically distant from him, he will have less incentive to comply.

### **3.3 The role of social norms**

The differences between the observed behaviour of individuals and the one predicted by the standard models of economic are well known. As it was stated before several explanations from psychological, social and behavioural aspects have been suggested for the researchers to justify this discrepancy.

One of the aspects that often come up in the studies of the behavioural and social aspects behind the tax compliance, is the influence of social norms in individuals' decision making process, i. e., in which way the perceptions of the individual about how the others will behave and how others will judge his actions, will shape his own decision (Alm et al., 1999).

Alm et al. (1999) define social norm as “a pattern of behavior that is judged in a similar way by others”. As a result, individual behavior is inclined to follow these social norms, since, if some behavior is social approved then individuals will behave accordingly to it. The same happens if the behavior is social disapproved with individual following the pattern.

The role of the social norms in individuals' behaviour was studied and sustained by the work of several researchers. Gordon (1989) and, Myles and Naylor (1996) present the concept of a ‘psychic payoff’, which they refer as being the value that the individual takes from adhering to the pattern of behaviour of his or her reference group.

Understanding in which way and how significant is the influence of social norms in tax compliance behaviour can play an important role in the development of more efficient policies and procedures of compliance.

## Part II- Experimental Study

### 1. Purpose and hypotheses of the study

Regarding the literature review described above the goal of this study is to use a controlled experiment of tax evasion to test predictions of behavioral economic theory in particular the use of cognitive biases in the decision making process, related with psychological aspects and social norms.

The goal is to achieve results that highlight the importance of considering individual's attitudes and intentions towards tax compliance over and above the traditional economic considerations. We do this by testing the influence of three variables in tax compliance behavior.

First, we have the *identifiability (IVE)*, related with the existence of available, specific and salient, information, about the tax cause, for taxpayers, which we expect to influence positively decision of compliance; in our study this variable is present by the different features of the cause (hospital) receiving the tax collection of the game that simulates the individual declaration of income.

Secondly, the *geographical distance*, variable that intends to capture the influence of geographical distance between taxpayer and tax cause in the decision of income declaration.

Finally we test the influence of the *social norms* in tax compliance decision, i.e. we analyze the influence of distinct social acceptable behaviour - comply or evade – on individual behavior.

According to the studies mentioned in the present work, our prediction is that IVE will influence participants' decisions of compliance. It is expected that participants decide to comply more in the presence of identifiability. Since, like proved for several works in the field, the vividness and salience of the information, associated with the identifiable treatment, foster a more intuitive way of processing the information (S1), rather than a more deliberative reasoning, which in turn is

associated with the rational economic decision (S2) and so, with the assumptions of the classical theory of compliance. We predict that the identifiability will trigger greater empathy on taxpayers, which we believe, will lead, in our experiment, to a better awareness of the importance of the tax revenue collected (Jenni and Loewenstein, 1997). Therefore, the willingness to comply when the cause of the tax revenue is identifiable – Hospital of São Joao in Porto and Hospital of Santa Maria in Lisbon – will be higher than when the object is non- identifiable – any hospital in Porto and Lisbon.

Relatively to the variable of geographical distance our predictions are that the smaller the distance between participants and the cause – geographical distance between participants' residence place and the hospital receiving tax revenues - higher will be the compliance.

Based on the literature previous presented, the normative context will influence compliance behaviour of participants, by promoting it when the norm is too comply (High norm) and diminishing it when the norm known is to evade (Low norm).

Summarizing the foregoing discussion, the main hypotheses to be tested by the experiment were the following:

H1) - participants will, on average, decide to comply more when the object is identifiable.

H2) – participants will, on average, decide to comply more when the object is psychological closer to them.

H3) – the IVE will be more robust when the geographical distance is smaller.

H4) – participants will, on average, comply more in High norm than in Low norm.

H5) – the reaction time of participants will be smaller in the presence of identifiable causes and when the geographical distance is lower.

We present now the method and the experimental design selected to test this hypothesis.

## **2. Methodology – public goods game**

The present work consists in an experimental research design, which involves the manipulation of one variable to determine possible changes in another variable. The main advantage of this method is the greater degree of control and the ability to replicate it. There are several forms to apply this method (see e.g., Hashimzade et al., 2013), the public goods game is one of those and it is the one used on this study.

The Public Goods Game (PGG) represents a scenario where the social dilemma associated with public services provision is presented in a laboratorial setting. In the standard form, the scenario recreates an abstract situation where each participant receives a monetary endowment. The decision task consists in deciding how much to donate to a public budget, that at each round is doubled by the experiment and evenly divided by all the players (Weber et al., 2014). The use of this scenario as a representation of the tax evasion problem is justified since, as the PGG, the tax system represents a social dilemma in which individual interests are in conflict with collective interests.

