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Methods of Analysis the Motives for Legal Tax Behavior

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ABSTRACT

The paper is devoted to improving the methodology for conducting laboratory experiments to study the actions of taxpayers. We note that the use of standard economic methods is not enough to study citizens' behavioral motives (in particular, the desire to evade their duties). The authors analyzed experimental methods of studying tax evasion, carried out their comparative characteristics and identified the problems of their implementation in practice. Based on the analysis of the results of previous experiments, we proved that involving students as interviewers enables us to identify and evaluate the behaviour trends of taxpayers. The research methodology is based on the use of tools and methods of comparative analysis, tabular and graphical methods of data visualization. In particular, the comparative characteristics of the form factor surveys (vignette with one profile, vignette with a double profile, single-profile association, conjugate profile, conjugate paired profile) made it possible to identify as a priority for use in laboratory tax experiments the conjugate paired profile in the form of a survey. In the resulting part of the paper, we presented the disadvantages of laboratory experiments and suggested possible options for their solution, which is an element of scientific novelty and the significance of the research' results.

Keywords: laboratory experiment; experimental economics; behavioral motives; taxpayer; survey experiment; vignette; conjugate paired profile; student sample

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INTRODUCTION

The identification of taxpayers' motives attracted the attention of scientists and practitioners in the context of combating tax evasion. There are different methods of studying legal tax behaviour. Experimental methods are the priority tools for analysing such behaviour, allowing information to be obtained on various phenomena, including hidden, such as tax evasion, for example (*Table 1*).

The aforementioned methods of investigating tax behavior have their advantages and disadvantages, the choice of the appropriate method depends to a great extent on the tasks set.

The purpose of this paper is to develop a methodology for analysing the behavioural motives of citizens in the context of a multitude of decision-making options (on the example of legal tax behaviour).

LITERATURE REVIEW

There are few systematic studies comparing different experimental methods, and only a few have compared the observations of laboratory experiments with the results obtained by other methods [10, 11]. P.A. Hite [12] revealed a low but positive correlation between his own observations of tax behaviour and government statistics. J. Alm, K. Bloomquist, M. McKee [13] analyzed the behaviour of the subjects in the laboratory with "real" taxpayer data obtained by the National Research Program of the North American Internal Revenue Service. On average, participants in the experiments were slightly more honest in their income declarations than real taxpayers. Interestingly, in both cases the distribution of matching indicators was bi-modal with peaks on the upper and lower ends.

R. G. Cummings and his colleagues [14] compiled the survey data using the so-called

afrobarometer and conducted laboratory experiments to compare tax compliance in Botswana and South Africa. The analysis showed that compliance in Botswana was significantly higher than in South Africa. Therefore, the afrobarometer gave results similar to those of the experiments. Both methods have been able to capture social norms prevailing in different cultures.

An overview of empirical researches on four parameters (probability of tax verification, amounts of fine, income and limit tax rate) of the income tax evasion economic model allows further comparison of methods of tax compliance research [15]. Experimental researches of ethics of parameters gave results similar to the analysis of aggregate data on "real" taxpayers. Consequently, the various methods we have considered used in empirical studies have similar effects as regards the observed effects.

From this point of view, survey experiments are an effective, inexpensive and widely applicable tool for studying human preferences and decision-making. Laboratory experiments are often the only option that can be used to control certain variables or to observe a particular behavior of a study object in controlled conditions. They allow individual choices to be studied, rather than a combination of them, have high internal reliability and thus allow researchers to determine a causal relationship. For example, tax amnesty studies [16, 17] have chosen an experimental method, but some data are not available to study the long-term effects of tax amnesty.

METHODOLOGY OF RESEARCH

Laboratory economic experiments are carried out in an artificial environment — the so-called "laboratory", and the subjects know that they are participating in the experiment [9]. Such declared preference assessment experiments are usually a survey of respondents to select or evaluate several hypothetical descriptions of objects (often referred to as profiles or vignettes) that vary in different attributes that are important factors in the choice or rating of the study object. The knowledge of factors varies randomly between respondents and tasks, allowing the researcher to assess the relative importance of each factor for the resulting choice or rating.

