VILNIUS UNIVERSITY

Aurelija Anciūtė

MODELLING OF DISHONEST TAXPAYERS' BEHAVIOUR

Summary of doctoral thesis
Social sciences, economics (04 S)

Vilnius, 2011

The dissertation was written at Vilnius University in 2006-2011

Research supervisor:

Doc. Dr. Rūta Kropienė (Vilnius University, social sciences, economics, 04S)

The doctoral thesis will be presented at the Economics Council of Vilnius University:

Chairman:

      Prof. Dr. Algirdas Miškinis (Vilnius University, social sciences, economics, 04 S)

Members:

      Prof. habil. Dr. Vaclovas Lakis (Vilnius University, social sciences, management, 03 S)
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      Prof. Dr. Linas Čekanavičius (Vilnius University, social sciences, economics, 04 S)

Opponents:

      Prof. Dr. Meilutė Jasienė (Vilnius University, social sciences, economics, 04 S)
      Prof. Dr. Eugenija Martinaitytė (Mykolas Riomeris University, social sciences, economics, 04 S)

The dissertation will be presented at the public sitting of the Economics Council held in 403 Auditorium of Vilnius University, Faculty of Economics on the 9th of December 2011 at 12.00
      Address: Saulėtekis Ave. 9, Vilnius, Lithuania

This summary of the dissertation was distributed on November   2011.
The dissertation can be reviewed at the library of Vilnius University

VILNIAUS UNIVERSITETAS

Aurelija Anciūtė

NESĄŽININGO MOKESČIŲ MOKĖTOJŲ ELGESIO MODELIAVIMAS

Daktaro disertacijos santrauka
Socialiniai mokslai, ekonomika (04 S)

Vilnius, 2011

Disertacija rengta 2006–2011 metais Vilniaus universitete

Mokslinis vadovas:
doc. dr. Rūta Kropienė (Vilniaus universitetas, socialiniai mokslai, ekonomika – 04S)

Disertacija ginama Vilniaus universiteto Ekonomikos mokslo krypties taryboje:

Pirmininkas
    prof. dr. Algirdas Miškinis (Vilniaus universitetas, socialiniai mokslai, ekonomika – 04 S)

Nariai:
    prof. habil. dr. Vaclovas Lakis (Vilniaus universitetas, socialiniai mokslai, vadyba ir administravimas – 03 S)
    prof. dr. Violeta Pukelienė (Vytauto Didžiojo universitetas, socialiniai mokslai, ekonomika – 04 S)
    prof. dr. Vytautas Snieška (Kauno Technologijos universitetas, socialiniai mokslai, ekonomika – 04 S)
    prof. dr. Linas Čekanavičius (Vilniaus universitetas, socialiniai mokslai, ekonomika – 04 S)

Oponentai:
    prof. dr. Meilutė Jasienė (Vilniaus universitetas, socialiniai mokslai, ekonomika – 04 S)
    Prof. dr. Eugenija Martinaitytė (Mykolo Riomerio universitetas, socialiniai mokslai, ekonomika – 04 S)

Disertacija bus ginama viešame Ekonomikos mokslo krypties tarybos posėdyje 2011 gruodžio 9 d. 12. val. Vilniaus universiteto Ekonomikos fakulteto 403 auditorijoje
        Adresas: Saulėtekio al. 9, Vilnius, Lietuva

Disertacijos santrauka išsiuntinėta 2011 m. lapkričio   d.
Disertaciją galima peržiūrėti Vilniaus universiteto bibliotekoje.

SUMMARY

INTRODUCTION

Subject relevance. Taxes, as one of the forms of the economical relations, had appeared long before people started using money. Taxes themselves express a kind of duress, therefore the taxpayers' will to somehow evade the obligation to give away a share of their income/assets is inherent.

Since taxes are the main source of income of a state, without which, it could not perform its own functions, a lot resources are diverted to ensure that the majority of payable taxes were collected, whereas the dishonest taxpayers were punished.

The latter aspect became topical when, in 2008, the global financial recession hit, the governments of countries faced the significantly decreasing state budget income and increasing demand to finance the important economy subjects, e.g. banks, and to support the particular groups of residents. Due to these reasons, the main source of the state budget income, taxes, were proceeded to be scrutinized closely. The countries, seeking to increase income, not only undertake tax system reforms, but also started to strive against the residents and companies, avoiding taxes.

The object of the scientific research is the dishonest behaviour of taxpayers. In this research, it is restricted to one of the main problems – underreporting of income, specifically, a case, when companies conceal income, therefore avoiding a part of taxpaying, is analysed. In Lithuania's case, that would be added value tax, taxes and fees related to work relations, and also company income tax.

The scientific problem and degree of its analysis. The problem of tax evasion is multilateral. In the practical point of view, the question is how much of the tax income is lost due to taxpayers' avoidance to obey the laws, and what the methods to decrease the payable tax sums are.

The tax administrations of particular countries (e.g. the USA, Sweden), having human et al resources, seek to evaluate the tax income lost due to the activities of dishonest

taxpayers. The State Tax Inspectorate has not provided the analogous results of the estimations.

It is important to the theoreticians of the economics how the taxpayer makes the decision to behave dis/honestly. The pioneers of such analysis are Allingham and Sandmo, who provided the first microeconomic model of tax evasion, based on the taxpayer utility maximization under conditions of risk. The first variant of the model had flaws (e.g. did not coincide with the practice of taxpayer infliction, applied in real tax systems), and is being improved in various aspects until today.

The peculiarities of taxpayer decision have also engaged the specialists of the experimental economics. Alm et al (1993, 1995) carried out several experiments in laboratories, investigating the behaviour of taxpayers in particular situations.

The objective of the scientific research is to develop model of tax evasion (based on Allingham – Sandmo suggestions), which, having used the results of the experiment carried out would help to evaluate the optimum share of the tax concealed, and possible tax income losses due to dishonest behaviour of taxpayers in Lithuania.

Tasks of the scientific research:
1. Classify the terms used to entitle the dishonest behaviour of taxpayers;
2. Analyze the versions of the Allingham-Sandmo model, suggested by various authors;
3. Separate the main factors, determining the behaviour of taxpayer;
4. Create the microeconomic tax evasion model, which would involve additional factors, that had not been included into the Allingham-Sandmo model;
5. Analyse the entered theoretical model, invoking the method of the comparative statics;
6. On the basis of the formed theoretical model, make calculations, i.e., to assess, what is the amount of the share, most beneficial for the taxpayer to conceal, given the indicated assumptions and parameters (search of the optimal sollution);

7. Carry out the experiment, seeking to evaluate the behaviour peculiarities of the persons, performing the roles of taxpayers and tax auditors in the determined situations;

8. Using the results of the theoretical model analysis performed, evaluate the extent of tax income losses due to dishonest behaviour of taxpayers (the case of small and medium-sized business) in Lithuania;

9. Considering the factors, which influence the taxpayers' decisions on tax evasion, provide the recommendations on Law of Tax Administration adjustment, which would help to minimize the incentives to evade taxes.

