Abstract:
Individual tax compliance remains an important area of research and still gives many directions that can be followed by economists in their constant struggle to understand the puzzle of taxpayer behaviour. The aim of this article is to offer a new approach regarding individual tax compliance and self-reporting behaviour, through a quasi-experiment with 102 students from three different professional areas: medicine, law and accountancy, which took place in Iași, Romania. The main results found highlight the importance and the role played by the income source, audit probability and the perceived chance of being detected. Potential taxpayers report less income when there is no evidence on paper for its existence and when the audit probability is low. As the perceived chance of being audited rises, the amount of reported income also rises. The perceived chance of being detected also rises simultaneously with the audit probability. The results are useful to both theorists and practitioners, but also to policy makers.

Key words: individual tax compliance, quasi-experiment, self-reporting behaviour, potential taxpayers

JEL classification: H26

INTRODUCTION

Tax compliance has been in the attention of specialists for the last two decades and many studies have highlighted its importance for economy. Tax compliance may be defined as the voluntary obedience to the rules and laws of the tax system. The compliance of taxpayers could be also associated with the idea of fulfilling the role of the consumer-citizen within a state. By complying, the consumer-citizen contributes to the public budget by paying taxes and fees and, on the other hand, he uses public services (health, education, etc.), funded by these contributions precisely.

Kirchler and Wahl (2010) consider that compliance is the most neutral and inclusive term that describes people's willingness to pay taxes.

Most of the researchers have chosen the direction of compliance behaviour analysis in relation to income tax. The most common view which is disseminated in the specialty literature captures compliance as a function of the rational pursuit of self-interest contributors (Wenzel, 2005). From this perspective, taxes are costs that taxpayers seek to avoid or reduce them.

The main direction in the economic literature on compliance has been drawn by Allingham and Sandmo, in 1972, in an earlier study that continues to be the starting point for many other research studies. According to their theory, taxpayers are faced with a choice: to declare their income entirely or less. Yitzhaki (1974) has continued the development of the Allingham-Sandmo model by highlighting the fact that the penalties, in most tax systems, are not calculated according to the size of undeclared income, but rather to the amount of unpaid taxes.

Other studies expanded these models by taking in account different types of variables, such as: risk aversion, in a clearer manner (Eisenhauer, 2008), taxpayer morale (Eisenhauer, 2008; Traxler, 2010) etc.

The purpose of this article is to examine the role played by the opportunity of noncompliance, as described by Fischer et al. (1992), the audit probability and the perceived chance of being detected in the tax reporting behaviour of potential taxpayers from Iași, Romania, through a quasi-experiment.

The primary objectives of the study start with the analysis of the role of opportunity, as described by Fischer et al. (1992), on three directions: occupation, income level and income source.
Secondly, the potential taxpayers’ perceptions about the chance of being detected are put into discussion. The audit probability plays also very important part by creating different situations in which the taxpayers have to make their compliance (or noncompliance) decisions.

The income tax is different in every country, in level, but also in form. Also, the tax systems differ by the way they are shaped and by the forms of applicability. In Romania, the income tax is a flat tax of 16%, applied on most categories of income (liberal professions, wages, pensions at a certain level, dividends, rent, investments and others). But only some of these categories are subject of self-reporting behaviour and people who have a liberal profession are included here: doctors, lawyers, notaries, self-employed accountants, legal experts etc.

In the following sections of the paper, some theoretical aspects regarding the development of the hypotheses will be presented, followed by the description of the research method, the results obtained and, finally, the conclusions, which resume the main contributions of the paper, limitations, future directions of research and practical implications.

**Hypotheses Development**

The opportunity of noncompliance has been rarely approached in the tax compliance literature. One of the first approaches was made indirectly by Allingham and Sandmo (1972), who built their model on the theories describing the self-interested nature of humans. Fischer et al. (1992) and Blanthorne and Kaplan (2008) have emphasized on the importance held by opportunity in tax compliance behaviour.

