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Lab experiment to investigate tax compliance: the case of future taxpayers' behavior in Russia and Belarus

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ABSTRACT

The paper aims to examine the internal motivation of taxpayer's behavior, and the factors affecting tax morale and voluntary tax compliance. The authors provide scientific results of the tax experiments in post-Soviet countries (Russia and Belarus). The laboratory tax experiment was carried out in a form of a business game engaging students of various levels of education and background. The controllability of the experiment with the impossibility of material encouragement is ensured in the student's environment in the form of scores to the final attestation. In order to obtain data on tax behavior motivation, a survey on attitude to tax system was conducted. Respondents (experiment participants) were asked to indicate their level of agreement with defined statements by Likert scale. To assess the differences between two groups of participants (who paid and who do not paid tax), the data obtained as a result of filling out the questionnaire using the Mann-Whitney *U*-test and the Kruskal-Wallis *H*-test were analyzed. The study results affirmed the hypothesis generated earlier, the personal tax morale influences the national tax system and the tax behavior of an individual. The article proves that the awareness of the ways government spends public revenue and the trust level to the state and tax system itself influence tax behavior directly. The civil awareness on the real state of fiscal distribution increases the trust level to the government among taxpayers and is the essential motivation to pay taxes. The developed methodology may be used in an educational process to increase tax literacy, its further application in the scientific research will allow us to derive evidence-based methods and ways to directly influence tax behavior, which may enlarge the public revenue in the times of an unstable global economy.

KEYWORDS

tax behavior; attitude to taxes; tax compliance; tax evasion; tax experiment; behavioral economics

JEL C91, H26, H39

HIGHLIGHTS

1. The study reveals that the tax audit affects more the amount of evading taxes than the number of evaders, where an increase of education level helps to reduce tax evasion through citizens, to make an individual more competent and more responsible as a taxpayer
2. Laboratory tax behavior monitoring of students allows us to identify the factors that influence on the real national tax behavior and tax experiments could become a tool for the formation of strategies of interaction between tax authorities and taxpayers in Russia and Belarus
3. The main incentives for paying taxes are the trust towards the government and the tax system and the understanding of the society-oriented character of the state

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**Изучение налогового поведения
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ORCID: [0000-0002-7860-5929](https://orcid.org/0000-0002-7860-5929)**АННОТАЦИЯ**

Целью статьи является исследование внутренней мотивации поведения налогоплательщиков и изучение факторов, влияющих на налоговую дисциплину и ответственное соблюдение налогового законодательства. Представлены научные результаты проведенных авторами лабораторных налоговых экспериментов в постсоветских странах (Россия и Беларусь). Эксперимент проводился в форме деловой игры среди студентов различных уровней обучения. Для обеспечения контролируемости эксперимента студенты получали условный доход в виде баллов к промежуточной аттестации. Для получения данных о мотивах налогового поведения был проведен опрос об отношении к налоговой системе. Респондентам (участникам эксперимента) было предложено указать свой уровень согласия с определенными утверждениями по шкале Ликерта. Чтобы оценить различия между двумя группами участников (заплативших и не заплативших налог), проанализированы данные, полученные в результате заполнения анкеты с использованием U-критерия Манна-Уитни и H-критерия Краскела-Уоллиса. Результаты исследования подтвердили предположение о влиянии отношения к налогам на налоговое поведение. Исследование доказывает, что доверие к правительству и налоговой системе, осознание социальной направленности деятельности государства, является основным мотивом для уплаты налогов. Разработанная методика и инструментарий налогового эксперимента могут быть использованы в учебном процессе для повышения налоговой гра-

мотности, а дальнейшее их применение в научных исследованиях позволит предложить научно обоснованные методы и формы воздействия на поведение налогоплательщиков, гарантирующие увеличение налоговых поступлений в бюджет в условиях нестабильности мировой экономической системы.

КЛЮЧЕВЫЕ СЛОВА

налоговое поведение; отношение к налогам; налоговая дисциплина; уклонение от налогов; налоговые эксперименты; поведенческая экономика

ОСНОВНЫЕ ПОЛОЖЕНИЯ

1. В результате исследования выявлено, что вероятность проверки в большей степени влияет на объем скрываемых налогов, чем на количество нарушителей, а повышение образовательного уровня позволяет сформировать не только более грамотного, но и более ответственного налогоплательщика

2. Исследование показало, что наблюдение за налоговым поведением студентов в лаборатории позволяет определить факторы, влияющие на поведение реальных налогоплательщиков, поэтому налоговые эксперименты могут стать полезным инструментом в разработке стратегии взаимодействия налогоплательщиков и налоговых органов в России и Беларуси

3. Исследование доказывает, что доверие к правительству и налоговой системе, осознание социальной направленности деятельности государства, является основным мотивом для уплаты налогов

Introduction

The world today is actively switching to electronic interaction in different spheres of life, and taxation is no exception. Electronic services facilitating interactions between taxpayers and tax authorities are being introduced at an impressive speed. All this may produce a false impression that such technological innovations could solve most problems of the taxation system, including the problem of tax evasion. We should, however, keep it in mind that interactions in the digital environment remain interactions between people who have their own interests and preferences. J. Schumpeter's claim that "psychology is really the basis from which any social sciences must start and in terms of which all fundamental explanation must run" [1] remains relevant in any economy, including a digital one. Without taking into account the motivation behind the taxpayers' behavior it is hard to understand why people still pay taxes to the budget with very low detection probabilities for tax evasion, and how to increase the collection of taxes in the future without increasing the administrative pressure.

The behavioral aspects of tax-related behavior have been described in research publications since 1970s. Due to this, most

studies of tax behavior and its dependence on subjective factors refer to countries where the observance of tax legislation and tax discipline have traditionally been high. The experience of foreign peers in the sphere of tax behavior is actively studied in Russia. For example, a specialist in management psychology Erich Kirchler presented a report "Economic Psychology of Tax Behaviour: Literature Overview and The "Slippery Slope" Framework" at the workshop "Rationality. Behavior. Experiments" in the Higher School of Economics¹. However, tax experiments per se have not yet been introduced in the practice of research.

The relevance of the scientific problem caused by the necessity of the complex study of factors that lead law-abiding behavior of taxpayers in the post-Soviet countries. Despite the relevance of an integrated approach to the study of tax evasion neither methods of behavioral economics, nor the psychological and sociological approaches to the study of the behavior of taxpayers practically do not apply in Russia and Belarus.

The goal of our research is to bridge the gaps in the experimental research of tax behavior and its motivation in the

¹ Available at: <https://iq.hse.ru/news/177673493.html>

Russian Federation and Republic of Belarus. We suggest using a laboratory tax experiment developed within the framework of behavioral economy to study taxpayers' behavior. The focus group of the study is students who will soon acquire the rights and corresponding duties of taxpayers.

The first part of the article contains an overview of research publications that form the theoretical background of the research; the second part describes methodology and instruments. The third part presents data on tax experiments in Russian and Belarus universities. The fourth part contains the results of a survey on the attitude of students from different countries to the system of taxation. The final part presents discussion and conclusions.

1. Theory

The models of the neoclassical approach to studying tax behavior are based on the premise that the taxpayer makes rational choices, and aims at maximizing benefit when making the decision to evade taxes. The founders of this approach Michael Allingham and Agnar Sandmo [2] used the criminal choice model by Gary Becker [3] to develop a so-called "A-S model" that demonstrates two behavioral strategies – risky tax avoidance and safe payment of taxes. This model was extensively used in numerous neoclassical models [4; 5], which supplemented it with various factors and assumptions.

Within the framework of neo-institutional analysis, the interpretation of rationality is extended by singling out three of its forms: maximization, limited rationality and organic rationality of economic agents. These are supplemented by the principle of self-interest, which can be enforced through opportunistic tax behavior; besides, the authors study the impact of de-formalization of tax rules (when the rules set by the state are substituted by informal rules, which in practice takes the form of tax avoidance) [6, p. 70; 7].

The transition from the neoclassical to the neo-institutional approach to behav-

ioral economy based on the paradigm of free, rational and unlimited choice of the taxpayer was connected with the necessity to explain why the observance of tax legislation is much higher than the level which the enforcement measures (audits and fines) could ensure. Thus, many neoclassical economic models show a considerably high degree of tax discipline observance and insignificant tax avoidance by taxpayers. In this connection, the advocates of behavioral approach point out that the widespread image of total tax avoidance is just a myth. For example, Alm, McClelland & Schulze [8], Fild & Frey [9], Elffers [10], Long & Swingen [11] claim, that some taxpayers never evade taxes and never try to find ways of doing so. Frey & Foppa [12], Pyle [13] criticize the opinion that individuals are amoral in their desire to maximize income by cutting taxes. In this connection, in modern behavioral research the question "why people do not pay taxes?" is substituted with the question "why people pay taxes?".