The defendable statements of the research

1. The Allingham-Sandmo tax evasion model can be supplemented by factors which would approximate the theoretical model to the real situation.

2. To prove by analysis of research results that stricter penalties might determine more honest behaviour of taxpayers.

3. The sum of tax income, which is lost due to the dishonest behaviour of taxpayers in Lithuania, is bigger than the sum, publicly declared by the Government, to be collected in 2011 by striving against the shadow economy.

4. The wording of the Law on Tax Administration of the Republic of Lithuania in force might be altered and supplemented by consolidating a few means which might help to decrease the stimuli of taxpayers to behave dishonestly.

Methods and organization of the scientific research. While preparing the first section of the paper, the method of scientific literature analysis and systematization, as well as the method of comparative analysis, has been used.

The behaviour of a taxpayer in the situation, when the decision has to be taken whether to behave dishonestly and to what extent dishonestly, is modelled with the methods of microeconomics (taxpayer optimizes the utility under conditions of risk). The analysis of the model has been carried out using the method of comparative statics.

While modelling the optimal behaviour of the representative taxpayer, the model of optimization has been applied, i.e. the value of the chosen parameter has been pursued, which would ensure the maximum utility to be expected.

The interaction of taxpayers and tax auditors has been modelled by the methods of the experimental economy. The data received during the experiment was important determining the parameters of the optimal taxpayer behaviour, in existence of the corruption factor.

Scientific novelty of the research. The research provides three microeconomic tax evasion models, including the endogenous probability of tax audit, corruption factor, costs of reputation, built on the basis of the Allingham-Sandmo model. Having chosen the adequate parameters, two models have been applied to Lithuania; having adopted them, the representative Lithuanian taxpayer's part of the taxes to be evaded was calculated.

The scientific value of the research. Two entered models of the taxpayer utility optimization under conditions of risk involve important factors – endogeny of tax audit probability, i.e. taxpayer's behaviour determines the probability of its audit, as well as possibility of corruption – a dishonest taxpayer and tax auditor might agree to conceal the fact of tax evasion. A separate model has been made up including costs of taxpayers' reputation and corruption factor. These models, in comparison to the one entered by Allingham-Sandmo, involve more factors and are closer to real situation.

Using two microeconomic tax evasion models, given the particular presumptions, the task of taxpayer utility optimization under risk conditions was accomplished. The results received have been used to count the potential tax losses in Lithuania, i.e. the results of microeconomic analysis were applied analysing a macroeconomic problem. The results of the research may be useful for institutions which are responsible for planning state's revenue, also for the members of academic society, potential foreign investors who are concerned with conditions of market competition.

The scope and the structure of the paper. This paper consists of introduction, three main parts and conclusions. It contains 163 pages, excluding annexes, 12 tables, 28 figures. There were 145 references used.

1. THE PROBLEM OF TAX EVASION

1.1. The terms related to tax evasion

Tax unavoidability appears to be encoded in a tax definition – "mandatory payments, defined in legislation by the state or local government, to the budget of a certain level or other non-budget funds" (Alekneviciene, 2005). Tax unavoidability was also highlighted by the US statesman Benjamin Franklin. Reality, however, is that the motive to increase one's financial resources (or merely not to lose them) as well as other factors are very strong and encourage a part of population and enterprises to attempt to save or even gain money at the expense of taxes.

While analysing the literature of the field one firstly comes across plenitude of different terms and definitions. For example, terms like "tax avoidance", "tax evasion", "tax concealment", "tax fraud", "tax mitigation", "(aggressive) tax planning", "tax optimisation" and other exist in the English language. Some of them emphasize taxpayers' willingness to plan payable tax amounts as a financial flow, others – tax evasion or even efforts to seize state budget illegally. Therefore the behaviour of taxpayers' can be classified into three categories:

- planning of payable taxes on purpose to decrease them legally (attributable terms of the English language: "tax mitigation", "tax planning", "tax optimisation", if to refer to some authors, "tax avoidance" as well), i.e. taxpayer's legal actions, corresponding to the business logic, the performance of which implements actual economic activities and the right to decrease the payable tax amount is obtained, are considered as tax optimization/planning/minimization. For example, an enterprise uses corporate income tax concession in relation to research and development expenditures. When such an enterprise calculates taxable profit, the latter expenses could be deducted

three times out of the income actually decreasing payable amount of tax without violating law in force;

- if a person seeks to undertake actual economic activities, provide inaccurate/false information about the activities, or, possibly, does not provide information at all, it could be entitled as tax evasion or concealment (terms of the English language "tax avoidance", "tax evasion", "tax concealment"; "tax evasion" is further used under this category). The most frequent form of tax evasion is giving inaccurate information about the tax base. The simplest example of tax evasion is unaccountable income of goods sold and services provided;

- illegal actions of an individual (e.g. imitation of economic activities, etc.) are to be considered as "tax fraud". The latter category includes actions of taxpayers that impose criminal responsibility.

The boundaries among the above mentioned types of behaviour are not exact and in particular countries the same operations of taxpayers might be differently interpreted. Further in this article it is dissociated from phenomena of the first and third types, and the situations, when a taxpayer purposefully conceals the real amount of tax base are considered.

1.2. Basic tax evasion model and its corrections

Theoretical analysis of tax evasion was started by Michael G. Allingham and Agnar Sandmo, who proposed a microeconomic income tax evasion model (hereinafter – A-S model) in 1972. The essence of the model – a taxpayer, who has to fill in tax return, needs to decide what to do, i.e.:

   o indicate the whole sum of income,

   o indicate only the part of income. If the taxpayer chooses this path, he/she can be checked by the tax authority, and be penalized. In this case, the situation becomes worse than in the case of being honest.

The assumptions and notations of the model (Allingham and Sandmo, 1972):
   1) the taxpayer is risk averse, the argument of his/her utility function is his/her income,

2) W – total income of the person to be declared. It is an exogenous variable,

3) X – the sum of personal income indicated in a tax return. It may be equal to W, if a taxpayer is an honest person, or below W, if a taxpayer decides to underreport his income,

4) θ – proportional rate of income tax,

5) p – the probability that a person will be inspected by the tax authorities (tax audit probability). If the taxpayer is checked, the whole sum of unreported income $(W - X)$ will be determined,

6) if it is found that the taxpayer has concealed part of his/her income, a penalty is imposed - the amount of unreported income is taxed at rate π which is higher than the tax rate θ.