Three different concepts may describe the nature of opportunity: income source, income level and occupation (Fischer et al., 1992; Chau and Leung, 2009). The income source refers to the chance of earning untraceable income or amounts of money that do not appear in the records of the taxpayers (Chau and Leung, 2009).

Very few researchers have studied occupational differences among taxpayers (Ashby et al., 2009), and the necessity of a specific analysis, by focusing on particular groups of interest and not on a wide range of taxpayers, it is more and more felt among specialists (apud Trivedi et al., 2003, p. 182). As Fischer et al. (1992) and Chau and Leung (2009) stated, the occupation of taxpayers seems to have a direct influence on their tax compliance behaviour.

**H1:** There are significant differences between the occupational groups analysed, in terms of the income reported.

The opportunity to evade taxes given by the source of the income appears to be a very important factor of influence. Smith (1990) found a positive relationship between tax evasion and opportunity. Blanthorne and Kaplan (2008) analysed the influence of opportunity to underreport by dividing their sample in two categories: low opportunity and high opportunity. The high opportunity group comprised those taxpayers who mentioned that they own a business and they have obtained cash income which has not been reported. They showed that opportunity has direct and indirect influence on the reporting behaviour (the influence on other factors like ethics etc.).

**H2:** The participants will report a significantly smaller income after the treatment (the introduction of experimental factor).

The income level has been perceived differently by specialists and its importance and relationship with tax compliance has not been very often analysed. Ho and Wong (2008) reached the conclusion that income level does not have a direct influence on tax compliance. On the other hand, the income could have a negative influence on the tax morale of taxpayers. The better they earn, the less they start to report (Andreoni et al., 1998; Torgler, 2003).
H3: There are significant differences between the amounts of income reported according to the real income earned by the participants.

Alm et al. (1992), Mittone (1997), Cullis et al. (2006), Mittone (2006), Maciejovsky et al. (2007), Lewis et al. (2009) and Cummings et al. (2009) have analysed the “audit probability” effects in their studies (the possibility that a taxpayer has to become the subject of an audit performed by the tax authorities), this being the most common approach that describes the chance of being audited.

Regarding the audit probability, the studies have shown that tax compliance and audit probability have a positive relationship, mainly, as the audit probability rises, the compliance of taxpayers also rises (Alm et al., 1992; Cullis et al., 2006; Lewis et al., 2009; Cummings et al., 2009). Also, people, after the happening of an audit, are less compliant because they believe that a new audit is not very likely to occur (Maciejovsky et al., 2007).

H4: The amount of reported income rises as the audit probability rises.

The chance of being detected has been approached by specialists in various forms: perceived detection risk (Carnes and Englebrecht, 1995), probability of detection (Allingham and Sandmo, 1972; Fischer et al., 1992) or probability of being detected as guilty of evasion (Mittone, 1997). The most conclusive definition is probably given by Fischer et al. (1992, p. 4): “the probability of detection is the probability that noncompliance will be discovered and that the IRS will seek to rectify the deviance”. The authors also underline the fact that the two concepts, “the probability of being detected” and “audit probability” are very different and might be confusing for readers, if the concept used is not properly defined. But the chance of being detected is not a concept that can be measured in advance, it relates more with the perceptions of the taxpayers.

No matter how the perceived chance of being detected is defined, the results from previous studies are the same. The perceived risk of being detected has a positive relationship with tax compliance (Carnes and Englebrecht, 1995). Also, when the probability of detection is high, tax compliance is also high (Alm, 1991).

H5: There is a positive significant correlation between the perceived chance of being detected and the income reported.

Although the chance of being detected and the audit probability have been carefully analysed in the past, their influences in the same context have not been put into discussion. Also, the way how they interact and influence each other might be an interesting direction of research.

H6: The perceived chance of being detected rises as the audit probability rises.

METHODOLOGY

This study approaches as method of research the quasi-experiment. Experimentation in tax compliance research has been the choice of many researchers because it gives to the researcher the chance to obtain more honest answers regarding a noncompliant behaviour (Torgler, 2002), the main issue addressed by the research on the subject of tax compliance.