Behavioral economy uses the concepts of tax moral, tax ethics, tax avoidance mentality, attitudes towards taxes. Tax moral (inner motivation to pay taxes) is described as inner honesty inherent in people, their moral duty to observe laws and pay taxes. Although early studies of tax moral were conducted as far back as 1960s (Cologne school of tax psychology – Schmolders [14], Strümpel [15]), the very concept of tax moral was for a long time denied by most researchers. Later, tax moral was mentioned in some studies of tax behavior (Lewis [16], Vogel [17]), but studies totally devoted to this issue appeared only in the early 21st century (Fild & Frey [9]). Empirical data obtained in such research demonstrate considerable differences in tax moral between countries and the influence of socio-cultural and psychological factors on the behavior of taxpayers (Alm & Torgler [18; 19]).

In the Russian Federation and in the post-Soviet countries, the issues of tax morality and tax ethics are considered from a theoretical perspective yet. So the paper by Zotova and Boguslavsky [20] examines the concepts of «tax honesty» and «tax ethics»,

which is interpreted by the authors as «the norms of behavior that guide citizens in their relationships with the government.» The paper substantiates the importance of social activity of citizens to establish a trusting relationship between the government and society. It also discusses the socio-psychological background of dishonest taxpayers. Some authors analyze opportunistic tax behavior leading to tax evasion, for example (Merkulova [21], Vishnevsky [7], Mayburov [22], Fedotov [23]). However, in these works, attention is often drawn to the economic causes of tax behavior.

Experimental methods are one of the instruments of experimental psychology. They make it possible to obtain information regarding various phenomena, including hidden ones, such as, for example, tax evasion. As pointed out by Nobel laureate Vernon Smith, the value of experimental research is that they «...directed at closing two gaps: the gap between decision theory and decision behavior, and the gap between evidence concerning how people think about economic questions and evidence concerning how people behave in experimental markets» [24].

A detailed description of experimental tests of various factors influencing the decision to evade taxes is presented in Table 1.

Table 1

Laboratory tax experiments' results in foreign countries

Studied factor	Experiment's conclusions
Audit probability	Positive impact on the observance of tax legislation
Penalty rate	Weak impact on the observance of tax legislation
Tax rates	Positive impact on the observance of tax legislation
Taxpayer's income	Weak impact on the observance of tax legislation
Reimbursement of some of the taxes paid as a transfer to the taxpayer	A growth in transfers has a positive influence on the observance of legislation
Impact of personal moral qualities	An effective constraint for tax evasion
Openness and honesty of tax authorities	Positive impact on the observance of legislation

Source: based on [25].

Lab economic experiments are carried out in an artificial environment – a so-called “laboratory”, and the subjects know that they take part in an experiment. Starting with the first lab tax experiment conducted by Israeli researchers (Freidland, Maital, and Rutenberg) in 1970s [26], students are the most common environment for laboratory experiments.

We developed the methodology of studying tax behavior using the experience of tax experiments from different countries that were based on “experiments with the public good”. During the experiment with the public good individuals face a choice – to invest in public or in private good (Alm [27]). It should be mentioned that up to now there have practically been no tax experiments in the Russian Federation. Some publications (including those by the authors) contain descriptions of experimental methods [28–31]. At the same time, tax experiments have been conducted in other countries for over 40 years.

2. Research methodology and instruments

2.1. Methodology of a laboratory tax experiment

The drawback of laboratory experiments is that the actual behavior of taxpayers cannot be reproduced in the artificial environment, just like real life cannot be reproduced. Field experiments based on using real subjects (who do not know that they are part of an experiment) are, undoubtedly, more persuasive and valuable, but they cannot be carried out without the tax authorities, while the procedure itself is complicated and very costly.

The choice of students as the experiment environment is determined by one more factor. According to State Statistics Committee, the average age of working people is at present about 41 years old², including 64.5% aged 35 and older³. The

² *Russia in Figures*. Moscow, 2017. P. 97. Available at: http://www.gks.ru/free_doc/doc_2017/rusfig/rus17.pdf

³ Available at: http://www.gks.ru/wps/wcm/connect/rosstat_main/rosstat/ru/statistics/publications/catalog/doc_1140097038766. Calculated from data in Table 2.2.

average age of executives in Russian top-500 companies is even older – 50 years⁴. These people were born, studied, and many of them started working before 1990. So, the formation of most modern taxpayers happened in the conditions of dominant administrative-command system and social ideology, and although it instilled in people a sense of responsibility before the state, this responsibility was “mainly oriented towards the external assessment” [32, p. 44]. This generation of taxpayers is gradually becoming the past. Behavioral reaction of the students, whose views are ahead of the actual picture of today’s reactions, could, in our opinion, reflect the mood of the generation of the future taxpayers in the 21st century.

Just like other researchers using experimental methods, we based our work in the methodology of a so-called “standard tax experiment”. Its procedure can be described in the following way: participants receive or earn a certain income and should declare it. According to the experiment’s conditions, the declaration cannot be checked automatically. The participants pay taxes from the declared income. The experiment includes a certain possibility of an audit. If undeclared income is revealed, the tax and the fine need to be paid.

The experiment was carried out as a business game during classes. In this game, the students were asked to use financial data to fill in the tax form. The game consisted of several rounds (tax periods), the students did not know the number of rounds beforehand. At the beginning of each round the organizer of the game (the professor) announced the rules of the game, the information regarding the possibility of an audit and the amount of fine, which were written down on the board. After the participants filled in the forms, a randomly chosen part of declaration forms was checked, the results of the audit were announced, and the declarations were returned to the participants. The participants then calculated the size of the remaining income. After that, they were asked to fill in new forms for the new tax period.

⁴ Available at: <https://www.rbc.ru/opinions/business/02/10/2015/560e41579a794751360896bf>

Variable parameters of the game corresponded to the practice of standard tax experiments: size of income; tax rate; audit probability; penalty rate.

The key problem of laboratory experiments is that, unlike real-life situations, negative behavior does not result in any real financial gains or losses for the participants. This is the challenge of creating a controlled situation – the participants should be interested not only in the game itself, but also in its results. One of the main methods of maintaining control in lab experiments, suggested by W. Smith, is the opportunity for the participants to get rewards. According to W. Smith’s theory of “induced valuation” [33], the reward should be closely connected with the results of the participants’ actions, should be meaningful and compensate any inconveniences and costs of the participants, and should also be confidential (not known to other participants).

Understandably, we were not in a position to offer monetary compensation to students, so we made a decision to motivate them by giving them a chance to earn extra points toward their credit grades in our subject. Thus, the instruction for the participants looked like this: “Your income is 10 points. It is taxable income and you should declare it. Tax rate is 20%. You can pay a full tax or its part, the possibility of an audit is 30% (30% of randomly chosen declarations will be checked). If the audit determines that somebody did not pay their tax in full, the offender will have to pay the tax and also a fine for tax avoidance, which is 40% of the unpaid sum”.

2.2. Research tools

We used a hypothetical “tax return” (Table 2) to conduct our experiment.

Table 2

Hypothetical “tax return” form

1.	Name, Surname	
2.	Tax period	1
3.	Taxable Income	10 points
4.	Tax rate, %	20%
5.	Tax owed	2 points
6.	Tax paid	
7.		
8.		

The “tax return” form shows the tax rate, income, and tax owed (income multiplied by the tax rate). Subjects used the form to enter a tax reporting decision, with the chosen amount of income (and associated tax payment) shown in the line 6. Line 6 is filled by the game participant. After all subjects fill the form, the audit outcome randomly determines independently for each individual according to the pre-announced audit probability. The last two lines are intended to fill in the results of the audit of the declaration. Line 7 indicates the amount of the penalties if the declaration has been selected for audit and tax is undeclared. The resulting earnings (if audited or if not audited) which is equal to the player’s income minus the additional amount of tax and fine, plus refund is indicated in line 8.

2.3. Experimental design

Each subject chose how much income to report in 5 rounds. Income was held constant (10 points, except the last round), as was the tax rate (20 or 30 percent). The probability of an audit was either 20 percent or 30 percent. The fine on unreported income (the individual paid unpaid taxes plus an additional penalty) was either 40 percent or 50 percent. Thus there were five different treatment combinations based on the audit probability and penalty. In addition to their earnings from the fifth round, subjects received tax refund. Experimental conditions are presented in Table 3. The color indicates the variable that is changed in the round of the game.

Table 3

Experimental conditions

Parameters of treatment combinations for each round	Game round				
	R1	R2	R3	R4	R5
Income	10	10	10	10	5
Tax rate, %	20	30	30	30	30
Audit probability, %	30	30	20	20	20
Penalty rate on unreported tax, %	40	40	40	50	50

The experiment was conducted at Baikal State University (Russia) and at Belarus State Economic University using student subjects from both institutions

(students). There were 208 students from Baikal State University (Russia) and the 172 students from Belarus State Economic University. All participants have economic knowledge and easily understood the description of the experiment. The age differences of the participants were insignificant, so we did not investigate this factor.