The taxpayer is considering how much revenue should be disclosed (X) and his decision is based on the maximisation of the utility of his revenue under the risk conditions. Von Neumann-Morgenstern utility function is chosen for that:

$$\max_{X} E(U) = (1 - p) * U(W - \theta X) + pU(W - \theta X - \pi(W - X)) \qquad (1)$$

The simplified notations:

o utility when the taxpayer is not checked:

$$U(W - \theta X) = U(Y) \qquad (2)$$

o utility when a taxpayer does not disclose all income, his/her return is verified and the fine is imposed:

$$U(W - \theta X - \pi(W - X)) = U(Z) \qquad (3)$$

When maximising (1) function the first order condition is:

$$\frac{\partial E(U)}{\partial X} = -\theta(1 - p) * U'(Y) - (\theta - \pi)pU'(Z) = 0 \qquad (4)$$

By solving the fourth equation it is possible to determine what X must be, in order the utility of the taxpayer to be maximum considering the given assumptions. The authors of the model also stated that the taxpayer will conceal a part of his/her income if the probable sum of taxes due related to underreported income is less than the sum of tax which would have been paid if the taxpayer had been honest.

Since an expression of a specific utility function is not known, by using the method of comparative statics it is possible to determine the impact on X of other parameters of the model. Results are presented in Table 1.

TABLE 1. Results of comparative statics

Exogenous variable	Analysed effect	Expression	Sign of the impact
W	$\dfrac{\partial X}{\partial W}$	$\dfrac{\partial X}{\partial W} = -\dfrac{1}{D^*}\theta(1-p)U'(Y)*$ $*\left[-\dfrac{U''(Y)}{U'(Y)} + (1-\pi)\dfrac{U''(Z)}{U'(Z)}\right]$ (5)	"+", if $\pi \geq 1$, i.e. if the income increases, reported income also increases. In other cases, there is no clear sign of the impact.
θ	$\dfrac{\partial X}{\partial \theta}$	$\dfrac{\partial X}{\partial \theta} = -\dfrac{1}{D}X\theta((1-p)U''(Y)+$ $(\theta-\pi)pU''(Z))+$ (6) $+\dfrac{1}{D}[(1-p)U'(Y)+pU'(Z)]$	The impact is not clear, since the increase of the tax rate encourages tax evasion, but the decline of income determines lower level of risk tolerance.
π	$\dfrac{\partial X}{\partial \pi}$	$\dfrac{\partial X}{\partial \theta} = -\dfrac{1}{D}(W-X)(\theta-\pi)pU''(Z)-$ $-\dfrac{1}{D}pU'(Z)$ (7)	„+", i.e. if the rate π increases, declared amount of income also increases.
p	$\dfrac{\partial X}{\partial p}$	$\dfrac{\partial X}{\partial p} = \dfrac{1}{D}[-\theta U'(Y) + (\theta-\pi)U'(Z)]$ (8)	„+", i.e. if tax audit probability increases, the amount of declared income also increases.

$* D = \theta^2(1-p)U''(Y) + (\theta-\pi)^2 pU''(Z)$ (9)

(the second order derivative of (1) expression)

By using the tools of economic theory and mathematics , the initial A-S model only partially allowed to explain the behaviour of taxpayers. In addition, some model

assumptions did not match actually functioning taxation systems. Therefore, the A-S model has been improved by Shlomo Yitzhaki. He took into account the fact that the penalty is usually imposed not on the concealed income, but it is rather related to the unpaid amount of tax (Yitzhaki, 1974):

$$U(Z) = U(W - \theta X - \pi \theta (W - X)) \tag{10}$$

In this case, $\pi > 1$ $\tag{11}$

Naturally, Ytzhaki's suggested change fits the classic approach to the tax audit. It improved the results of the A-S model. The effect of the change in tax rate is clearly positive:

$$\frac{\partial X}{\partial \theta} = -\frac{\theta}{D}(1-p)U'(Y)\{X[-\frac{U''(Z)}{U'(Z)} - \frac{U''(Y)}{U'(Y)}] - \pi(W-X) * \frac{U''(Z)}{U'(Z)}\} \tag{12}$$

Where $D = \theta^2 (1-p)U''(Y) + p(\pi-1)^2 U''(Z)$ $\tag{13}$

The interpretation of the results: when the tax rate is raised, the declared income also increases (the taxpayer acts more honestly). However, this finding contradicts the prevailing point of view that a tax rate increase causes higher incentives to evade tax. This result can be explained in such a way – due to a decrease in income (since the tax rate increases) a person feels "less wealthy" and less inclined to take risks.

The authors of A-S model themselves also paid attention to some of the assumptions that can be criticised. One of them – a part of a natural or legal person's income is often known or can become known to the tax authorities. For example, if company's clients pay for the goods and services via banks, tax authority may ask the bank to provide the information about transactions in a particular bank account. Another example - often legal persons are obliged to report the amount of money paid to individuals in the form of wages or for other reasons, as well as about dealings with other companies (i.e. to submit register of invoices).

On the other hand, the possibilities of the tax authority to identify income evaded during the tax audit can be doubtful as well, particularly if the goods or services are sold to

individuals paying cash. However, there are more reasons for the tax authority to fail in finding out the total sum of income; for example, the auditor's incompetence. This may correspond to the situation in a country's labour market – if wages in public sector are lower than those in the private sector, the tax authority has smaller chances of attracting competent staff. Low wages and poor moral values of employees can lead to even worse situation - corrupt auditors may cooperate with cheating taxpayers. Of course, it can be the opposite situation - the taxpayer is trying to bribe the auditor, but the auditor is honest and does not accept a bribe. In other words, the A-S model can be improved by including elements of the game theory. If the probability to cooperate with tax auditor is equal to g and fixed sum of the bribe is S, A-S model, when the penalty is associated with the amount of tax evaded, can be written as follows (Escobari, 2004):

Another assumption of the A-S model that can be regarded as a shortfall is neglecting the labour supply, i.e. the taxpayer might actually work in the informal sector as well.

1.2. Models of tax evasion in experimental economics

Tax evasion problem started to receive attention from specialists of experimental economics at the end of nineties last century. Since then there have been a number of interesting attempts to model real life situations at the laboratories. For example, Alm et al. (1993) conducted an experiment related to tax evasion in the laboratory of Economics and Psychology at the University of Colorado (Boulder). The experiment involved 10 students who had to play the role of the taxpayers.

There were eight experimental sessions organized, each of them consisted of up to 20 rounds. At the beginning of the experiment participants were given 5 units of fictitious currency each. It was said that money accumulated during the experiment would be exchanged to real currency (dollars) at the ratio 4:1.

In each round a participant received randomly selected income from 2 to 4 units of money. Then the taxpayer had to decide how much income to declare, if the income tax

rate is 30 percent. The taxpayer knew that he/she can be audited and if found cheating would not only have to pay the missing amount of the tax, but also 100 percent fine.

During the experiment rules of selection for tax audit were changed several times. The authors divided those selection rules into random and endogenous ones. Endogenous rules considered to be the logical conditions of selection for audit depending on the information provided by the taxpayers about their income, i.e. taxpayers influence the probability of tax audit by making a decision about income to be declared.