Quasi-experiments are at the boundary between field and laboratory experiments, being preferred especially when the researcher has a small budget. Their main feature is the fact that participants are selected and exposed to treatments in a non-random manner.

In tax compliance research, quasi-experiments have been applied either on students or on taxpayers, keeping a relatively simple design of the method. Some of the authors that used quasi-experiments, applied different treatments in the same time and using the same research instrument (questionnaires mainly), relying on the fact that the participants had received their instruments individually and could not realize that they are part of an experiment and also they could not
communicate with each other (Bobek et al., 2007; Dijke and Verboon, 2010). Other authors applied the quasi-experiment during courses, where students or even taxpayers had participated, trying to maintain in this manner some characteristics from the lab experiments (Carnes and Englebrecht, 1995; Fallan, 1999; Lewis et al., 2009; Leder et al., 2010).

The design of the quasi-experiment follows, mainly, the next structure:

\[ O_1 \ X \ O_2 \]  
(O1− pre-treatment groups; X – the treatment; O2 – post-treatment groups)

The present study has two phases. Participants receive the same test instrument in the first phase. After a period of time of minimum 2 hours, they receive the test instrument modified, in the second phase. The modification regards only the introduction of the experimental factor (or the treatment), and so, the two test instruments used in the two phases differ only by introduction of this treatment. The quasi-experiment takes place during student courses.

The participants for the study were chosen from three different categories (potential doctors, potential lawyers or notaries and potential accountants), who might choose to practice these professions in the future and be self-employed. The target population was represented by students from two public universities from Iași, Romania: students from the Faculty of Medicine, master students from the Law Faculty and accounting master students from the Faculty of Economics and Business Administration.

As one of the main characteristics of quasi-experiments is the rational extraction of participants from the target population and not a random extraction as in the case of classic experiments, the sampling method approached in this study follows three main criteria of selection. Firstly, the courses where the target population is present must be accessible for this type of study (the cooperation with the attending professor). Secondly, the number of hours of the course or courses taken in the same day by the same group students must be at least 3 (a minimum 2 hours break is necessary between the two phases of the study). Also, the students should participate at the study on a voluntary basis.

In order to have a better control on the quality of the sample, students were asked, before the session had started, to participate only if they intend to practice, in the future, one of the three professions mentioned before.

The test instrument was formed from a file received by each participant. In the first phase, the materials in the file are:

- An identification code, attached on the first page, necessary to identify the participants in second phase;
- A page containing instructions;
- A page containing the description of a hypothetical situation;
- Three small white envelopes (114x162 mm), marked with A, B and C and the identification code, which contained answer sheets.

The files from the second phase are identical, except a short questionnaire which contains demographic measures and other types of information.

After receiving the file in the first phase, the participants were asked to keep the identification code for the second phase, but also to be rewarded at the end of the study with a voucher to buy a coffee or other similar products from a place close to the faculties involved in the study. In this manner, the students were motivated to keep the code and it facilitated their identification in the second phase.

In the instructions page, the participants are informed about the purpose of the study, what kind of materials are in the file and how they should act. Also, they are asked to give sincere and individual answers, as their identity remains unrevealed during the study. After reading the instructions, they find out that they should read the hypothetical situation, on the next page. They are asked to image themselves as practicing one of the three professions (doctor, lawyer/notary or accountant), according to the group they are in. The text states that at the beginning of the year, they submitted a report form containing the income that they estimate to obtain during the following year.
(the amount is the same for each participant: 20 000 Ron, the equivalent of 4650 Euros). At the end of the year they must submit a new report form containing the real income obtained. They earned more than 20 000 Ron and now they must decide how much of the extra income they will report (the extra income is 10 000 Ron for the whole year, or 2325 Euros). The participants are also informed in the text of the possibility of being audited by the authorities and if they did not declare the whole income, they might be detected and accused of tax evasion. No values for audit probability or the chance of being detected are mentioned in the text.