2.4. The attitude to the tax system questionnaire

At the second stage of the experiment the subjects also filled out the questionnaire about the attitude to the tax system. In this case, we followed the logic of the authors of the *following* fundamental tax experiment (Spicer & Becker), who introduced into the methodology of experiments a tool called the «tax resistance scale» [34].

Data for second part of our research was collected using questionnaires applied to primary sources. The questionnaire consists of twenty (20) statements was designed to evaluate taxpayers attitudes against taxes⁵. A five-point Likert scale (from 1 strong agreement to 5 strong disagreements) was used to indicate agreement or disagreement of the subject with each statement (Table 4).

Respondents were asked to choose a number to indicate the extent of their agreement or disagreement with each statement: 5 points – fully agree, 4 points – agree, 3 points – difficult to answer, 2 points – do not agree, 1 point – completely disagree.

The questionnaire form consisted of three types of questions. The questionnaire contains 12 questions, the positive answer to which characterizes the positive attitude of the experiment participants to the tax system (1, 4, 5, 7, 8, 10, 11, 13, 15, 17, 19, 20); 5 questions, a positive answer to which implies a negative assessment (3, 6, 14, 16, 18); 3 questions of a neutral nature, the answer to which does not imply value judgments (2, 9, 12). The last group of questions is presented in the question-

⁵ We are gratitude for prof. [Aleksandr Vyatkin](#) whose questionnaire we used.

naire in order to relieve the emotional tension of the participants. This group of questions was not included in the analysis of the results.

3. Experimental Results

3.1. Experimental Results in Russia

The students from Baikal State University (Russia) were trained on different

level of education: bachelors; master students and postgraduate students.

In Figure 1 we present the level of noncompliance for each group of students (bachelors, undergraduates and postgraduate students) and for different treatment combination based on the tax rate, audit probability and penalty rate. The noncompliance rate for each group is calculated as declared tax divided by (true) tax.

Table 4

Questionnaire on attitude towards tax system

No	Statements	Answer
1	The tax system in our country allows redistributing income effectively	
2	Due to taxes, health care systems, education, etc. are developing	
3	The tax system in our country is ineffective	
4	Most citizens in our country pay taxes on time and in full	
5	If everyone pays taxes, the standard of living in our country will increase	
6	In our country there will never be fair taxation	
7	If to raise taxes, we all will live better	
8	The attitude toward taxes in our country can change for the better	
9	Taxes are fees for certain public goods provided by the state	
10	A good citizen has to pay taxes	
11	One of the functions of taxation is social justice	
12	Taxes are inevitable	
13	I pay taxes on all my income	
14	If there is even the slightest opportunity to avoid paying taxes, I will use it	
15	I pay taxes because I believe that it is my duty	
16	I will pay taxes only in the case of a real threat of restricting travel abroad	
17	The tax system in our country is open and transparent	
18	I do not trust our tax service	
19	Paying taxes, I know exactly what this money goes	
20	Filling in the tax payment form not cause difficulty for me	

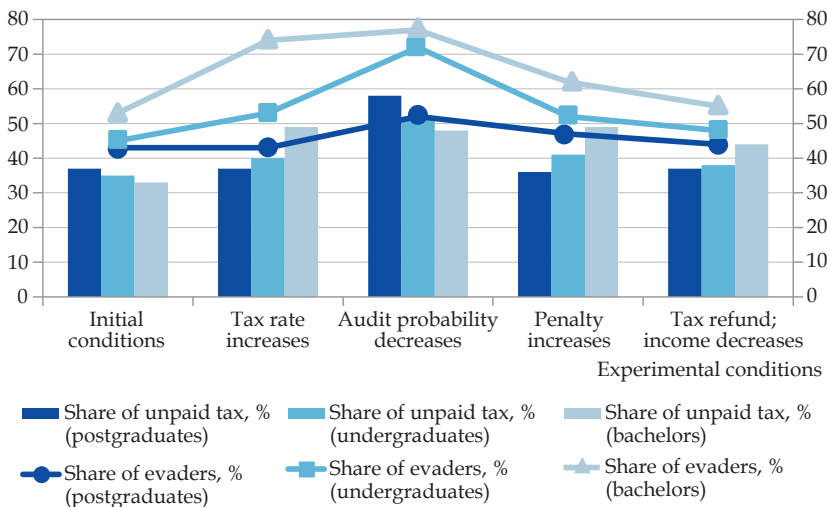


Figure 1. The level of noncompliance for different groups of students

These aggregate data reveal that the average compliance rate depended on education level of the subjects. The higher education level meet higher level of tax compliance (lower percentage of tax evaders and lower percentage of unpaid tax). Thus, subjects who already have university education (muster students and postgraduate students) demonstrated the higher level of tax compliance then subjects without university education (bachelor students).

The experiment also obtained the data on the impact on taxpayer's behavior the economic factors: the amount of income, tax rates and possible losses from tax evasion (probability of audit and the penalty rate).

The aggregate data of the game reveal the following (Figure 2):

- the tax rate increase in the second round caused the percentage of unpaid tax increase in four groups of six;
- the audit probability decrease in the third round caused an increase in the percentage of unpaid tax in all groups, the proportion of evaders remained unchanged;
- the penalty rate increase in the fourth round resulted in the decrease of the share of unpaid tax;
- the tax refund in conjunction with the income decrease in the fifth round led to different results: in some causes – the share of unpaid tax increases, in others – it decreases.

These aggregate data reveal that the growth the percentage of evaders outpace the growth of the share of unpaid tax only in two rounds (2 and 5). This means, that tax rate increase induces high incidence of tax evasion. Tax refund («reward law-abiding behavior») does it always lead to the reduction in evasion to a baseline: it may be affected by the effect of a reduction in income, i.e. the amount of risk.

Reducing the audit probability slightly affects on the involvement in illegal behavior, but evaders are willing to risk more substantial amounts. The increase in the fine rate predictably reduces the scale of evasion, both in the amount of unpaid tax and the number of evaders.

The aggregate data of the game shown in Figure 3.

The results of the questionnaire were analyzed by comparing the number of positive answers (answer «4» – I agree; answer «5» – I fully agree) between the experiment participants who paid and did not pay tax (Figure 4).

When comparing the answers given by the participants who have paid and not paid the tax, a number of regularities are revealed.

When answering questions illustrating a positive assessment of the tax system, the greatest range was observed when answering the following questions:

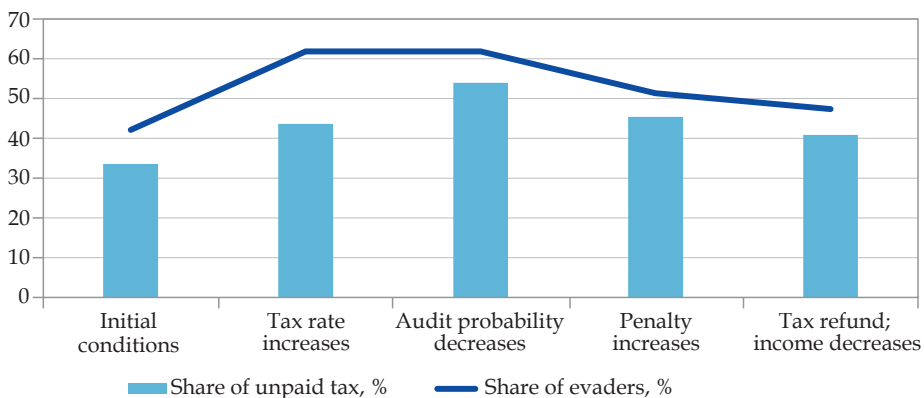


Figure 2. The share of evaders and the share of unpaid tax under different experiment parameters (Russia)

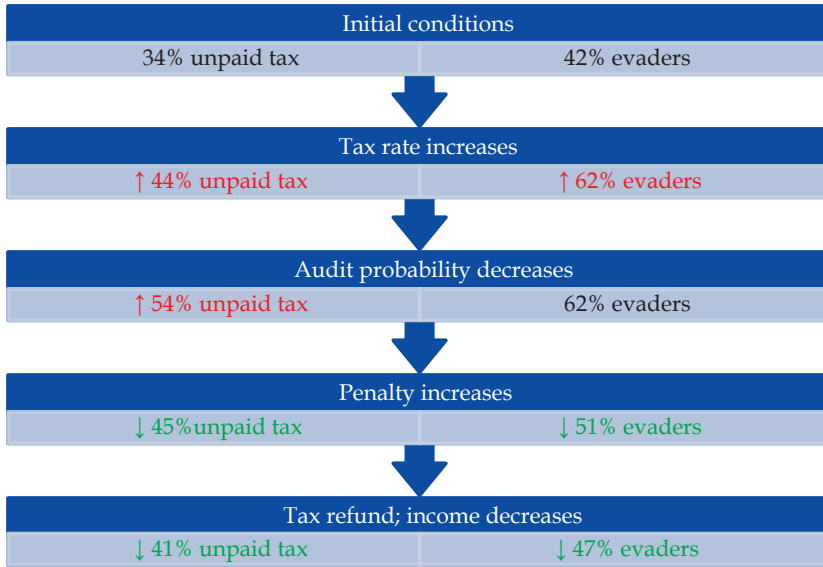


Figure 3. The impact of economic incentives on the experiment participants behavior (Russia)