A few examples of endogenous rules of selection for audit, used during the experiment:
1) conditional future audit rule (CFA). Taxpayers were selected randomly (with probability equal to 5 percent). If during the audit of recent tax return a taxpayer was found cheating, he/she was subjected to the audit of two upcoming tax periods,
2) conditional back audit rule (CBA). Taxpayers were selected randomly (with probability equal to 5 percent). Taxpayers are chosen at random tax audits. If during the audit of recent tax return a taxpayer was found cheating, he/she was subjected to the audit of two previous tax periods.

A few summarised findings of the experiment:
a) in case of endogenous audit rules taxpayers tended to be more compliant than in case of random selection (on average approximately 80.8 percent of actual income was declared). Taxpayers were behaving most honestly when mixed strategy of the selection for control was applied. Still, in the latter situation it was not efficient to audit taxpayers who received low income, while participants with high income faced audit with low probability. One could find such policy discriminatory.

b) in case of conditional future and back audit rules taxpayers declared a little bit more than 50 percent of their actual income on average. It should be noted that checking a few tax periods of once caught cheating taxpayers is rational because their behaviour may be systematic.

The influence of cultural and other factors, unrelated to tax control, was the object of research conducted by Cummings et al. (2007). The experiment was carried out in two different countries, South Africa and Botswana. It aimed to assess whether the taxpayers from different countries will behave the same way under identical circumstances. It was assumed that deviations if they occur can be explained by social and cultural factors.

The findings of this experiment proved that higher audit probability and penalty rate forces taxpayers to be more compliant. It was also evident that participants from Botswana declared on average a higher share of their income by approximately 10 percentage points. This gap can be again explained by different culture and traditions.

In 2004 another experiment was conducted in Ukraine (Bilotkach, 2006). It differs from previously analysed ones as the participants were divided into two interacting groups (the businessmen, representing enterprises, and tax auditors).

Businessmen had to decide if to hide a share (half) of company's turnover. The total turnover was fixed to ten monetary units and the tax rate was 50 percent. If businessmen decided to cheat, that meant they would offer a bribe to the tax auditor in order to avoid sanctions. The size of the bribe equals to monthly salary of the auditor. In this case it was one monetary unit.

According to conditions of the experiment, the work of an auditor can be checked with the probability of 10 percent. If it is found that a taxpayer and a tax auditor decided to cooperate, the taxpayer has to pay tax due and a fine (half of the income), while the auditor looses his/her income. The payoffs of the businessman and the tax auditor are provided in table 2.

TABLE 2. Payoffs of taxpayer and tax auditor

		Tax auditor	
		Cooperate	Do not cooperate
Businessman	Hide	6,5; 1,8	2,5; 1
	Do not hide	5;1	5;1

Source: Bilotkach (2006).

This information was provided to all the 16 participants of the experiment. During the experiment they had to indicate 12 times (rounds):

- if to hide 50 percent of the turnover (a question for the businessmen),
- if to accept a bribe (a question for the tax auditors).

According to the results of the experiment, 52 percent of tax auditors were willing to accept bribes, while 48 percent of the businesses tried to conceal a share of the turnover. Approximately in half of the cases when the taxpayer was evading taxes, the tax auditor agreed to cooperate.

The other outcomes of this experiment are provided in section 3 together with the results of the experiment conducted in Lithuania.

2. THEORETICAL MODEL AND DESIGN OF THE EXPERIMENT
2.1. Factors influencing taxpayer's behaviour

Factors influencing taxpayer's behaviour can be divided into three categories according to the influence source (taxpayer – tax system – environment (other factors)):

- factors related to the taxpayer himself/herself. They are usually subjective. According to OECD (2010), one of the central factors influencing taxpayers' decision is perception of justice. This consists of distributive, procedural and penal justice. Perception of distributive justice expresses taxpayers' views on tax burden and how government uses the tax revenue. Perception of procedural justice is taxpayers' understanding about tax administration and its behaviour. Perception of penal justice denotes taxpayer's opinion about penalties for the tax evasion. Tax evasion would be encouraged if a taxpayer thinks that taxes are too high or it is wasted by the government, also if he/she thinks that the tax administration is aggressive or penalties are too high.

Another important set of factors is personal and social values. Personal norms are the views of a taxpayer, and social norms are the views of the society. Personal and social norms are interrelated. Rather often a taxpayer accepts norms of the society.

- Factors related to tax administration. This group consists of features of taxpayer control and other activities, also tax administration system itself. One of the most important examples is audit probability and fine rate. The possibility to evade taxes is also essential. There are cases when taxpayers have no possibility to conceal their income/turnover because of tax laws, for example, employer withholds income tax form employees' salaries. If tax auditors are unqualified or corrupted, tax evasion is encouraged.

- Other (usually economical) factors.

2.2. The model

The object of the modelling is behaviour of a company. Notations:

- X is actual income of the company,

- Y is income to be indicated by the taxpayer. $X \geq Y$, income concealed: $X - Y$,

- integrated tax rate is t (comprises direct and indirect taxes, i.e. it expresses tax burden in relation to taxpayer's turnover),

- fine rate is b. Fine is imposed on the sum of taxes evaded: $bt(X - Y)$,

- μ is the share of individuals in a society tolerant towards tax evasion,

- D is a fixed sum of bribe,

- p is probability of the audit, it depends on μ, i.e. if the share of dishonest individuals in society is high, audit probability is low because of numerous subjects for tax control.

- k represents the likelihood for the taxpayer to cooperate with the tax auditor as this would allow to avoid paying taxes due and a fine. $k = k(\mu)$, i.e. if the share of dishonest individuals in society is high, it is easier to find an auditor who would agree to cooperate,

- it is assumed that taxpayer who is caught cheating also incurs costs of reputation. For example, looses trust of partners or possibility to get a credit, etc. $c = c(\mu, t(X - Y))$, i.e. costs depend on the society's views and sum of taxes evaded,

- utility function is concave. Its argument is income. The first derivative of utility function is positive ($U'(y) > 0$) and the second one is negative ($U''(y) < 0$).

The taxpayer maximizes its expected utility by choosing how much to declare, knowing that if caught cheating a fine will be imposed, on the other hand, there is a chance to cooperate with a dishonest tax auditor.

$$\max_{Y} E(U) = (1 - p)U(X - tY) + \qquad\qquad\qquad \textit{No audit}$$

$$+ p(1 - k)U\{[X(1 - t) - bt(X - Y) - c(t(X - Y))]\} + \quad \begin{array}{l}\textit{Tax audit carried out, the}\\ \textit{auditor is honest}\end{array} \qquad (14)$$

$$+ pkU\{X - tY - D\} \qquad\qquad\qquad \begin{array}{l}\textit{Tax audit carried out, the auditor}\\ \textit{is dishonest}\end{array}$$

Here $E(U)$ is the expected utility. This problem is solved by differentiating the function by Y, making it equal to 0 and finding a solution. The first derivative[1]:

$$W \equiv \frac{\partial E(U)}{\partial Y} = (1 - p)U'(X - tY)(-t) +$$

$$+ p(1 - k)U'\{[X(1 - t) - bt(X - Y) - c(t(X - Y))]\}(bt + tc'(t(X - Y)) +$$

$$\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad (15)$$

$$- ptkU'[X - tY - D] =$$

$$= -t(1 - p)U'(A) + tp(1 - k)U'(B)(b + c'(t(X - Y))) - ptkU'[C]$$

The second derivative:

$$Z \equiv (1 - p)\underbrace{U''(A)}_{(-)}t^2 +$$

$$+ p(1 - k)\underbrace{U''\{D\}}_{(-)} * \underbrace{(bt + tc'(t(X - Y))^2}_{(+)} + p(1 - k)\underbrace{U'\{B\}}_{(+)}\underbrace{(-t^2 c''(t(X - Y))}_{(?)}) + \qquad (16)$$

$$+ pt^2 k\underbrace{U''[C]}_{(-)}$$

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[1] It should be taken into account that in expression (15) additional notations (A, B, C) were introduced to simplify the expression.