From a neoclassical economic perspective, the optimal strategy for individuals is not to cooperate, i.e. evade. This results from the fact that this perspective is based on the assumption that individuals are rational and make their decisions in order to maximize their outcome (Kirchler, 2007).

## Experimental design

This study uses a between-subject design, since each participant only participates once, and for a single treatment (Field and Hole, 2003). Participants are allocated randomly to the different treatments<sup>4</sup>.

There are three independent variables in analysis: identifiability (identifiable causes and non-identifiable causes), geographical distance<sup>5</sup> (metropolitan area of Porto and Lisbon) and normative context (social norm to comply and social norm to evade).

The identifiability is manipulated by including identifiable causes of the tax collection of the game, which consists in an specific hospital of Porto (Hospital of Sao Joao) and Lisbon (Hospital of Santa Maria) and non-identifiable causes, which simply referred the city of the cause but no specification of the hospital is available (treatments: an hospital in Porto and hospital in Lisbon).

The geographical distance is included by the fact that hospitals are either from Porto or from Lisbon. The experiment was conducting with the objective of include the majority of participants from the metropolitan area of Porto<sup>6</sup>, and so the inclusion of a treatment in which the taxes' cause is in Porto, to represent the geographical proximity, and a treatment with hospital from Lisbon to represent the geographical distance.

The normative context was include in the experiment by the simple display of the information to the participants during the experiment, and was presented as being relative to previous sessions of the game.

The dependent variables are the percentage of declared income relatively to income received and the reaction time of the decision-making. The inclusion of the

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<sup>4</sup> Randomization of participants across treatments limits correlated effects and sorting biases (Fortin et al., 2007).

<sup>5</sup> The criterion of inclusion for the geographical area was participants living within 150 km of one of the capitals of district (Lisbon and Porto), all those outside were placed in condition *Outside Geographical Area*; all the participants living outsider Portugal were excluded.

<sup>6</sup> From the total of 286 participants, 197 are from the metropolitan area of Porto.

reaction time as a dependent variable in this experiment is made in order to understand if it is possible to find a pattern in decision making process of compliance and evasion that could allow us to identify the use of the distinct modes of reasoning – S1 and S2 - presented by Kahneman (2011), and which are, by definition, distinct in terms of time of decision – S1 is faster and automatic and S2 is deliberative and slower.

There are 8 treatments in this experiment resulting from the combination of each cause, identifiable from Porto and Lisbon (Hospital São Joao Porto, Hospital Santa Maria Lisbon), and non-identifiable from Porto and Lisbon - (Hospital of Lisbon, Hospital of Porto), and each social norm - comply and evade.

Given the need for a significant sample, the study was conducted through an online survey using the online survey program Qualtrics.

The experiment consists in a game that pretends to simulate the decision-making process of individual income declaration.

The experiment started with the display of the instructions of the game to the participants in which were also referred the information about the tax rate<sup>7</sup>, applied to the reported income, the penalty fee<sup>8</sup>, in case of detection of unreported income and the existence of some probability of being audited. It was also presented in instructions the cause of the tax revenue collected in the game, being this one of our independent variables varies between treatments, from a specific hospital in Porto or Lisbon (identifiable treatment) to any hospital from Porto or Lisbon (non-identifiable treatment). The experiment then was followed by a session of the game, composed by 10 rounds. Before the first round starts information about the social norm<sup>9</sup> is presented - social norm to comply (high norm) or social norm to evade (low norm) – this information is fixed through all the 10 rounds of the game for each participant. In each round the participants receive a variable amount of credits<sup>10</sup> which constitutes their income. Then, each participant is requested to decide how

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<sup>7</sup>The tax rate is fixed during the all game in 25%.

<sup>8</sup> Penalty fee is a fixed amount of 600 credits.

<sup>9</sup> The variable of the social norm is presented as *low* (5% report the total of income) or *high* (95% report the total of income).

<sup>10</sup> Income varies from a range of 100 to 950 credits.

much credits to report. Taxes are paid on reported income, and not on unreported income. Between each round a reminder of the initial information appears in the screen with the cause of tax collection and the normative context of previous rounds.

Concluded the 10<sup>th</sup> round participants had to complete some questions with demographical information, as age, gender, education level, country and area of residence.

### **Participants**

The online survey posits several concerns regarding the reliability of the collected data. In order to eliminate non-collaborative behaviour from the participants we exclude participants that failed to complete all the survey. We also exclude participants that failed to meet the criteria for geographical inclusion in the experimental conditions (e.g. overseas participants). With the adjustments done there were 286 adult volunteer participants in this experiment with ages between 18-32 years.