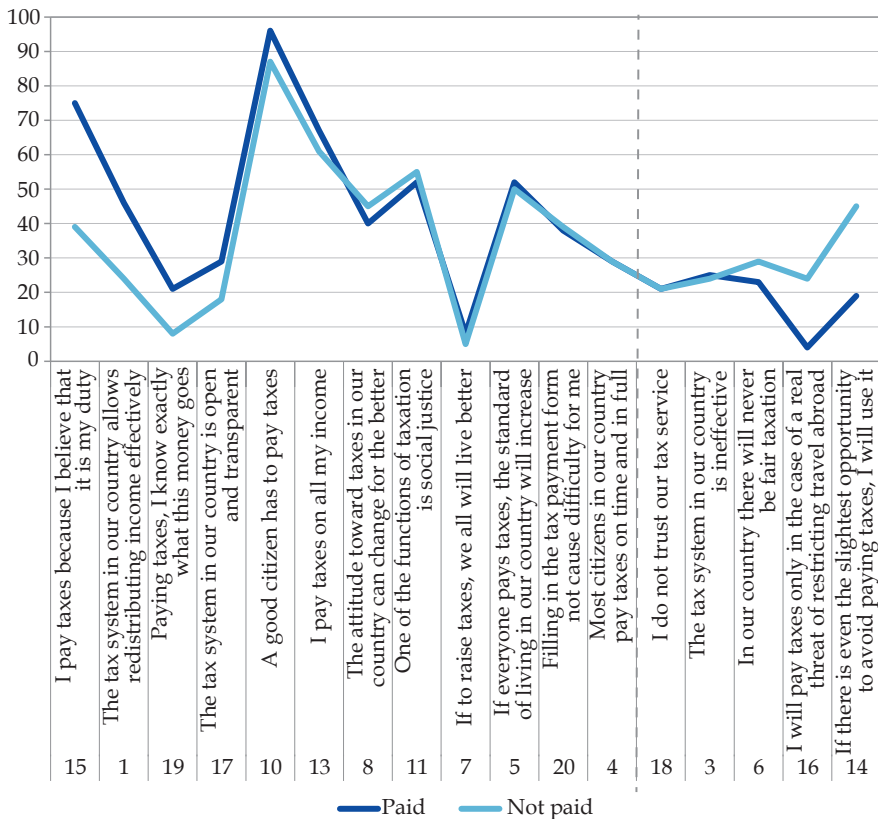


Figure 4. Distribution of positive answers to questions about the attitude to tax system among the experiment participants who paid and did not pay tax

1. I pay taxes because I believe that it is my duty. Such an answer chose 75% of the experiment participants who have paid the tax, and 39% whom have not paid the tax (range is 36%).

2. The tax system in our country allows redistributing income effectively. This answer chose 46% of the experiment participants who have paid the tax, and 24% whom have not paid the tax (range is 22%).

3. Paying taxes, I know exactly what this money goes. This answer chose 21% of the experiment participants who have paid the tax, and 8% whom have not paid the tax (range is 13%).

4. The tax system in our country is open and transparent. This answer chose 29% of the experiment participants who have paid the tax, and 18% whom have not paid the tax (range is 11%).

When answering questions that demonstrate a negative assessment by the respondent for the practice of taxation, the greatest range was observed when answering the following questions.

1. If there is even the slightest opportunity to avoid paying taxes, I will use it. This answer was given by 45% of the experiment participants who have not paid the tax, and 19% whom have paid the tax (range is 26%).

2. I will pay taxes only in the case of a real threat of restricting travel abroad. This answer was given by 24% of the experiment participants who have not paid the tax, and 4% whom have paid the tax (range is 20%).

Experiment participants were more unanimous in assessing the activities of tax authorities, regardless of their tax behavior (Figure 5). So, more than 60% of participants have no difficulty filling out a tax return; almost 80% trust our tax service and only 25% consider the tax system ineffective. The participants are unanimous in the negative assessment of the prospects for raising taxes: only 5–8% believe, that if we raise taxes we will all live better.

Regarding the tax behavior of other citizens, the experiment participants

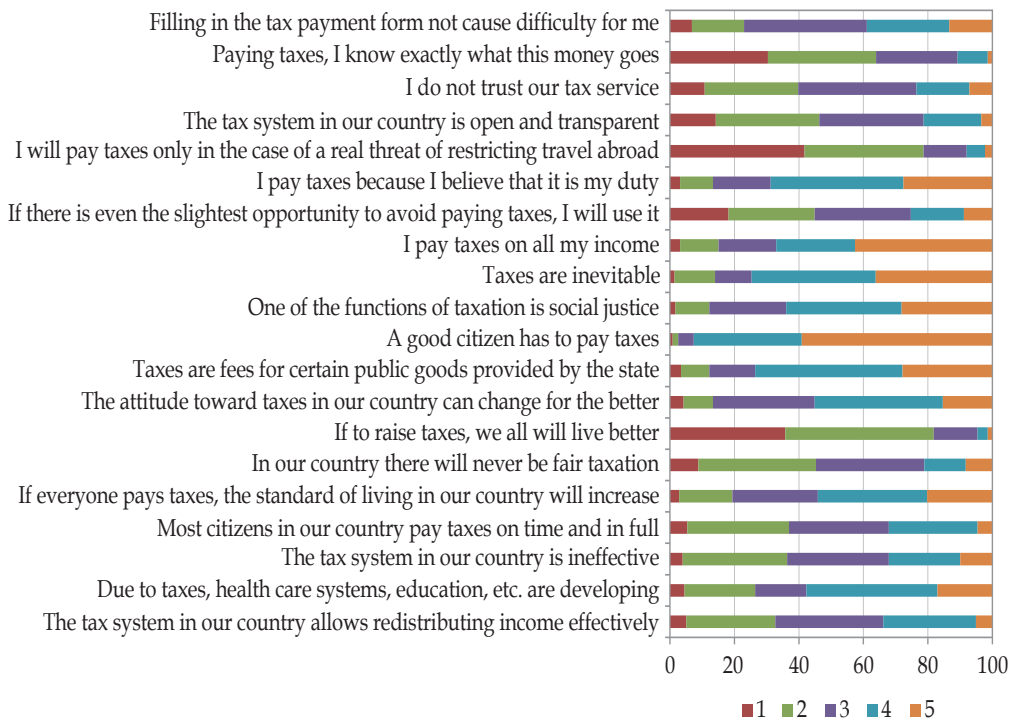


Figure 5. The results of the questionnaire on attitude towards tax system (Russia)

formed a pessimistic point of view. Less than 1/3 of respondents agree with the statement «Most citizens in our country pay taxes on time and in full». At the same time, there are no differences (in percentage terms) between the groups of respondents who paid and did not pay taxes during the experiment.

The perception and attitudes of the respondents to taxation were analyzed: whether there is significantly difference according to their decision during experiment (to pay or do not pay tax). Thus our sample (experiment participants who filled questionnaire) consists of two groups: group 1 – 66 participants who do not paid tax, and group 2 – 128 participants who paid tax at the experiment. I.e. grouping variable is compliance.

H0: responders who not paid tax have the same distribution of answers on Likert scale as responders who paid tax.

The following is descriptive statistics for taxpayers and tax evaders. In order to reveal central tendencies for questionnaire results among the experiment participants who paid and did not pay tax, we calculated several measures: mean, mode and standard deviation for each group. For Likert scale the most appropriate measure of central tendency is the mode.

The results of calculation are presented in Table 5 (0 – not paid; 1 – paid).

Minimal standard deviation is characteristic of question «A good citizen has to pay taxes». The greatest range of responders' estimates is observed when answering questions «If there is even the slightest opportunity to avoid paying taxes, I will use it» and «I will pay taxes only in the case of a real threat of restricting travel abroad».

According to this table, quite remarkable is the respond to statement «A good citizen has to pay taxes» from violators. (Kurtosis is 3.46. Kurtosis greater than 3 is positive excess kurtosis. Distributions with kurtosis greater than 3 is leptokurtic.) For this same question, we observe negative skew, i.e. for this group of respondents the distribution appears as a right-leaning curve. (We suppose that

this can be interpreted as «respondents provide a socially approved response that is not appropriate for their behavior during the experiment».)

Next, we found that distribution of data was not normal according to Kolmogorov-Smirnov normality test ($p < 0.05$). Therefore, we use methods of nonparametric analysis towards all 20 statements: Mann-Whitney U Test and Kruskal-Wallis H Test.