The text is almost identical in the second phase, excepting the introduction of the experimental factor, which will be described in the next section of the paper.

**VARIABLES**

The dependent variable, e.g. the degree of compliance, has been measured through the amount of extra income reported, on a 5 level scale, each level describing a certain amount from the total extra income earned by the participants, from 0 to 10 000 (1 – 0, 2 – 2500, 3 – 5000, 4 – 7500, 5 –10 000). Henderson and Kaplan (2005) also used this type of scale in describing compliance, but they had 6 levels of income (the first level was also 0, and the last level the whole amount) and their respondents had to decide which amount they would not report. The scale is written on each answer sheet from the three envelopes in the file (A, B and C) and the participants must choose what the amount they wish to report.

The audit probability has three predefined levels: 1%, 10% and 25% (Cullis et al., 2006 and Lewis et al., 2009 also used three different levels of the probability of detection). Each level describes a different situation, respectively three cases: A, B and C. The audit probability is written on each answer sheet from the envelopes in the file (case A – 1%, case B – 10%, case C – 25%), before the measure of the degree of compliance.

The perceived chance of being detected is described by the second item on each answer sheet. After choosing the amount they want to report, the participants must evaluate what chances a person who does not report entirely his/her income has of being detected by authorities, in the specific situation described on the answer sheet. The item has an answer with 8 levels: 0% - 1%, 2% - 9%, 10% - 24%, 25% - 39%, 40% - 54%, 55% - 69%, 70% - 84% and 85% - 100%, similar to the item used by Carnes and Englebrecht (1995). The question was built by using an indirect style, by asking the participants to express their opinion about “a person”, and not about their own person, in order to have a better control over social desirability bias induced by the sensitivity of the subject (Jo, Nelson and Kiecker, 1997).

The experimental factor introduced in the second phase of the quasi-experiment changes the hypothetical situation described in the first phase by the fact that the extra income earned (the 10 000 Ron) is now untraceable on paper (there are no records to prove their existence). Previously, there were no statements about the situation of the extra income. So the degree of compliance and the perceptions about the chance of being detected are measured two times: before and after the introduction of the experimental factors.

The real monthly income obtained by the participants can be described by 7 different intervals (manipulated according to the minimum wage level in Romania and the fact that the participants are students, so most of them have very low incomes): less than 700 Ron (162 Euros), between 700 and 1000 Ron, between 1000 Ron and 1300 Ron, between 1300 Ron and 1600 Ron, between 1600 Ron and 1900 Ron, between 1900 Ron and 2200 Ron and the last, more than 2200 Ron (512 Euros). The amounts have been rounded up because most of the potential participants do not have a fix income, so they are asked to choose the level that better describes their average monthly income.
RESULTS

The quasi-experiment took place in October-November 2011, in Iaşi, Romania, separately for each group. The total and final number of participants at the both phases is 102 students. The data obtained has been analysed through SPSS 13.0.

The first group tested was the potential self-employed accountants. In the first phase, 53 students participated, but in the second phase, after two and a half hours, only 31 files were distributed and fully completed. In the case of potential lawyers/notaries, in the first phase participated 34 students and in the second phase, after two hours, only 31 remained. The quasi-experiment took place twice in the case of potential doctors. The first group tested had only 16 participants in both phases so a second group was needed and resulted 24 participants in the both phases (26 in the first), and a total of 40 participants from the potential doctors group.

From the total of 102 participants, 74 were women and 28 were men. This shows us that women attend classes (courses) more than men. The mean age of the entire sample is 23.45 years (SD = 2.037).

In matters of monthly income, the majority of the participants (63.7%) earn less than 700 Ron (approximately 162 Euros). Only three participants checked the highest income box (more than 2200 Ron or 512 Euros).

The questionnaire filled out by the law master students contained an extra question regarding their preference for one of the two professions destined to this group. 87.1% would follow the lawyer profession and only 12.9% would work in the future as notaries.