$Z < 0$, if $p(1-k)U'\{B\}(-t^2c''(t(X-Y)) \le 0$. The latter element is equal to zero or negative if the second derivative of cost function is negative or equal to 0. The method of comparative statics helps to explore how taxpayer's choice could change if certain parameters shift. For example, the effect of change of corruption probability:

$$\frac{\partial Y}{\partial k} = -\frac{\dfrac{\partial W}{\partial k}}{\dfrac{\partial W}{\partial Y}} = -\frac{\dfrac{\partial W}{\partial k}}{Z} = -\frac{1}{\underbrace{Z}_{(-)}}\{-p\underbrace{U'\{B\}}_{(+)} * \underbrace{(bt + tc'(t(X-Y)))}_{(+)} - pt\underbrace{U'[C]}_{(+)}\} < 0 \qquad (17)$$

This expression is negative, therefore, if the probability of cooperation between a taxpayer and tax auditor increases, the taxpayer will tend to declare less of actual income. In such case, government should take effort to diminish such probability by introducing special measures.

When the rate of fine is increased:

$$\frac{\partial Y}{\partial b} = -\frac{\dfrac{\partial W}{\partial b}}{\dfrac{\partial W}{\partial Y}} = -\frac{1}{\underbrace{Z}_{(-)}}\{tp(1-k)\underbrace{U''(B)}_{(-)}(-t(X-Y)) * \underbrace{(b + c'(t(X-Y)))}_{(+)} + \\ + tp(1-k)\underbrace{U'(B))}_{(+)}\} > 0 \qquad (18)$$

The expression is negative, therefore the increase of fine rates will serve as an incentive for the taxpayer to reveal more of the turnover.

As cost function makes the model rather complicated to use for calculations, there are a few more suggestions how to look at the problem of the taxpayer. In this case the taxpayer has to make the decision which share of actual income (in percent) to declare, i.e. $Y = RX$, $0 \le R \le 1$, and $p = p(R)$.

When there is no corruption, the taxpayer's problem can be written as follows:

$$\max_R E(U) = (1 - p(R))U(X - tRX) + \qquad \textit{No audit}$$

$$\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad (19)$$

$$+ p(R)U\{[X(1-t) - bt(X - RX)]\} \qquad \textit{Tax audit carried out, the auditor is honest}$$

When there is a possibility to cooperate with the tax auditor by offering a bribe as fraction (K) of potential losses in case of an audit without corruption, taxpayer's problem can be written as follows:

$$\max_{R} E(U) = (1 - p(R))U(X - tRX) + \qquad \text{\textit{No audit}}$$

$$+ p(R)(1 - k)U\{[X(1 - t) - bt(X - RX)]\} + \qquad \substack{\textit{Tax audit carried out, the} \\ \textit{auditor is honest}} \qquad (20)$$

$$+ p(R)kU\{X - tRX - K(t + bt)RX\} \qquad \substack{\textit{Tax audit carried out, the auditor} \\ \textit{is dishonest}}$$

Those two models without cost function were used for calculation of optimal tax evasion. The results of theoretical calculation were used for evaluation of tax gap in Lithuania, assuming that a taxpayer tends to make optimal choices in life as well. If total sum actually paid is *VM*, and the share of taxes paid by small and medium enterprises is *q* then absolute tax gap can be assessed this way (the concealed share of taxes is denoted as *SD*):

$$SPR_1 = VM * q * \frac{SD}{1 - SD} \qquad (21)$$

The relative evaluation of tax gap (as share of potential tax revenue):

$$SPR_2 == \frac{q * SD}{(q - 1) * SD + 1} * 100 \qquad (22)$$

The results of the application of this methodology are presented in the third chapter of the summary.

2.3. Design of the experiment

The experiment carried out in Ukraine served as basis for the one conducted in Lithuania in 2009. It was meant to:

• determine how often participants-taxpayers (businesses) are likely to behave dishonestly under predefined conditions,

• determine how often participants - tax auditors are likely to behave dishonestly when having a possibility to accept a bribe,

• check if there were participants who would behave honestly in any case.

There were 14 Vilnius University students, who studied at Faculty of Economics, voluntarily involved in this experiment. Half of them had to perform the role of businessmen and half of them had to do the tax auditor's job.

In this experiment businessmen had to decide whether to reveal entire turnover of the company or 70 percent of it, i.e. the share of turnover to be concealed is fixed and close the size of the shadow economy according to various sources (see publications of Lithuanian Free Market Institute or numerous papers of the Professor F.G. Schneider).

Making assumption that small and medium sized companies tend to conceal their turnover more often and after brief analysis of the turnovers of such companies according to the data of Department of Statistics under the Government of the Republic of Lithuania, monthly turnover of the company had been set to 200 thousand litas. To help the participants to understand the situation easier, the tax rate was set at 25 percent.

A businessman who evades taxes would always suggest a bribe to a tax auditor as in this case the taxpayer would escape paying tax due and a fine. The size of the penalty is 25 percent of the sum of the evaded tax. Bribe amount is fixed and equal to the auditor's monthly salary.

Tax auditor performs audits of companies which are randomly assigned to him/her. In case of tax audit, all turnover of the company is determined. Tax officer needs to indicate in each round if he/she would accept a bribe offered by a taxpayer. The official knows that his/her work can be checked with a probability of 10 percent. If caught cheating, the tax auditor looses the income and the taxpayer is punished anyway.

In this experiment the salary of the auditor is 2,000 litas. It had been chosen according to publicly available information about salaries which are indicated to the applicants seeking a job at State Tax Inspectorate in Lithuania.

After the fourth and twelfth rounds the information about the corrupted tax auditors was announced to both groups of participants.

The payoffs of a businessman and a tax auditor are provided in table 3.

TABLE 3. Payoffs of a taxpayer and a tax auditor, thousands of litas

		Tax auditor	
		Cooperate	Do not cooperate
Businessman	Hide	163;4	135;2
	Do not hide	150;2	150;2

This game has two Nash equilibriums:

•   (hide, cooperate), i.e., if an entrepreneur chooses to hide income (payoff equals to 163 thousand litas), it is worth for a taxpayer to cooperate (payoff equals to 4 thousand litas),

•   (do not hide, do not cooperate), i.e. if a taxpayer does not hide a share of turnover, there are no incentives for a tax officer to cooperate.