First, we use Mann-Whitney U Test. Mann-Whitney U test (also called the Mann-Whitney-Wilcoxon test) is a test of the null hypothesis that it is equally likely that a randomly selected value from group 1 will be less than or greater than a randomly selected value from group 2 (Table 6). The observations from both groups are combined and ranked. The test calculates the number of times that a score from group 1 precedes a score from group 2 and the number of times that a score from group 2 precedes a score from group 1. The Mann-Whitney U statistic is the smaller of these two numbers. The Wilcoxon rank sum W statistic is the smaller of the two rank sums. For large samples (one or both groups with $n > 20$) the value of U approaches a normal distribution, and so the null hypothesis can be tested by a Z -test. We compare the obtained Z value and the critical Z value to determine whether to retain or reject the null hypothesis:

– if the absolute value of the obtained Z is less than 1.96 (for 5% two tailed), then we should retain H0;

– if the absolute value of the obtained Z is greater than 1.96, then we should reject H0.

Then we use Kruskal-Wallis H test (Table 7). It extends the Mann-Whitney U test, which is used for comparing only two groups; it can be used for comparing two or more independent samples. If sample consist from more than five members per group, we should treat H as Chi-Square. H is statistically significant if it is equal to or larger than the critical value of Chi-Square for particular degree of freedom.

We have: $df = 1$; $p = 5\%$; critical Chi-Square = 3.84.

Table 5

Summary of Responses

№	Statement	Mean		Std. Deviation		Mode		Kurtosis		Skewness	
		0	1	0	1	0	1	0	1	0	1
1	The tax system in our country allows redistributing income effectively	2.89	3.05	0.91	0.99	3	3	-0.40	-0.42	0.09	0.19
2	Due to taxes, health care systems, education, etc. are developing	3.26	3.70	1.22	1.06	4	4	-1.30	-0.39	-0.09	-0.63
3	The tax system in our country is ineffective	3.05	3.09	1.17	1.07	2	3	-1.07	-0.69	0.15	0.14
4	Most citizens in our country pay taxes on time and in full	2.86	2.80	0.94	0.93	2	3	-0.82	-0.55	0.28	0.10
5	If everyone pays taxes, the standard of living in our country will increase	3.36	3.77	1.15	0.87	4	4	-0.43	-0.16	-0.26	-0.34
6	In our country there will never be fair taxation	2.65	2.62	1.18	0.99	2	2	-0.57	-0.22	0.43	0.39
7	If to raise taxes, we all will live better	2.03	1.98	0.93	0.96	1	2	-0.84	2.21	0.42	1.35
8	The attitude toward taxes in our country can change for the better	3.59	3.62	0.94	1.06	4	3	0.40	-0.27	-0.67	-0.44
9	Taxes are fees for certain public goods provided by the state	3.79	4.14	1.09	0.91	4	5	0.83	-0.28	-1.11	-0.79
10	A good citizen has to pay taxes	4.21	4.64	0.90	0.54	4	5	3.46	0.42	-1.60	-1.18
11	One of the functions of taxation is social justice	3.80	4.01	1.03	0.98	5	5	-1.09	-0.49	-0.29	-0.62
12	Taxes are inevitable	3.76	4.07	1.12	0.98	4	4	-0.47	0.77	-0.64	-1.11
13	I pay taxes on all my income	3.65	4.08	1.03	1.16	4	5	-1.07	-0.48	-0.20	-0.92
14	If there is even the slightest opportunity to avoid paying taxes, I will use it	3.17	2.54	1.00	1.24	3	2	-0.21	-0.74	0.03	0.46
15	I pay taxes because I believe that it is my duty	3.38	3.94	1.02	1.11	4	5	-1.10	0.44	0.07	-1.01
16	I will pay taxes only in the case of a real threat of restricting travel abroad	2.33	1.66	1.24	0.78	2	1	-0.47	0.34	0.72	0.97
17	The tax system in our country is open and transparent	2.26	2.63	0.97	0.99	2	2	-0.83	-0.38	0.30	0.27
18	I do not trust our tax service	2.88	2.93	1.12	1.08	3	3	-0.52	-0.50	-0.03	0.10
19	Paying taxes, I know exactly what this money goes	2.06	2.22	1.02	0.97	2	2	-0.07	-0.58	0.77	0.38
20	Filling in the tax payment form not cause difficulty for me	3.02	3.07	0.95	1.15	3	3	-0.21	-0.62	-0.14	0.02

Table 6

Mann-Whitney U test

No of statement	Mann-Whitney U	Wilcoxon W	Z	Asymp. Sig. (2-tailed)	Exact Sig. (2-tailed)	Exact Sig. (1-tailed)	Point Probability	Inference
1	3878.5	6089.5	-0.980	0.327	0.329	0.165	0.001	H0
2	3371.5	5582.5	-2.408	0.016	0.016	0.008	0.000	Reject
3	4115.0	6326.0	-0.305	0.761	0.762	0.381	0.001	H0
4	4127.0	12383.0	-0.275	0.783	0.783	0.392	0.002	H0
5	3370.5	5581.5	-2.413	0.016	0.016	0.008	0.000	Reject
6	4215.0	6426.0	-0.025	0.980	0.981	0.491	0.001	H0
7	4024.5	12280.5	-0.576	0.565	0.567	0.283	0.000	H0
8	4169.0	6380.0	-0.155	0.877	0.878	0.439	0.001	H0
9	3459.0	5670.0	-2.195	0.028	0.028	0.014	0.000	Reject
10	3059.0	5270.0	-3.617	0.000	0.000	0.000	0.000	Reject
11	3745.0	5956.0	-1.357	0.175	0.174	0.088	0.001	H0
12	3563.5	5774.5	-1.890	0.059	0.059	0.030	0.000	H0
13	3162.5	5373.5	-3.024	0.002	0.002	0.001	0.000	Reject
14	2895.5	11151.5	-3.692	0.000	0.000	0.000	0.000	Reject
15	2893.0	5104.0	-3.736	0.000	0.000	0.000	0.000	Reject
16	2949.5	11205.5	-3.681	0.000	0.000	0.000	0.000	Reject
17	3384.5	5595.5	-2.370	0.018	0.018	0.009	0.000	Reject
18	4157.0	6368.0	-0.188	0.851	0.851	0.425	0.001	H0
19	3782.5	5993.5	-1.247	0.212	0.214	0.107	0.001	H0
20	4143.0	6354.0	-0.228	0.820	0.810	0.405	0.000	H0

Note: Grouping Variable: compliance

Table 7

Kruskal-Wallis H test

No of statement	Chi-Square	Asymp. Sig.	Inference
1	0.960	0.327	H0
2	5.798	0.016	Reject
3	0.093	0.761	H0
4	0.076	0.783	H0
5	5.820	0.016	Reject
6	0.001	0.980	H0
7	0.332	0.565	H0
8	0.024	0.877	H0
9	4.818	0.028	Reject
10	13.081	0.000	Reject
11	1.840	0.175	H0
12	3.573	0.059	H0
13	9.145	0.002	Reject
14	13.632	0.000	Reject
15	13.961	0.000	Reject
16	13.551	0.000	Reject
17	5.615	0.018	Reject
18	0.035	0.851	H0
19	1.556	0.212	H0
20	0.052	0.820	H0

Thus, as a result of the analysis, it was revealed that there are differences in the distribution of answers to the questionnaire among tax payers and tax evaders on the following answers (Table 8).

Table 8

Results from nonparametric analysis

No of statement	Statements
2	Due to taxes, health care systems, education, etc. are developing
5	If everyone pays taxes, the standard of living in our country will increase
9	Taxes are fees for certain public goods provided by the state
10	A good citizen has to pay taxes
13	I pay taxes on all my income
14	If there is even the slightest opportunity to avoid paying taxes, I will use it
15	I pay taxes because I believe that it is my duty
16	I will pay taxes only in the case of a real threat of restricting travel abroad
17	The tax system in our country is open and transparent

The results of modal value calculation are presented in Figure 6.

It can be noted that:

1. «Law-abiding taxpayers» show greater solidarity in the affirmative answers to the questions: «Taxes are fees for certain public goods provided by the state»; «A good citizen has to pay taxes»; «I pay taxes on all my income»; «I pay taxes because I believe that it is my duty».

2. The majority of «offenders» do not agree with the statement «If to raise taxes, we all will live better».

This is quite consistent with participants' behavior during the game.

3.2. Experimental Results in Belarus

The game results indicate that:

- when the tax rate is higher the tax noncompliance increases (the amount of unpaid tax increases in the average sample and the share tax evaders also increased);

- when the probability of tax audit is lower the amount of unpaid tax and the rate of tax evaders also increases;

- when the fines rate is higher the tax noncompliance decreases (the amount of unpaid tax decreases and the share tax evaders also decreased);

- the tax refund combined with the income decrease resulting in the higher tax compliance only in the half of the sample (lower share of unpaid taxes, as well as the lower share of evaders).