In order to apply the most appropriate tests, we have first tested the normality of the distribution for each variable (independents and dependent), through a Kolmogorov-Smirnov test. The significance level of the tests, for each variable was lower than 0.05, so the distributions of the variables differ from a normal distribution. In these conditions, to test the hypotheses, we have used nonparametric tests.

In order to test the differences on the occupational level described by hypothesis 1, a Kruskal-Wallis test has been applied. The significance levels of the Kruskal-Wallis tests were higher than 0.05, so the differences between the degree of compliance of the three occupational groups tested are not significant and will not be further discussed.

The differences between the mean income reported in each phase, according to the three situations given by the three different levels of the audit probability, have been tested through a Wilcoxon test, for each pair from each case: the amount reported in the first phase with the amount reported in the second phase (in case of 1% audit probability and so on), obtaining in the end three different pairs of variables to test.

<table>
<thead>
<tr>
<th>Audit probability</th>
<th>Mean income reported in phase 1</th>
<th>Mean income reported in phase 2</th>
<th>Wilcoxon Test</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Z</td>
</tr>
<tr>
<td>1%</td>
<td>8063</td>
<td>4117</td>
<td>-6.328*</td>
</tr>
<tr>
<td>10%</td>
<td>8504</td>
<td>4681</td>
<td>-6.272*</td>
</tr>
<tr>
<td>25%</td>
<td>9240</td>
<td>5588</td>
<td>-6.121*</td>
</tr>
</tbody>
</table>

*Based on positive ranks.

The significance level (p value) of the Wilcoxon test is lower than 0.05 in each case. The participants reported a significant smaller amount of income after the introduction of the experimental factor. Although the extra income was untraceable, some of the participants did not change their behaviour in the second phase of the study and so the differences between the amounts reported in the two phases are lower than expected.

The differences between the amounts of income reported according to the real level of the income obtained by the participants have been also tested. The results of the Kruskal-Wallis test
show that there are no significant differences according to the monthly income obtained (p > 0.05 in all the cases). This might be explained by the fact that the majority of the participants declared that they obtain a very low income, as they are studying and most of them are not working, so the real income variable could not give the differences expected.

In order to test if the amount of income reported is different in each case given by the three different levels of audit probability (1%, 10% and 25%), a Friedman test for multiple paired samples has been used, for both phases of the quasi-experiment. The significance level of the test in each phase was lower than 0.05, with a Chi-Square result of 42.941 for the first phase and 47.255 for the second phase. At least one of the amounts of income reported differs from the others, in both phases and the differences can be viewed in table 2. So we can conclude that the mean income rises as the audit probability rises.

The correlation coefficients calculated to analyse the strength and the direction of the relationship between the perceived chance of being detected and the amount of income declared show, as predicted, that the correlation of the two variables is positive and significant. The results are presented in table 2.

Table 2. The correlation coefficients between the perceived chance of being detected and the income reported

<table>
<thead>
<tr>
<th>Audit probability</th>
<th>Phase 1 (before the experimental factor)</th>
<th>Phase 2 (after the experimental factor)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pearson’s R</td>
<td>p</td>
</tr>
<tr>
<td>1%</td>
<td>.334</td>
<td>.001</td>
</tr>
<tr>
<td>10%</td>
<td>.339</td>
<td>.000</td>
</tr>
<tr>
<td>25%</td>
<td>.308</td>
<td>.002</td>
</tr>
</tbody>
</table>

The significance value of each correlation coefficient is lower than 0.05, confirming the existence of a significant correlation between the variables. The values of the coefficients show, according to Cohen (1988), a medium correlation in the first phase, excepting the case when the audit probability is 25%, for the Spearman coefficient which shows a small correlation. In the second phase, the correlation coefficients are visibly stronger, indicating medium and high correlations in all the cases.