The third table presents information which, together with other relevant instructions, had been read for the both groups of participants. After that they were asked to indicate their choice on an answer sheet 16 times (rounds). After each round tax returns were randomly assigned for the tax auditors and the payoffs of the participants were indicated. The results of interaction had been known to the tax auditors after each round.

In addition, it should be mentioned that all participants received a fixed amount of money for performing their roles. The amount of money was not related to the actual payoffs during the experiment in order not to encourage excessive risk taking.

3. RESULTS OF THE RESEARCH AND RECOMMENDATIONS FOR TAX ADMINISTRATION

According to the models provided in the second part (see expressions (19) and (20)) calculations are presented for the taxpayer who is not willing to take risks, i.e. utility function is concave. There were three utility functions chosen (see table 4).

TABLE 4. Utility functions

	Expression	The first derivative	The second derivative	Comments
1	$U(X) = \dfrac{X^{1-\beta}}{1-\beta}$ (23)	$\dfrac{\partial U}{\partial X} = X^{-\beta} > 0$ (24)	$U''(X) = -\beta X^{1-\beta} < 0$ (25)	$\beta \geq 0$. The higher value β represents stronger risk aversion (Bernasconi, 1998).
2	$U(X) = \sqrt{x}$ (26)	$\dfrac{\partial U}{\partial X} = \dfrac{x^{-\frac{1}{2}}}{2} > 0$ (27)	$U''(X) = -\dfrac{x^{-\frac{3}{2}}}{4} < 0$ (28)	Simple concave utility function.
3	$U(X) = x$ (29)	$\dfrac{\partial U}{\partial X} = 1$ (30)	$U''(X) = 0$ (31)	Not strictly concave utility function.

The next step is to define other parameters of the model: probability function, fine rates, tax rate, probability of corruption and the size of the bribe. The probability function of the tax audit is linear and represents lower probability for the higher share of the income declared (R):

$$p = 0,999 - 0,998 * R \tag{32}$$

According to this function tax audit is never guaranteed 100 percent, on the other hand, even a compliant taxpayer faces a very low probability of tax audit.

Since in this model the tax base is taxpayer's income/turnover and in Lithuania the tax base seldom equals income/turnover, it is needed to calculate the aggregate tax rate which comprises all taxes in relation to taxpayer's income/turnover.

According to the data of State Tax Inspectorate during the first tree quarters of 2010 small and medium-sized businesses paid approximately 52 percent of all the taxes. In 2010 the national budget and State social insurance fund budget revenue (from taxes and fees) reached 26.1 billion litas. Assuming that in 2010 52 percent of all the taxes and fees were paid by small and medium-sized businesses (that equals to 15.72 billion litas)

and taking into consideration that sales of those businesses reached 124.7 billion litas, the tax burden rate in relation to sales would be approximately 10.9 percent. This rate has been used in calculations.

The rates of fines, which are established in Lithuania, are from 10 to 50 percent of unpaid tax amount. Also, additional calculations were performed with a higher penalty rates in order to assess how they might change taxpayers' behaviour.

One of the parameters which can hardly be evaluated in real life is probability that tax auditor would be willing to take a bribe. Evaluation of this possibility was one of the goals of the experiment. During the experiment, the approximate percentage of auditors willing to cheat in different rounds of the experiment ranged from 20 to 60 percent.

Coefficient R represents a taxpayer's compliance. Coefficient SD represents which share of income (and taxes) is to be concealed:

$$SD = 1 - R = 1 - \frac{Y}{X} \qquad (33)$$

When using the utility function (23), the maximisation of the expected utility for the taxpayer may be written as follows (no corruption factor included):

$$\max_R E(U) = (1 - p(R)) \frac{(X - tRX)^{1-\beta}}{1-\beta} + p(R) \frac{[X(1-t) - bt(X - RX)]^{1-\beta}}{1-\beta} \qquad (34)$$
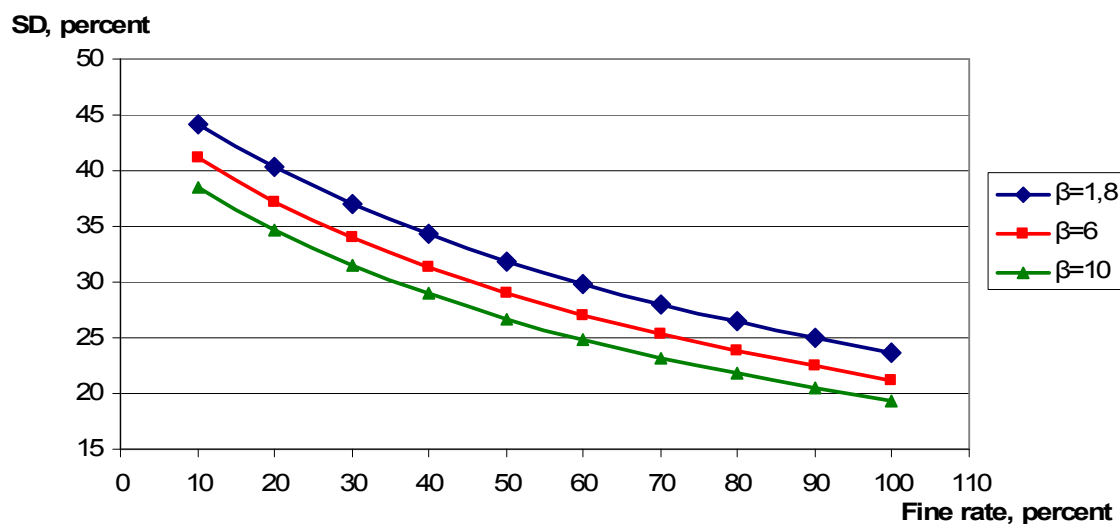
$$\max_R E(U) = X^{1-\beta} * [(1 - p(R)) \frac{(1 - tR)^{1-\beta}}{1-\beta} + p(R) \frac{[1 - t - bt(1 - R)]^{1-\beta}}{1-\beta}] \qquad (35)$$

MS Excel function *Solver* has been used to identify R which maximises the element $[(1 - p(R)) \frac{(1 - tR)^{1-\beta}}{1-\beta} + p(R) \frac{[1 - t - bt(1 - R)]^{1-\beta}}{1-\beta}]$. In this case optimal R as well as optimal SD (taxes evaded) is calculated.

Figure 1 represents results according to the level of fine and β. Higher fine rate encourages lower tax evasion.

Fig. 1. Optimal share of taxes evaded (SD) according to different fine rate and β (no corruption factor), in percent

When probability of corruption is 20 percent and the potential bribe equals to 30 percent of possible losses in case of an audit, the results of calculation of optimal tax evasion is higher from 3 to 7 percentage points than in case when there is no possibility for a tax taxpayer to cooperate with auditor.