Since the first laboratory tax experiment conducted by Israeli researchers (Freidland, Maital and Rutenberg) in the 1970s, students have been the most common environment for laboratory experiments [7]. Scientists around the world have repeatedly assessed the effectiveness of this method of research, implemented on the example of the student community, and not only in the field of taxation.

The practice of using students is frequently questioned, especially in the research of citizens' tax behaviour [18–20]. It is noted that students younger than the average taxpayer, usually have a higher IQ and come from more wealthy families [21]. In general, students are a relatively homogeneous group, and it is unclear whether their behaviour extends to the entire population [12]. In addition, it is often mentioned that students lack experience in tax paying. With experience, taxpayers can learn the social norms of their professional group [22, 23], their perception of tax obligations and tax authorities is changing [24]. The study's research will mostly determine whether a lack of experience in tax problems is a barrier for studies. Stanford University representatives J. Hainmueller, D. Hangartner and T. Yamamoto assessed the effectiveness of using the student community as sociology testers. In particular, they investigated whether it was possible to reproduce the results of the main experiment (with the subjects being Swiss working adults) on a separate sample representing a completely different population of Swiss respondents [25]. They compared the results of two survey experiments and obtained different results. However, the authors noted that the low effectiveness of the experiment suggests

Table 1

Experimental Methods for Studying Tax Evasion

Method	Application problem
Field experiments	It is rarely, as expensive and intrusive [1, 2]
Quasi-experiments	Possible only if there are comparable groups in the field that differ by the variable of interest [2]
Archived data	Difficult to access. Such data are often available only in aggregate form by taxpayer group rather than by individual [3] Usually cover a relatively small set of variables and are therefore useful only for a limited set of research questions [4]
Independent compliance behavior reports	Easily collected during interviews or surveys, but respondents are inclined to socially desirable answers [5, 6]
Laboratory experiment	It is documented, making it a cost-effective method of collecting large amounts of data [7] and provides a hypothetical environment for collecting data in areas where information is confidential [8, 9]

Source: Compiled by the authors.

that, in order to obtain informed conclusions about real behavior, it is necessary to compare the sample characteristics with the target population as accurately as possible.

Comparison of the results of otherx experiments by American scientists involving students and groups of adult subjects in the US (obtained through the US Tax Service) showed that, firstly, the patterns of behavior of the subject in the laboratory corresponded to the pattern of behaviour of adults in natural conditions [26]. Secondly, the behavioral responses of students are similar to those of real taxpayers [27].

Moreover, an empirical study by Wartick and his coauthors [28] compared the behavior of students in tax experiments with the behaviour of university staff, with similar results. I. Wahl, B. Kastlunger, E. Kirchler [29] studied the role of trust and authority in tax compliance and similar results between a sample of students in the first experiment and self-employed participants in the second. J. Alm, K.M. Bloomquist and M. McKee compared tax behaviour of students, professors and university staff [30]. This study showed that the students were less obedient, but when the experiment parameters were changed, the behavioral transformation corresponded to the behaviour of other participants who were not students. A study by K.M. Bloomquist, which compared the tax behaviour of students in the laboratory experiment and the results of the sampling of real taxpayers, showed similar results in both groups [31]. An interesting result is Tom Lane, who, by analyzing the results of 22 previously conducted laboratory experiments by other researchers, has proved that working with student samples will not lead to biased perception of results of such experiments [32].

Changes in tax behaviour of students in the experimental environment help to understand what factors influence tax behavior of real taxpayers in our country and how this behaviours can be changed to make it more legal behavior. We also agree with A.P. Kireenko et al.: behavioral reaction of students, whose views outweigh the real picture of today's reactions, may reflect the mood of the generation of future taxpayers in the 21st century more adequately, than adults, raised in the spirit of the administrative-command system [9].