The participants of the experiment were constituted by 157 women and 129 men.

In terms of area of residence the participants were distributed as: 197 from the metropolitan area of Porto, 9 from metropolitan area of Lisbon and 80 are included in the condition of *outside geographical area*, since they reside from a distance higher than 150k from Porto or Lisbon.

### 3. Results

The Statistical Package for Social Science (SPSS) program was used to assist in the statistical treatment of the data collected.

Sample size, means and standard deviations for age, mean percentage of income declaration and mean reaction times for each experimental group are displayed in Table

**Table 1.** Samples size, means and standard deviations for age, mean percentage of declared income, and mean reaction times for each level of the manipulated independent variables. Legend: Dist - Distance; SD – Standard Deviation.

	N	Age		Mean % Declared Inc.		Mean Reaction Times	
		Mean	SD	Mean	SD	Mean	SD
Identifiable	146	25.08	7.43	82.03	24.27	4.05	4.87
Non-Identif.	140	23.67	6.13	81.12	22.19	3.71	3.40
Low Dist.	141	25.09	7.96	82.34	21.93	3.93	4.96
High Dist.	145	23.72	5.51	80.85	24.49	3.84	3.36
High Norm	144	24.03	6.40	82.80	23.38	3.63	3.94
Low Norm	142	24.75	7.28	80.35	23.10	4.13	4.48

#### 3.1. Main effects of identifiability, geographical distance and normative context

To test our hypothesis we started realizing three independent samples t tests comparing each level of the three independent variables, for both, mean percentage of declared income (10 rounds) and mean reaction times.

In respect to Hypothesis 1 (H1), the identifiability manipulation, for mean percentage of declared income, no significant difference was found between identifiable causes (M=82.03; SD=24.27) and non-identifiability causes (M=81.12; SD=22.19) [ $t(284)=0.33$ ;  $p=.742$ ], which means that the hypothesis was not confirmed by the results. For the geographical distance manipulation, no significant difference was found between low geographical distance (M=82.34; SD=21.93) and high geographical distance (M=80.85; SD=24.49) [ $t(284)=0.54$ ;  $p=.59$ ], therefore H2 was not confirmed. Also, for the normative context no significant difference was

found between high normative status ( $M=82.80$ ;  $SD=23.38$ ) and low normative status ( $M=80.35$ ;  $SD=23.10$ ) [ $t(284)=0.89$ ,  $p=.37$ ], this results do not confirm our hypothesis H4.

Regarding mean reaction times, H5 was also not confirmed by the experiment results, since no significant difference was found between identifiable causes ( $M=4.05$ ;  $SD=4.87$ ) and non-identifiable causes ( $M=3.71$ ;  $SD=3.40$ ) [ $t(284)=0.68$ ;  $p=.50$ ], low geographical distance ( $M=3.93$ ;  $SD=4.96$ ) and high geographical distance ( $M=3.84$ ;  $SD=3.36$ ) [ $t(284)=0.18$ ;  $p=.86$ ], and between high normative context ( $M=3.63$ ;  $SD=3.94$ ) and low normative context ( $M=4.13$ ;  $SD=4.48$ ) [ $t(284)=-0.99$ ;  $p=.32$ ].

### **3.2. Multivariate Analysis of Variance**

We conducted a MANOVA with mean percentage of declared income and mean reaction times as dependent variables and identifiability, geographical distance and normative context as between-subjects factors. For mean percentage of declared income, results show no significant second order interactions between identifiability and geographical distance ( $F(1,277)=0.04$ ;  $p=.84$ ), not confirming our hypothesis H3, between identifiability and normative context ( $F(1,277)=0.04$ ;  $p=.84$ ) and between geographical distance and normative context ( $F(1,277)=0.38$ ;  $p=.54$ ). Also, no significant third order interaction (identifiability \* geographical distance \* normative context) was found ( $F(1,277)=2.65$ ;  $p=.11$ ). For mean reaction times, results also show no significant second order interactions between identifiability and geographical distance ( $F(1,277)=0.88$ ;  $p=.35$ ), between identifiability and normative context ( $F(1,277)=0.01$ ;  $p=.93$ ) and between geographical distance and normative context ( $F(1,277)=1.91$ ;  $p=.17$ ). Also, no significant third order interaction (identifiability \* geographical distance \* normative context) was found ( $F(1,277)=0.25$ ;  $p=.62$ ).