This suggests that taxpayers in Belarus do not trust the allocation of budgetary funds and prefer to determine the use of their income by themselves (they give priority to the growth of earned income, rather than budget subsidies). Since the students were oriented toward the grade earned from the results of the game, they could calculate the amount of allocable funds, which is difficult to do in real economic conditions.

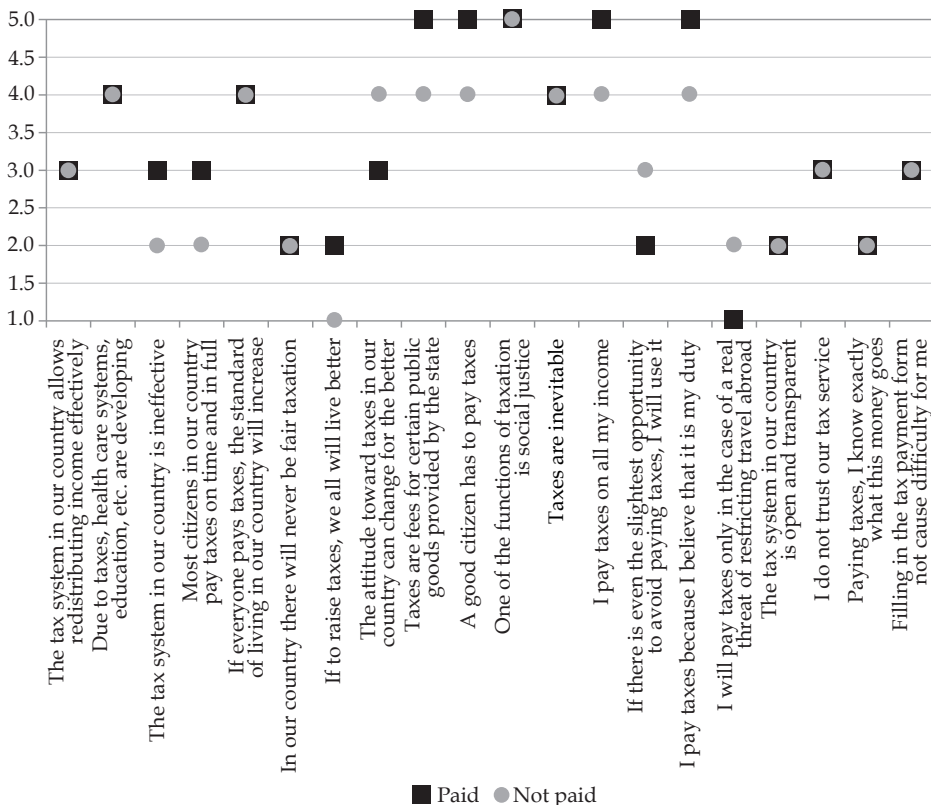


Figure 6. The results of the questionnaire on attitude towards tax system: modal value (Russia)

The game results are presented in Figure 7.

The figure shows, that under experiment conditions, the change in the share of unpaid tax moved closely with the share of evaders, except the round with tax refund.

Comparison the share of unpaid tax and the share of evaders under different experiment conditions presented on Figure 8.

Comparison of changes in indicators allows us to conclude that the increase in the tax rate and penalties causes epy more intensive increase in the share of

evaders compared to the share of unpaid taxes. The decrease in the audit probability causes a faster change in the share of unpaid taxes compared to the change in the share of tax evasion. The decrease in the amount of income and the tax refund leads to the decrease in the share of evaders, but causes the increase in the share of unpaid taxes. Thus, an increase in the tax burden and a decrease in the probability of tax audit causes Belarusian taxpayers to seek to violate the tax legislation. The strengthening of measures of responsibility for violations – stimulate the reduction of unpaid taxes.

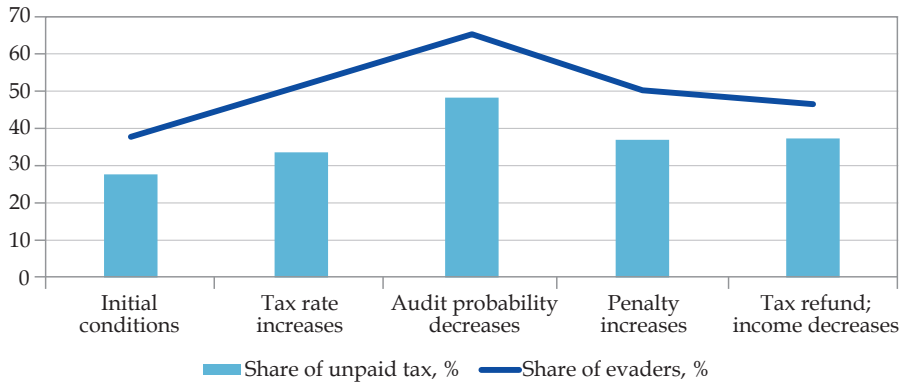


Figure 7. Tax evasion rate by determinants of the experiment (Belarus)

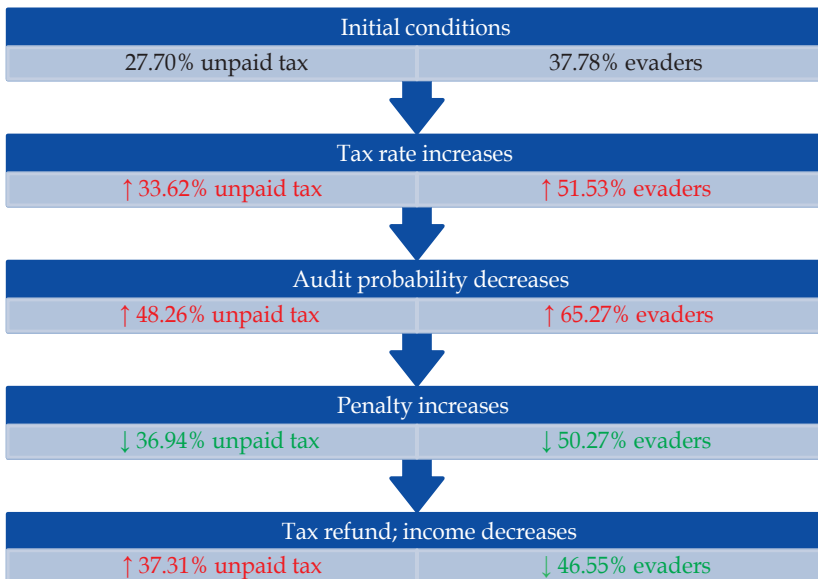


Figure 8. The impact of economic incentives on the experiment participants' behavior (Belarus)

The results of the survey on attitude to tax system and taxation are presented in Figure 9.

4. Comparison of research results with the same from other countries

In the previous part of the paper we presented the tax experiment data from two universities of Russia and Belarus. The survey data from students at Baikal State University were supplemented with the data obtained from students of Far Eastern Federal University, Saint Petersburg State University and Financial University under the Government of the Russian Federation (292 people in total).

We compared the data of our study with the results of the study on tax morale of Turkish and Spanish students from the universities of Sakarya (Turkey) and Zaragoza (Spain) [35]. The total number of students surveyed in these countries was 459 people. All of them studied tax issues and had an idea about taxes as part of their educational programs.

Comparison of results was possible for several groups of questions characterizing:

- perception on fairness of the tax system;
- attitude towards the obligation to pay taxes;
- the potential of law-abiding behavior;
- attitude to the tax authorities.

The wording of the same questions in different studies had some differences, which in our opinion is not crucial for comparing the results (Figure 10).

To compare the results of surveys, the data were brought to a uniform form. Thus, i.e. if in a survey conducted in Russia and Belarus, agreement with a certain statement meant satisfaction with the tax system, and in a survey conducted in Turkey and Spain, it had the opposite meaning, then for international comparison we rephrased the statement wording (by changing, respectively, the location of data obtained from answers of respondents).