To test the differences between the perceived chances of being detected, in each case given by the audit probability, Wilcoxon tests have been applied on three pairs of variables (the perceived chance of being detected from the first phase with the perceived chance of being detected from the second phase, when the audit probability is 1% and so on). The significance value of the test, in each three cases, was lower than 0.05, showing that the variables differ in distribution. The sum of ranks is -7.206 for the pair formed when the audit probability is 1%, -7.759 for the pair formed when the audit probability is 10% and -7.555 for the pair formed when the audit probability is 25%. The conclusion which can be drawn from this final analysis is that the perceived chance of being detected rises when the audit probability rises.

CONCLUSIONS

The tax compliance of individuals remains a subject of great importance and interest for the economic literature. Income reporting behaviour gained the attention of the specialists, as it is the most frequent approach in terms of tax compliance.

Some of the researchers focused on the analysis of economic determinants of tax compliance (Allingham, Sandmo, 1972; Yitzhaki, 1974), while others continued their work by adding noneconomic factors (Fischer et al., 1992; Torgler, 2003; Eisenhauer, 2008; Blanthorne, Kaplan, 2008; Traxler, 2010), trying in this manner to have a better perspective on the puzzle of tax compliance.

The present study has approached both economic and noneconomic factors that influence the income reporting behaviour of three categories of taxpayers: doctors, lawyers/notaries and self-employed accountants (according to the Romanian fiscal law, only certain categories of individual
taxpayers report on their own the income obtained and the professions analysed are included in one major category – liberal professions). The approach of specific categories of taxpayers is the first major contribution of the study, following the need of focusing on specific groups of interest felt in the specialty literature (apud Trivedi, Shehata, Legun, 2003, p. 182).

The results are consistent, on most of the aspects, with the previous findings on individual tax compliance. In matters of opportunity of noncompliance, only one component resulted to be an important factor of influence, the income source. The participants at the study reported a significantly lower income when they were informed that the income they had to report was untraceable on paper. The occupation and income level did not show a significant relationship with the income reported, contradicting in this way the model of Fischer et al. (1992).

Another important contribution of this study results from the approach of the audit probability and the perceived chance of being detected in the same context. The participants reported higher amounts of income as audit probability rose. Also, positive correlations have been found between the perceived chance of being detected and the income reported, this meaning that as the perceived chance of being detected was higher, the degree of compliance was also higher. Significant differences were found between the perceived chances of being detected, in each case described by the three different levels of the audit probability. As the probability of being audited was higher, the participants perceived also a higher chance of being detected for those people who report less income and face an audit.

The study has its limitations, starting with the sensitive subject of income reporting which makes it difficult to have control over social desirability bias. To minimize their effect, some of the questions have been written in a indirect style and the anonymity of the participants was kept across the whole study. Obtaining individual answers has also encountered difficulties. Although this requirement has been mentioned verbally and also specified in the instructions, the quasi-experiment was not completed in total silence.

Another limitation regarded the accessibility of the potential participants and this is shown by the rather small number of participants included in the study. Also, this limited the random selection of the participants, who have been chosen by following rather rational criteria of selection. The time between the two phases of the study was also limited to a minimum of two hours, as the courses taken by the participants did not allow a different approach.

The results must be treated and interpreted carefully, as the number of participants in each group is not significant from the statistical point of view (a minimum 50 participants for each group would have given more reliable results).

As future directions of research, more occupational categories may be included in a similar study. Secondly, extending the study on the entire country or even on other countries (with a similar tax system as the Romanian one) might bring new interesting results. Last but not least, the approach of more variables, especially noneconomic, in a study with a similar design, would help in obtaining a better view on the behaviour towards income reporting of individual taxpayers.

The practical implications of the results start with the necessity to minimize the opportunity to non-comply that taxpayers have, by stimulating the correct record-keeping of all the income obtained by self-assessing categories of taxpayers. This may be done in two ways: increasing audits and asking the population to stop paying for the services of the mentioned professional categories without receiving a proof of their payment. The increase of audits may be also useful, due to the positive effect on the compliance of the participants at the study. Also, as the chance of an audit gets higher, the perceived chance of being detected those who try to cheat the system is stimulated to grow and taxpayers may feel a higher risk and may try to report correctly the income obtained.

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REFERENCES