### 3.3. Main effect of income size

In order to test the effects of income size (amount of credits allocated) we conducted a repeated measures ANOVA with round as within-subjects factor with 10 levels (10 rounds with different amounts of credits allocated). We found a significant effect of round ( $F(7.57, 2157.52)=2.57$ ;  $\eta^2_p=.01$ ;  $\epsilon=.84$ ;  $p=.01$ ). Contrast analysis showed a significant linear contrast ( $F(1,285)=15.68$ ;  $\eta^2_p=.05$ ;  $p<.001$ ) with a tendency to higher amounts of allocated credits to elicit lower percentages of compliance. Means and Standard Deviations for percentage of declaration for each allocated amounts of credits are displayed in Table 2.

**Table 2.** Means and Standard Deviations of percentage of declaration for each allocated amounts (independent rounds).

Amount of allocated credits	Mean	Standard Deviation
100	84.57	30.32
300	83.86	30.95
400	82.90	29.23
550	81.50	30.91
600	81.01	31.03
650	78.96	33.85
700	82.08	30.67
750	81.12	30.94
800	78.66	32.08
950	78.25	34.36

## Conclusions

The main goal of this dissertation was to develop an experiment that allowed the analyses of how the identifiability of taxes' causes would influence the tax compliance behaviour, in other words, we aimed at understand if the presentation of a more specific, vivid and salient information about the finality of tax collection to the taxpayers, would influence their decision. Our hypothesis, based on the existent literature, was that the presence of the identifiability would enhance compliance behaviour, which means that the IVE would be an effect also present in tax evasion decision-making process.

We also intended, with this experiment, to understand the role of the psychological distance between taxpayers and the object of tax revenues, measured by the geographical distance, and also the influence of the normative social context of compliance in taxpayers' decisions.

This experiment was realized with Portuguese participants and residents in Portugal for, at least, the last 5 years, so the results are applied to Portuguese context of tax compliance

The analysis of reaction's time (RT) of participants' decisions intended to identify if there were some degree of variance that would show the existence of the use of different ways of processing the decision between the different treatments, being able to identify the presence of System 1 (intuitive and faster decisions) and System 2 (deliberative and slower decisions). No significant result was achieved, we believe that this might result from the features of the experiment. We suggest in future works the manipulation of S1 and S2 through its induction on the experiment, in order to better evaluate the influence of the two modes of thinking in the decision of taxpayers.

The results of our experiment did not allow us to get answers to our questions, since the results were not statistical significant to confirm our hypothesis. A possible explanation for these results can be the specificities of the experiment

conducted. For instance: the complexity of the instructions, the lack of control that an online survey implies, in what concerns to the environment in which the participants complete the survey, and also the difficulty to avoid survey fraud, i.e., the difficulty of ensure that participants complete the survey honestly and with intention of contributing to the advancements of the study.

Our results allowed us to get some interesting conclusions that came to prove some previous studies' results and theories. The levels of compliance were, on average, high – the total average percentage of reported income was around 81%<sup>11</sup> – although the levels of deterrence in the game did not justify those numbers. This result supports the fact already pointed by several researchers which is that the effective levels of compliance are much higher than what standard economic theory of compliance predicts, based on the assumptions of expected utility maximization, rational choice and economic determinants (e. g. tax rate, penalty fee and audit probability). Alm et al. (1991) pointed this matter and said that the levels of deterrence, which are low in most of the countries, cannot, alone, explain the levels of evasion.

Another relevant result from our experiment was the significant relation between income level and compliance behaviour, suggesting that tax compliance will decrease as income is increased. This result is in accordance with the predictions of the classical model of Allingham and Sandmo (1972), that concluded that taxpayers will increase the percentage of income hidden from the tax authorities since their disposition to hold risky assets increases as income increases.

Therefore we believe that our experiment contributes to literature in the empirical ground of tax compliance, by providing an experiment that can propel further researchers into work in this problematic taking for base this work and, by refining it, try to achieve the conclusive results we were seeking.

The main limitations of this work can be the first clue for future works as in avoid these same limitations. First, the experimental methodology, although being a very useful way of operationalizing tax compliance, has some disadvantages:

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<sup>11</sup> See Table 1.

difficulties in isolating the independent variable, and ensure that no other variable influences the results; the fact that is composed by a laboratory setting might make difficult to generalize the results to tax evasion in the real world (Spicer and Hero, 1985), the lack of control of the participants' attitudes, since, by knowing that they are being tested, they may adopt behaviours they believe to be desired and acceptable, which introduces biases in the results (Monteiro, 2005). The online survey is also a limitation since creates a bias in the sample collected, due to the fact that it is just able to reach to some part of the population, excluding, for instance, respondents who do not have access to the internet, and, by so, to this survey.

We suggest then, that future researches try to implement this experiment in a laboratory setting, with a bigger sample and with participants more representative from the taxpayers' population, and also the inclusion of effective measures of deterrence, by tax penalty or fee, and audit probability.

It would also be interesting conduct a similar study but filtering participants, and allowing only individuals that already filed declaration of income.

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