We consider that the application of the laboratory experiment method, especially with the participation of students, in tax science has a number of important advantages. As Nobel laureate Vernon Smith pointed out, the potential contribution of experimental methodology to economic knowledge is unique [33]. First, economics as a science as it is studied and taught is more theoretical and less observational than any other science (whether it be physics, chemistry, mathematics, etc.). One can partly agree with the assertion that "no simple fact has ever corresponded in economics to the theory agreed with it" [34]. This is because the education of economists makes us think of economics as a theoretical science, not an observational science, in which the interaction between theory and observation is of paramount importance. In this regard, the value of experimental studies is that they are "... aimed at overcoming two gaps: the gap between decision-making theory and decision-based behaviour, and the gaps between data on what people think about economic issues and data on how people behave in experimental markets" [35].

These experiments create a controlled environment and therefore contribute to much cleaner measurements. In part, laboratory experiments allow researchers to control variables and test a large number of alternative options (set a large amount of parameters) with small financial and labor costs. In addition, when evaluating dynamic changes, it is possible to replicate the results of survey experiments.

RESULTS

Laboratory experiments in the field of economics are usually conducted in the form of sociological surveys, among which factor surveys are most often used, which is a description of the situation in taxation with specified parameters (usually in the shape of cards or vignettes). The set of vignettes in which the parameters (factors) change alternately is assessed by the subjects. It is extremely important to note that the characteristics of the cards do not change in the same way, but systematically, which allows to assess the impact of each factor on the resulting variable [36]. This is the key difference between factor surveys and other scenario studies.

From the point of view of the methodology of conducting the experiment, the most important point is the choice of the form of the factor survey (*Table 2*).

Comparison results showed that pairs of survey designs induce higher motivation in the subjects to seriously deal with problems and to evaluate information about situations (taxpayer behaviour) more carefully than single-profile constructions.

According to the reliability rating of these structures, compiled by Jens Heinmüller, for the purposes of conducting sociological surveys, the first place should be given to the method of conjugate profile, the second — the method of conjugate paired profile, the third — the single-profile association and vignette with a double profile, the fourth occupies — the vignette with one profile. In agreement with the above distribution, we consider it necessary to mention only one clarification relating to the application of the experiment in the field of taxation. In particular, for tax expenses the method of conjugate paired profile is ineffective, since the choice of one of the given tax situation options is not the only correct one. It greatly restricts the subjects in their own answers (*Fig.*).

The example described in *Fig.* gives the subjects a choice of only two possible situations. For example, there are no answers for honest taxpayers willing to comply with their tax obligations in any situation. On the other hand, changes in several parameters (in this situation — the rate, the amount of the fine and probability of verification) during the analysis of the taxpayer's behaviour will significantly complicate the processing of the results of the experiment. For this reason, for

Table 2

Comparative Characteristics of the Forms of Factor Surveys

No.	Form	Description	Advantages	Disadvantages
1	Vignette with one profile	One taxpayer profile is described in the form of a short paragraph that characterizes the payer with the attributes listed in the text, and then respondents are invited to answer short questions	They are the most widely used factor design of the survey in the social sciences	The lack of comparison with another situation or taxpayer leads to inaccurate replies from respondents, if they have no idea of other possible options. Text representation of material is perceived to be more difficult than table representation
2	Vignette with a double profile	Analogic vignette with one profile, except that two vignettes of two payers situations are presented one under another, and then respondents are invited to answer short questions on each of the two taxpayers	Respondents are implicitly asked to compare the two situations, and this increases the involvement in the survey	Text representation of material is perceived to be more difficult than table representation
3	Single-profile association	One taxpayer profile is preceded in table c by two columns. The first column lists the names of the attributes, and the second one lists their values. Respondents are invited to answer short questions	Information is more accessible to respondents in table form compared to the text descriptions used in vignettes	The lack of comparison with another situation or other taxpayer leads to inaccurate answers of respondents, in the event that they do not have an idea of the alternatives available
4	Conjugate profile	Profiles are analogous to mono-professional associations, except that two taxpayers are represented next to each other in the correlation table. Respondents are invited to answer short questions on each of the two taxpayers	Allows respondents to easily compare two taxpayers (two situations) for each feature	Not identified
5	Conjugate paired profile	Equivalent to related pairs of profiles, except that respondents are forced to choose which behaviour of the two possible behaviours the taxpayer prefers	Encourages respondents to study profile information more thoroughly and to increase their involvement in the task	Far from a real choice, which is not limited to the unconditional probability of a candidate adopting a strictly defined optio

Source: Compiled by the authors.