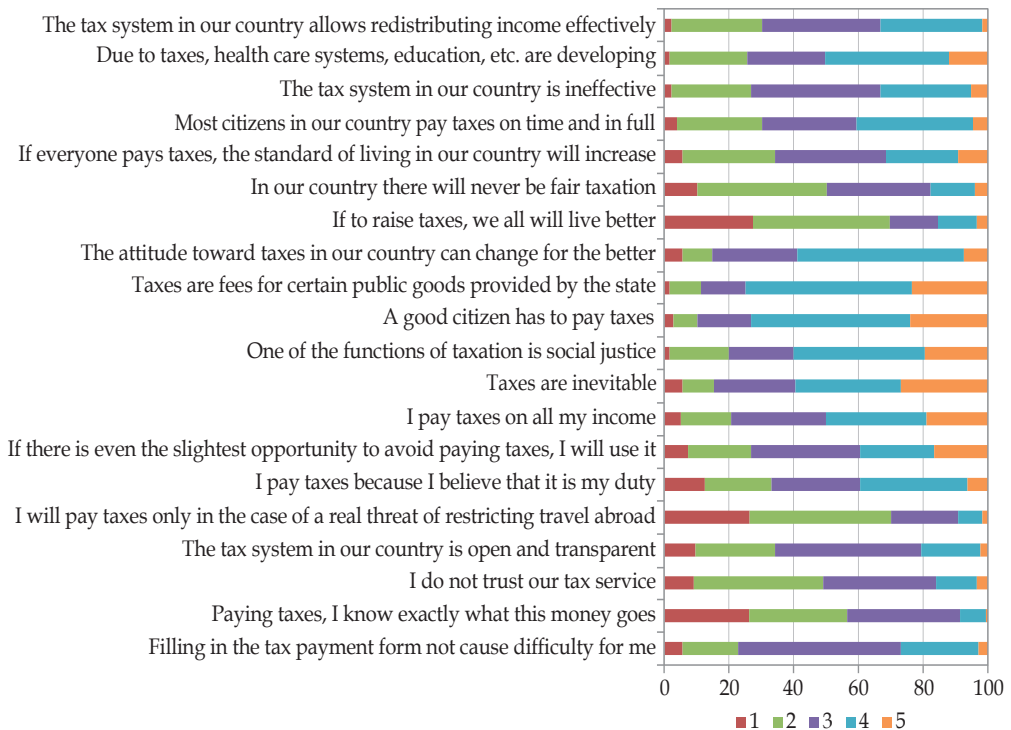


Figure 9. The results of the questionnaire on attitude towards tax system (Belarus)

As a result, in all statements, consent denotes high tax morale of the taxpayer.

The results are shown in the Figure 11.

Figure 11 makes it possible to distinguish features of tax systems of these countries from the point of view of the experiment participants, motivating them to make a decision on tax payment or tax evasion.

Even more clearly the perception of such features can be seen by calculating the ratio of the share of those who agreed

with the statement with the share of those who did not agree with it. The results are presented in the Table 9.

Based on the results of summarizing the data in the last table, we can draw the following conclusions about the perception of the tax system by respondents:

1. Russia: legislation is non-understandable for citizens; but consider paying taxes a moral duty; assert that they will not avoid paying taxes in the future.

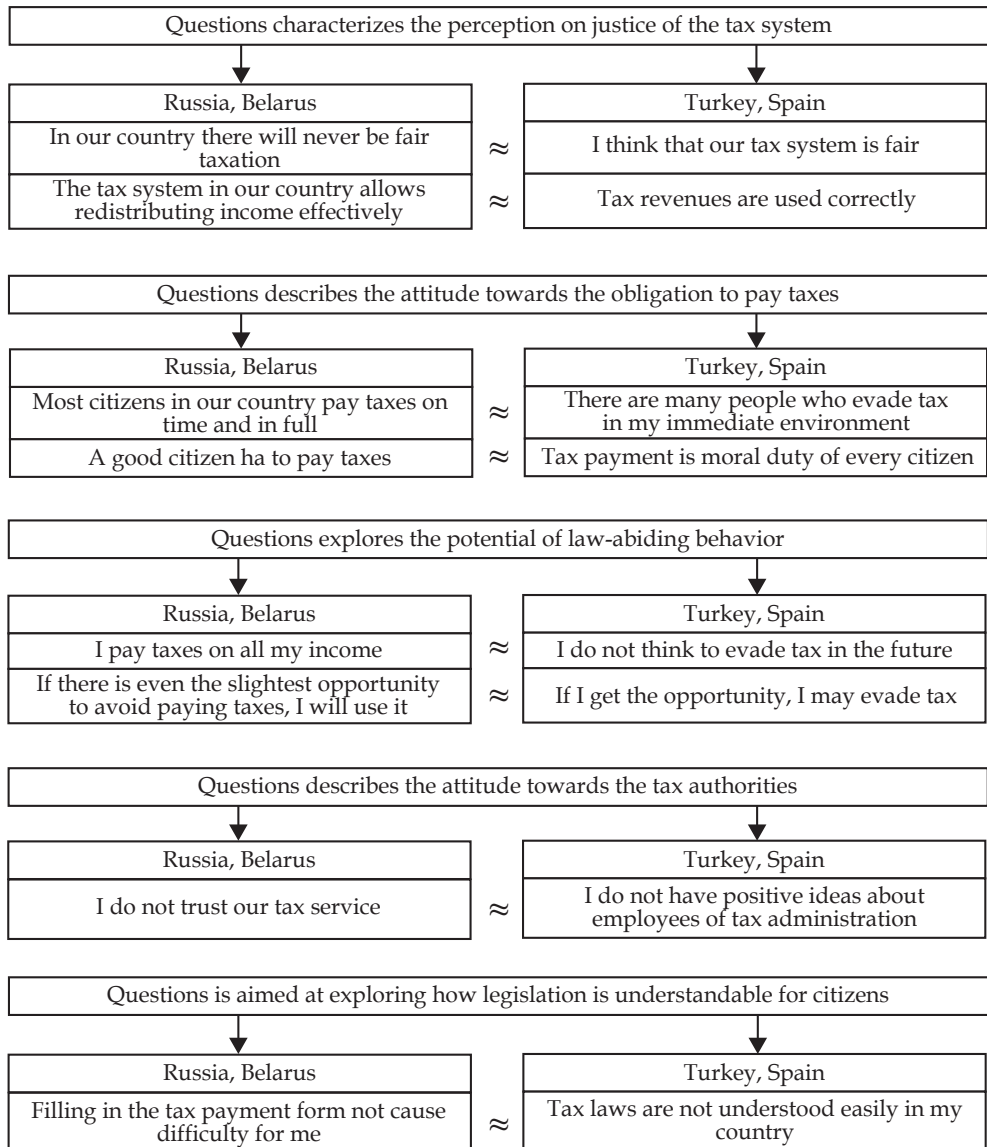


Figure 10. Groups of questions characterizing attitude to tax system in different countries

2. Belarus: do not consider paying taxes a moral duty; [if it is possible] they avoid paying taxes now, and will avoid paying in the future.

3. Turkey: legislation is non-understandable for citizens; they do not trust the tax authorities, but they will pay and pay taxes (it can be assumed that the existing system of punishments is perceived as

harsh: the highest value of ratios of agreed and disagreed persons with recent statements).

4. Spain: unfair tax system; funds are used incorrectly in terms of respondents; think that many avoid paying taxes; legislation is non-understandable for citizens; but paying is regarded as a moral duty; assert that they will pay taxes.