Using the results of modelling when utility function is (23), $\beta = 1,8$ and there is no possibility for cooperation, approximate tax gap is calculated. Table 5 also contains tax losses which could be considered as unavoidable due to the fact that control of all the taxpayers is too costly or sometimes impossible. The fraction of potential losses which are unavoidable was taken from the example of Sweden (Skatteverket, 2007), which has high tax culture (Šinkūnienė, 2009).

TABLE 5. Potential tax gap in Lithuania

Fine rate, %	10	20	30	40	50
Share of taxes to be concealed, %	44,1	40,2	37,0	34,3	31,9
The sum of taxes lost because of tax evasion, billion litas	10,7	9,1	7,9	7,1	6,3
Unavoidable tax losses, billion litas	2,4	2,3	2,2	2,1	2,0
Tax gap, %	29,0	25,9	23,3	21,3	19,5

The potential loss of taxes due to tax evasion in Lithuania is higher than the sum which was set as target by the Lithuanian government to recover from the shadow economy. Of course, to reach such an objective timing and measures are very important.

Results of the experiment

As mentioned above, the results of the experiment (the number of auditors willing to cooperate with the tax payers) were used for calculations according to the theoretical models. The number of taxpayers and tax auditors who decided to cheat during each round is provided in figure 2.
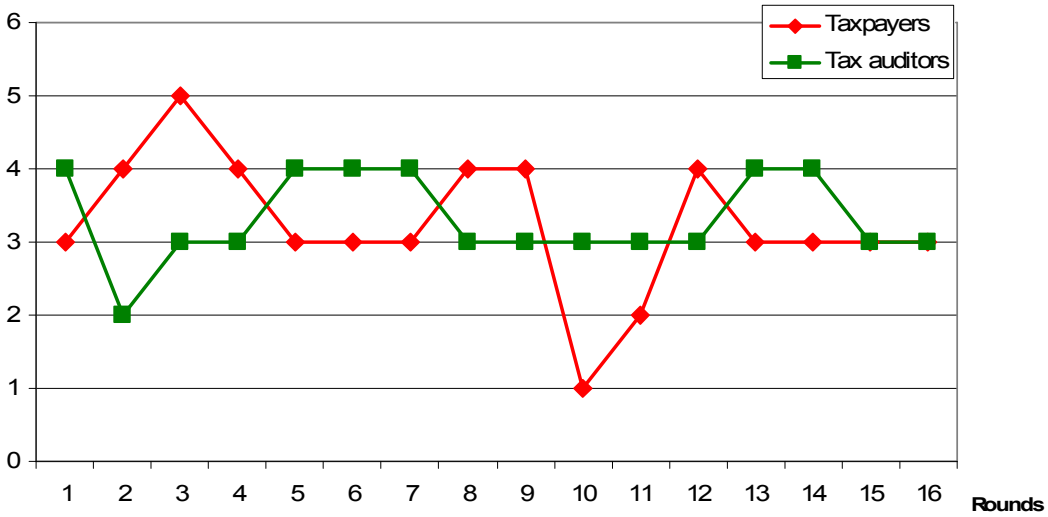
Fig. 2. The number of dishonest taxpayers and tax auditors during each round

The main findings of the experiment are as follows:

1) In 47.3 percent of cases the auditors were willing to cooperate with the tax payers. Three out of seven auditors in all cases or almost in all cases expressed their willingness to accept a bribe.

2) In 46.4 percent of cases taxpayers were willing to hide their turnover. Three out of seven almost in all cases indicated about concealment of the turnover. Almost half of the cases when a taxpayer was trying to evade taxes ended in cooperation with a corrupted tax auditor.

3) 52 percent of tax evasion cases were discovered. After the re-control of tax auditors' work, this rate reached 55.8 percent. Two times the cooperation between a tax auditor and a taxpayer was discovered.

4) One taxpayer and one tax auditor remained compliant during the whole experiment.

The most important result of this experiment in Lithuania is the percentage of cases when participants indicated their willingness to cheat (evade taxes or accept a bribe). It implies that future employees and businessmen are rather tolerant towards tax evasion and bribery. To complement this it should be noted that, according to the report by the Transparency International for 2010, 34 percent of respondents in Lithuania confirmed that they had given a bribe to the state representatives.

In order to make the experiment closer to real life situations, it can be improved in a number of ways. First of all, businessmen should have a possibility to decide about the share of turnover to be audited. Such opportunity should allow a better assessing of the views of participants about the tax evasion.

Another important aspect is assumptions about the tax audit probability. During the experiment businessmen should be aware that not everyone is controlled, but they should not be informed how the taxpayers are selected for the tax audit. This would better reflect the reality since only a small number of taxpayers are audited.

The rule of selection for tax audit should be endogenous, i.e. depend on financial indicators of the taxpayers. For example, if taxpayers declare lower income, some of them could be audited. This would allow checking if taxpayers tend to change their behaviour after they are caught cheating.

It is also important to know that taxpayers and tax auditors have contacts in real life. Therefore, during the experiment both of them should be able to learn about each other. For example, the taxpayer should know if the auditor could have accepted a bribe in case of audit after each round, because such officials may tray to encourage bribery at the beginning of the audit. An honest taxpayer having such information later on can change his/her behaviour.

An auditor should also clearly know what kind of taxpayer he/she had to audit, i.e. if the taxpayer was willing to offer a bribe. This could have an impact on the behaviour of an auditor who usually tends to be honest.

In addition, the auditors who would be caught accepting bribes should be excluded from the game and new participants should be appointed. The businessmen participating in such deals should pay taxes due, a fine and additional sum of money for offering a bribe to tax officials.

The experiment should also be expanded by involving more participants and rounds as more data would enable in depth statistical and econometric analysis.

Recommendations for improvement of tax administration

In the second part of the work some aspects of tax administration in Lithuania were discussed. Also, considering the results of calculations according to the theoretical models, Lithuanian tax administration system could be improved, for example by amending the Law on Tax Administration.

First of all, the order of imposition of fines and interest should be reviewed (Law on Tax Administration, article 139). As higher penalties are an incentive for the taxpayers to be compliant, it should be changed in a way that taxpayers would not perceive the penalties as too light or too strict. A reasonable suggestion would be to extend the highest rate of the penalty to 100 percent of the tax evaded.

Attention should also be paid to the variety of control procedures. Desk audit (Lithuanian Law on Tax Administration, Chapter VII) should be removed as this option provides an opportunity to treat taxpayers differently though their issues related to taxes can be identical. Besides, in case of desk audit no penalty is imposed on a tax evaded, so, this control measure does not serve as strong motivator to be more compliant.

The author believes that one of the important issues in Lithuania is taxpayers' perception of justice. One of the ways to improve the situation is public announcement of tax

evaders who were caught cheating (this would require amendment of the article 39 of Law on Tax Administration). This provision would be very unattractive for the businesses which want to have good reputation and also for the individuals who want to run for certain positions in the government apparatus. Publicity could be avoided if taxpayer reports about violations before the commencement of tax audit and pays the tax due and certain fine.