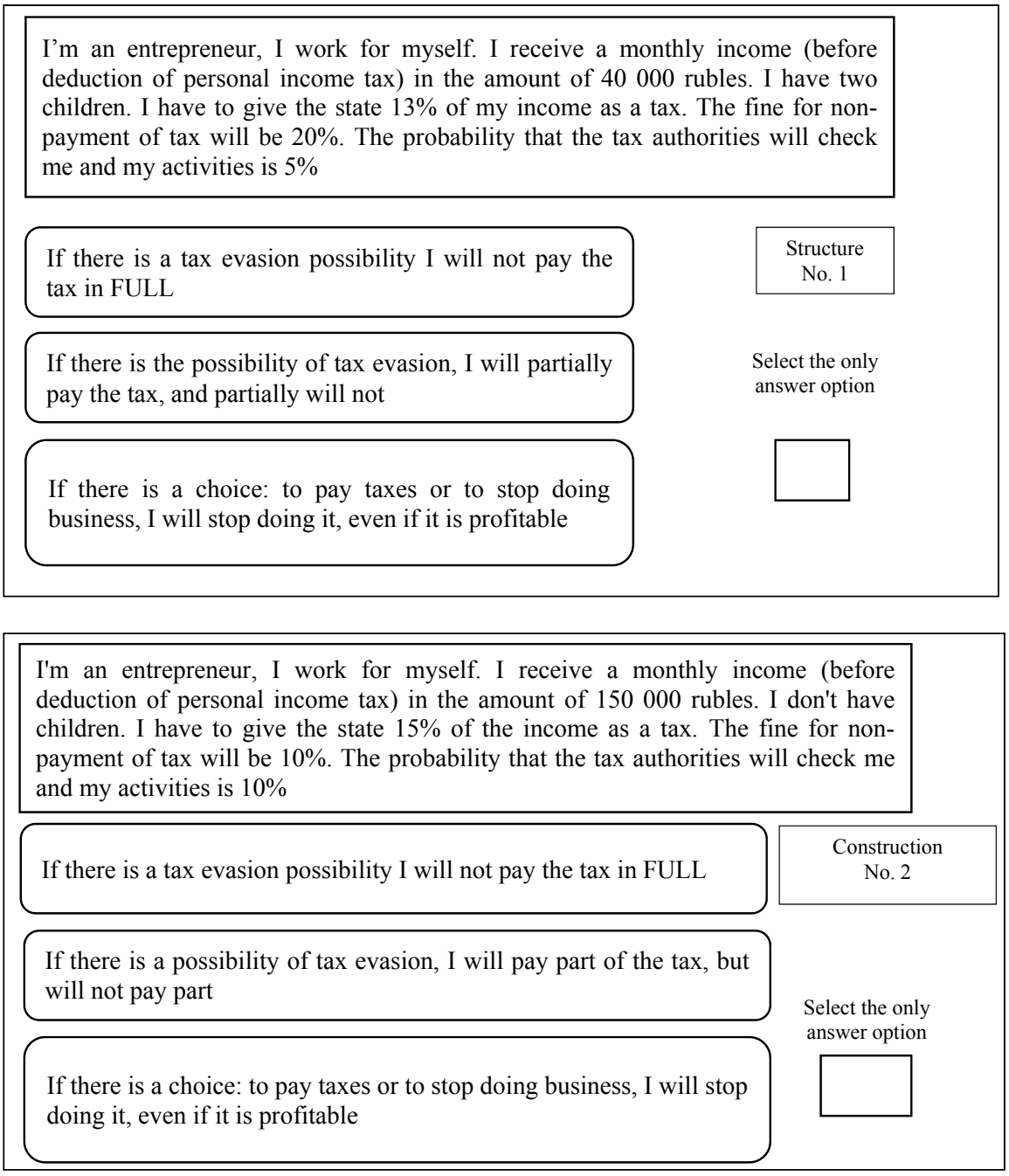

Fig. **An Example of a Survey Structure the Conjugated Pair Profile Method**

Source: Compiled by the authors.

the purpose of implementing a laboratory experiment as a design, we recommend using a connected profile that can be applied several times when only one attribute is changed successively from the original version.

In addition to the formation of the basic structures of the factor survey, it is advisable to include in the elements of the non-experimental survey, which measure individual features of perception of the tax system and tax legislation, mechanisms of interaction between governments and features of moral attitudes. The division of the study into experimental and non-experimental parts allows comparative assessment of models of tax behaviour of individuals.

The further need to improve the methodology of conducting pilot surveys

in the field of taxation is determined by two reasons: the first is the disadvantages of the survey method itself; the second is the specificity and novelty of the scope of its application (taxation).

The survey experiment is a significant tool for determining the causal relationship between information, tax selection and tax rate assessment. However, there are important methodological problems that may limit the external validity of the results of the experiments carried out. In the context of identifying these problems, directions can be proposed for improving the methodology of conducting laboratory experiments.

First problem. The results can vary significantly and depend on the hypothetical shift, as they are based on a sample (not a general) study. As A. P. Kireenko noted, the disadvantage of laboratory experiments is that the real behavior of taxpayers cannot be reproduced in an artificial environment, as it is impossible to reproduce real life [9]. Thus, the answers to hypothetical scenarios may differ significantly from the actual behaviour of taxpayers. Moreover, survey experiments are subject to bias of subjects, bias in integrity, hypothetical bias, biasis in social desirability, biases in silent consent, satisfaction and other cognitive biases that can seriously undermine the validity of experimental survey methods. These biases may result in respondents behaving completely differently when making a choice in an experiment, compared to a similar choice in the real world.