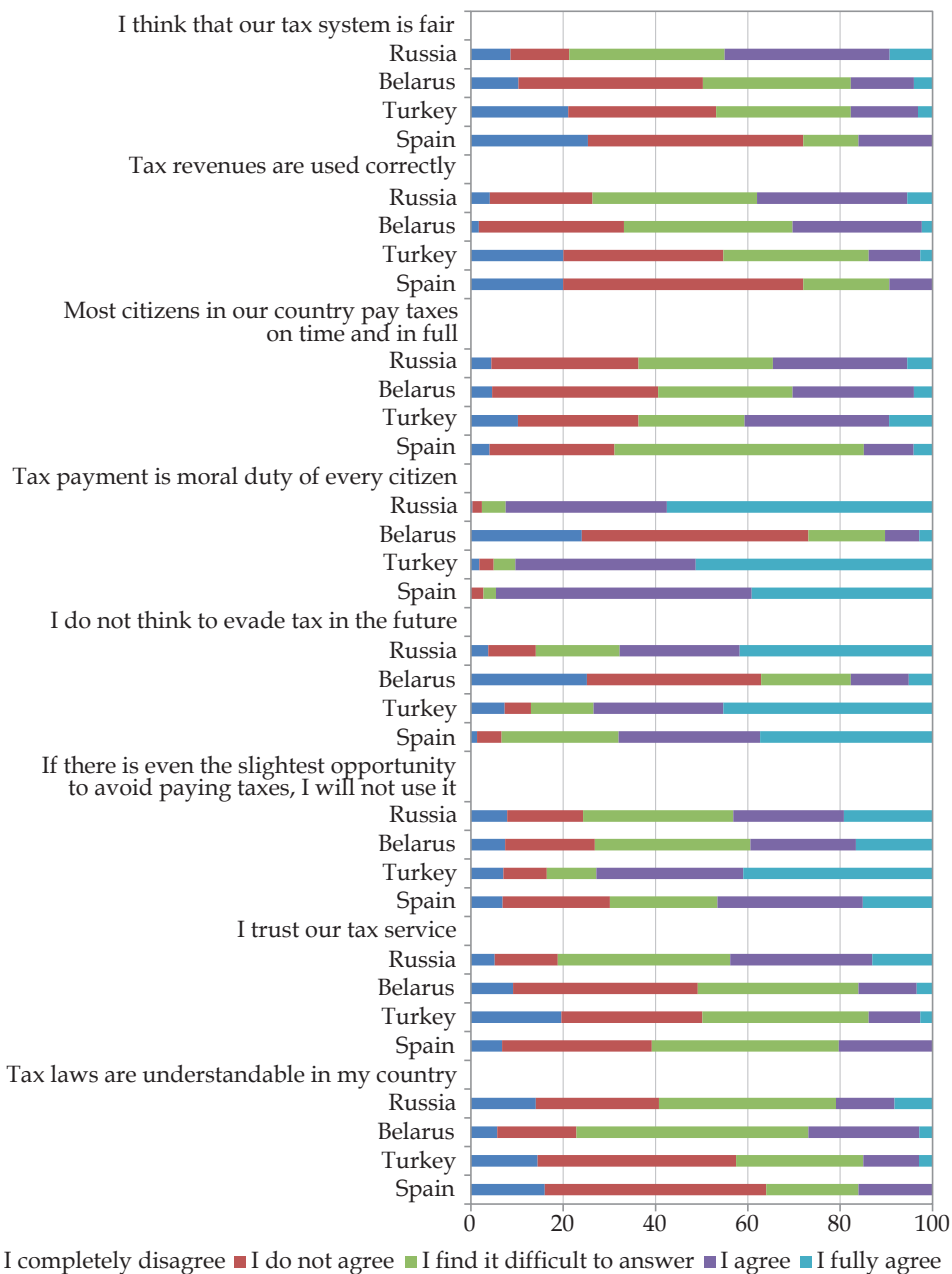


Figure 11. Processed surveys' results

Table 9

Surveys' results – cross-country comparison

Statements	Country	I completely disagree + I do not agree	I find it difficult to answer	I agree + I fully agree	Ratio of the share of those who agreed with the statement with the share of those who did not agree with it
<i>Perception on justice of the tax system</i>					
I think that our tax system is fair	Russia	21.31	33.68	45.02	2.11
	Belarus	50.29	32.00	17.71	0.35
	Turkey	53.13	29.17	17.71	0.33
	Spain	72.00	12.00	16.00	0.22
Tax revenues are used correctly	Russia	26.37	35.62	38.01	1.44
	Belarus	33.14	36.57	30.29	0.91
	Turkey	54.69	31.51	13.80	0.25
	Spain	72.00	18.67	9.33	0.13
<i>Attitude towards the obligation to pay taxes</i>					
Most citizens in our country pay taxes on time and in full	Russia	36.30	29.11	34.59	0.95
	Belarus	40.57	29.14	30.29	0.75
	Turkey	36.29	22.98	40.73	1.12
	Spain	31.08	54.05	14.86	0.48
Tax payment is moral duty of every citizen	Russia	2.40	5.14	92.47	38.57
	Belarus	73.14	16.57	10.29	0.14
	Turkey	4.95	4.69	90.36	18.26
	Spain	2.70	2.70	94.59	35.00
<i>Potential of law-abiding behavior</i>					
I do not think to evade tax in the future	Russia	14.04	18.15	67.81	4.83
	Belarus	62.86	19.43	17.71	0.28
	Turkey	13.02	13.54	73.44	5.64
	Spain	6.67	25.33	68.00	10.20
If there is even the slightest opportunity to avoid paying taxes, I will not use it	Russia	24.32	32.53	43.15	1.77
	Belarus	26.86	33.71	39.43	1.47
	Turkey	16.45	10.70	72.85	4.43
	Spain	30.14	23.29	46.58	1.55
<i>Attitude towards the tax authorities</i>					
I trust our tax service	Russia	18.84	37.33	43.84	2.33
	Belarus	49.14	34.86	16.00	0.33
	Turkey	50.13	36.03	13.84	0.28
	Spain	39.19	40.54	20.27	0.52
<i>How legislation is understandable for citizens</i>					
Tax laws are understandable in my country	Russia	40.75	38.36	20.89	0.51
	Belarus	22.86	50.29	26.86	1.18
	Turkey	57.48	27.56	14.96	0.26
	Spain	64.00	20.00	16.00	0.25

Discussion and conclusions

As this experiment is one of the first in the Russian Federation, its main result is testing the available instruments for studying tax behavior. The results of the experiment, first, proved that this method can be used in our country and second, highlighted the advantages of experimental methods for studying tax behavior:

- lab experiments make it possible to obtain information that was not available earlier (for example, the influence of incentives modeled by the researcher on the behavior of subjects);

- the experiment allows the researchers to control variables and test a large number of alternatives at low cost;

- lab experiment can be recreated.

Experiment results confirmed that non-material incentives can be used as motivation. In our experiment it was the number of points added towards the credit grade of students. The credit grade for an academic discipline is based on a 100-point scale, so 32–45 points that can be earned as a result of the game were a considerable incentive, besides, it improved attendance and increased interest in studying taxes.

Lab experiments are carried out in an artificial environment and the behavior of students (who are not yet taxpayers) may not correspond to the behavior of actual taxpayers. The problem of “external validity” of lab tax experiments (how well the research corresponds to the objective reality) is recognized and analyzed by researchers.

The comparison of the results of experiments involving students and groups of other test subjects in the USA [36] (obtained with the help from the Internal Revenue Service) showed that firstly, behavior models of subjects in the laboratory correspond to the behavior model of persons making similar decisions in natural conditions. Secondly, behavioral reactions of students are similar to the behavior reactions of real taxpayers [37]. Special research has been carried out to compare the results of experiments with students and with other test subjects. Thus, Alm,

Bloomquist & McKee [38] compared tax behavior of students and professors and university staff. This research showed that students were less law-abiding, but when the parameters of the experiment were changed, it matched the behavior of other participants who were not students. The study by Bloomquist [39], who compared tax behavior of students in the conditions of the lab experiment and the results of a selective audit of real taxpayers, also revealed similar results in both groups.

Thus it is possible to conclude that the results of experiments involving students do not allow researchers to make definite conclusions regarding the level of tax avoidance, but make it possible to judge how different factors influence it. The changes in the tax behavior of students in the experimental environment help understand which factors influence the tax-related behavior of real taxpayers in our country and how this behavior can be changes to make it more law-abiding. It is necessary to answer the questions “why people pay taxes?”, “why the level of tax conscientiousness is different?”, “how taxpayers react to different changes in taxation?” to formulate conditions that contribute to maximizing the collection of taxes without additional administrative pressure.

We studied the influence of three factors on the behavior of taxpayers: level of education, economic incentives and attitude to the tax system.

The influence of the level of education on tax behavior

Arguably, education has a positive influence on tax behavior. Better educated people find it easier to understand legislation and changes in it and, correspondingly, less often make mistakes when calculating and paying taxes. Insufficient knowledge about taxes deteriorates trust in tax authorities and tax system and, correspondingly, impedes lawful tax behavior.

Our research showed that a higher level of education makes a person not only a more literate, but also a more responsible taxpayer. It should be noted, however, that results of other research of this factor

found in foreign publications are not so unequivocal. One study (Bobek et al. [40]) proves that a low level of education could be the reason behind low tax discipline, while another study (Kirchler [41]) shows that the complexity of tax legislation, insufficient understanding of tax responsibilities and the feeling of insecurity stimulate tax discipline. Besides, a higher level of education makes it possible to work out and use schemes of tax minimization. Thus, an increase in the level of education leads, on the one hand, to the reduction of tax avoidance and, on the other, to the increase of tax minimization⁶.

The influence of economic incentives (profits and losses) on tax behavior

Our experiment studied the influence of the size of income, tax rate and possible losses in cases of avoidance (the possibility of audits and the size of fines) on the behavior of taxpayers.

The results were as following:

- an increase in income does not have any considerable influence of the observance of tax legislation;
- an increase in tax rates leads to a growth in the number of violations;
- the reduction of the possibility that the declaration will be checked has little influence on the improvement in the observance of tax legislation, besides, if this possibility is lowered, it has a weak influence on the decision to commit unlawful

⁶ Tax minimization is lawful practice of taxpayers aimed at reducing the tax burden, unlike unlawful tax avoidance.

acts, but the violators are ready to risk greater sums;

- an increase in the size of fines reduces avoidance, both in terms of the concealed sums and the number of violators.

These results support the strategy that has been chosen by tax authorities who reduce the number of audits and concentrate their efforts on working with specific groups of taxpayers. A possible way to reduce tax avoidance could be the increase of fines (up from the current 20%), at least for some violations.

The influence of attitude to the tax system on tax behavior

The obtained results agree with the hypothesis regarding the influence of the attitude to the tax system on tax behavior: those who pay taxes have a positive attitude to the system of taxation, understand paying taxes as their duty, recognize the effectiveness of taxation and redistribution of income and believe that our tax system is open and transparent. And vice-versa, those who avoid taxes do not trust our tax system, do not consider it to be just, do not believe that it is open and transparent and will only pay if they are forced to do so.

In our opinion, key research results of the conducted tax experiment are that education is a necessary factor in the upbringing of a law-abiding taxpayer and that trust towards the government and the system of taxation, the understanding of the society-oriented character of the state are the main incentives for paying taxes.

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