Solving the first problem. This problem is solved quite effectively in the formation of an adequate sample of the subjects, which in addition to the criterion of representativity should be reasonable. The representativity of the sample is determined by its quantitative composition. Ensuring reasonable can be achieved by including in the experiment all students of the flow, group. In the case of a sample group, the latter should include different categories of students with equal likelihood of being included in the sample. In order to evaluate the error of the sample and the probability values of the general set, the statistical science has developed formulae for their definition, which is advisable to apply at the stage of generalization of the results of the experiment:

1) average sample error:

$$m = \sqrt{\frac{\sum \varepsilon_i^2 f_i}{\sum f_i}}, \quad (1)$$

where ε_i — variable specific error value;

f_i — frequency (probability) of occurrence of a particular error;

2) simple error of the sampling average:

$$m_{\bar{x}} = \frac{\sigma}{\sqrt{n}}, \quad (2)$$

where σ — average square deviation of the sample;

x — feature value;

n — number of observations in the experiment;

3) marginal error of sampling average:

$$E_{\bar{x}} = t m_{\bar{x}}, \quad (3)$$

where t — standard value of normal distribution function.

Quantitative assessment of sample errors in tax laboratory experiments appears to be crucial. Therefore, unlike classical social surveys, factor surveys in taxation require, as a rule, a quantitative assessment of the determinant (tax burden, tax rate, the amount of fines for violation of tax legislation, etc.).

Second problem. In a number of cases, the results can only be repeated if the specific (similar) language used in the questionnaire is answered. The formulation of a synonymous question can change results if it is misinterpreted.

Solving the second problem. For a unambiguous interpretation of the results of the experiment in the field of taxation, it is necessary to formulate the situation and

the factors placed in the vignette as simply as possible (survey list). In taxation, this is relevant, because individuals on a hidden level perceive tax legislation as incomprehensible, and the tax system itself is complex. This problem comes to the fore when students from different profiles and faculties, including economists and non-economists, participate in the survey. Therefore, an introductory instruction with explanations of the contents of the vignette (card) and a detailed description of what is required from the subjects should be made before conducting the survey. In addition, it is extremely important that all subjects evaluate all situations at once in one approach. In some cases, it is possible that after one phase of the experiment, some people refuse in principle to continue their participation in it. This should not be recognized as a negative situation; on the contrary, this circumstance may more clearly characterize individual behavioural characteristics of taxpayers. On the other hand, this requires a sufficiently large input number of subjects (as also demonstrated by the need for sample representativity described earlier). Analysis of the scientific literature showed that to obtain adequate results the sample for the experiment must be 100–200 subjects [36]. Previous scientific studies have revealed that causal relationships established by sampling experiments are usually confirmed in natural conditions [25].

Third problem. The hypothetical nature of the experiment may present certain difficulties, as the responses of the subjects are not related to material or other forms of benefit. In other words, participants should be interested not only in the game itself, but also in its results.

Solving the third problem. According to the W. Smith theory, the reward received by respondents in the experiment must be closely related to the results of their actions, be meaningful and compensate for any inconvenience and cost, and must be confidential (not known to other participants) [37]. In connection with the impossibility of paying funds to the student community, options may be offered, for example, to encourage them by adding additional points to the current rating on readable disciplines [9]. On the other hand, there are a number of studies according to which the hypothetical nature of the experiment has only a minor influence on its results [38]. Scientific papers have repeatedly documented the absence of differences in the effects of tax behaviour and preferences when comparing hypothetical scenarios with real remuneration and when there is no [39, 40]. We conside that the utilitarian behavior of interviewers can be adjusted by greater detail of the input information and positive motivation for good faith, sincere behaviour during the experiment. Such motivation implies the exclusion of the possibility of punishment in the educational process for choosing options of unlegal behaviour.

Fourth problem. A common problem with measuring behavioral intentions is that respondents may refuse to answer questions about willingness to commit tax fraud or lie because of the social beliefs of the surrounding society to appear better than they are.

Solving the fourth problem. There are several methods to minimize this problem. First, to eliminate this deficiency, it is preferable to conduct online surveys, as they increase the social distance between the researcher and the respondent, which reduces the bias in the answers. Secondly, confidentiality and anonymity diminish the bias of respondents in answering questions. Although, on the other hand, with personal remuneration for participating in the experiment, anonymity is impossible.

In this aspect, the researcher is faced with a principle choice of subsound to conduct the experiment: anonymous, but without reward of the subjects for participation; and outspoken, but with rewards of the subject. At the same time, the selection criteria for scientists conducting the experiment should

be based on a comparative characterization of the risks in different ways of its implementation.

CONCLUSION

The phenomenon of tax evasion is studied using various experimental methods. A laboratory experiment — is a relatively cost-effective way of studying taxpayer behaviour in situations that are not easy to manipulate in the "real" world; it also allows researchers to control mixing variables that can influence behavior alongside interested variables. It can be used to develop a toolkit for the study of the optimal level of tax burden of individuals as the most important motive for legal behaviour of the taxpayer. We identified the problems of the use of laboratory experiments in the form of a survey and suggested possible options for their solution. Conjugate paired profile was chosen as a priority based on the comparative characterization of factor survey forms.

In conclusion, the role of academic training in student behavior in experiments is unclear. In this context, the role of education in tax behaviour and tax culture can be investigated in a laboratory experiment, which could serve as a basis for further research. The scope of the students' training, as well as the educational profiles of the subjects, may be essential in the context of the study of tax literacy. Another direction of application of the laboratory experiment is the study of the potential effects of planned innovations in taxation and tax administration, for example, the introduction of a single tax account, an automated simplified taxation system, etc.

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