Another mean of strengthening the perception of justice is the duty for the tax authorities to carry out tax audits of individuals (also their family members) who have high positions in the government apparatus. In order to implement such practice Law on Declaration of Individuals' Assets and / or Law on Income Tax should be amended.

As the calculations showed that in case of corruption state's revenue losses due to the tax evasion are greater, it is necessary to mitigate possibilities of such unlawful agreement. One of the measures to do that is follow up control of auditors' work. It is also worth to review the salary system of auditors, i.e. to increase salaries in order to minimise financial incentive to cooperate with cheating taxpayers.

CONCLUSIONS

1. Seeking to extend the microeconomic tax evasion model, suggested by Allingham and Sandmo as far back as 1972, the 3 new models, which correspondingly include the costs of taxpayer reputation, corruption factors (the possibility to bargain with an unfair tax auditor, fixed and proportional bribe), endogenous (depending on the decisions of a taxpayer) possibility of tax audit, have been composed.

2. One of the models (including the costs of reputation) was analysed by using the method of comparative statics. It allowed to ground mathematically the preconditions that, given the possibility to bargain with tax auditors, taxpayers will be apt to evade taxes, on the contrary, the increase of the penalty encourages taxpayers to behave more honestly.

3. Using the built theoretical models and the parameters (the rates of penalties, imposed for unpaid taxes, the aggregated rate of taxes), describing the Lithuanian tax system, it has been estimated that, the optimal hidden part of income (taxes) of the taxpayer, having no possibility to bargain with an auditor, is from 32 to 45 percent (depending on the chosen norm of penalty and utility function).

4. Having used a single taxpayer's, as a representative agent's, behaviour results according to the theoretical models, and, presuming that taxpayers seek for optimal utility in real situations and organize the activity accordingly, the evaluation of the lost tax part in Lithuania, due to the dishonest activity of the small and medium-sized subjects, was carried out. According to the different presumptions, the small and medium-sized business did not pay from 6,3 to 10,7 billion litas in 2010.

5. According to the suggested methodology, the evaluation results of the absolute tax losses have been used counting the tax gap, i.e. the comparative part of the potential tax income, which is lost due to tax evasion. These losses make from 19,5 to 29,0 percent of the potential income of the national budget and State Social Insurance Fund. Since in real life a part of taxpayers have no absolute possibilities to conceal their income, and a part are lean to behave honestly, disregarding the possible benefit or taking the occasions, moreover, protect their reputation, it would be proper to follow the more reserved results of these estimations.

6. Having assessed some of the characteristics of the Lithuanian and Irish tax administration, the results of the theoretical models' analysis, the generalisation of the factors, determining the behaviour of taxpayers, the research provides recommendations, which could ensure the more honest behaviour of taxpayers. Once of such suggestions would be to increase the norms of the penalties for the evaded taxes, the decrease of overdue fines renounced. The effective measure could be the public announcement of taxpayers, who, as found during the audit, had not paid certain amount of the taxes. It would be appropriate having withdrawn the desk audit, since such a control procedure presumes to approach the taxpayers differently and does not bring any penalty.

REFERENCES

Aleknevičienė, V. (2005). Finansai ir kreditas. Vilnius: Enciklopedija.

Allingham, M., Sandmo, A. (1972). Income Tax Evasion: A Theoretical Analysis. Journal of Public Economics, Vol. 1, p. 323-338.

Alm, J., Cronshaw M., McKee, M. (1993). Tax Compliance with Endogenous Audit Selection Rules. Kyklos, 46(1), p. 27-45.

Alm, J., Sanchez, I., De Juan, A. (1995). Economic and Noneconomic Factors in Tax Compliance. Kyklos, Vol. 48, p. 3-18.

Bilotkach, V. (2006). A Tax Evasion - Bribery Game: Experimental Evidence from Ukraine. The European Journal of Comparative Economics, Vol. 3, p. 31-49.

Cummings, R.G., Martinez-Vazquez, J., McKee, M. Torgler, B. (2007). Effects of Tax Morale on Tax Compliance: Experimental and Survey Evidence. NCER Working Paper Series, Working Paper No. 12.

Escobari, D. (2004). Corruption and tax evasion: a model of optimal behavior and strategic interaction.

Yitzhaki, S. (1974). Income tax evasion: A note. Journal of Public Economics, 3, p. 201-202.

Lietuvos Respublikos mokesčių administravimo įstatymas. Valstybės žinios , 2004, Nr. 63-2243.

OECD (2010). Understanding and Influencing Taxpayers' Comliance Behaviour. Prieiga per internetą http://www.oecd.org/dataoecd/58/38/46274793.pdf (accessed 02.05.2011).

Skatteverket. (2007). Tax gap Map.

Transparency International (2010). Global Corruption Barometer 2010. Prieiga per internetą:
http://www.transparency.lt/new/images/global_corruption_barometer_report_2010.pdf
(accessed 02.05.2011).

AUTHOR'S PUBLIACTIONS

1. Anciūtė, A., Kropienė R. (2010). The model of tax evasion, its coherence to the practical tax administration. Ekonomika, 89(4), p. 49-65.

2. Anciūtė, A. (2010). Mokesčių mokėjimo tendencijos Lietuvoje 2008–2009 metais. Lietuvos statistikos darbai, 2010 (49), p. 40-46.

3. Anciūtė, A., Misiūnas, A. (2006). Finansiniai rodikliai ir efektyvumas Lietuvos pramonėje. Ekonomika ir vadyba: aktualijos ir perspektyvos. Ernesto Galvanausko tarptautinė mokslinė konferencija. Šiaulių universitetas, p. 255 – 260.

BRIEF NOTE ON THE AUTHOR

From 2000 to 2004 Aurelija Anciūtė studied at Vilnius University, Faculty of Economics (direction – finance). She also attended the program of Mathematical Economics.

The author received master degree in economics (economic analysis and planning) in 2006 at Vilnius University, Faculty of Economics. The same year she was accepted for PhD studies (department of Economic Modelling and Quantitative Methods). Since 2008 Aurelija Anciūtė has been working as a lecturer at Vilnius Co-operative College.

Since 2004 the author has been working at State Tax Inspectorate under the Ministry of Finance of the Republic of Lithuania. Her work field is related to risk management and development of IT tools which help to manage taxpayers' risks.

Aurelija Anciūtė together with other specialists from tax administrations of European Union have contributed to upgrading Compliance Risk Management Guide for Tax Administrations. This publication is presented on the website of European Commission as an example of good practice in tax administration.

REZIUMĖ

Mokesčių nemokėjimo problema yra aktuali nuo pat mokesčių atsiradimo, kadangi dėl įvairių priežasčių dalis visuomenės narių nenori atsisakyti dalies savo finansinių išteklių. Šiame darbe, nagrinėjant nesąžiningą mokesčių mokėtojų elgesį, yra apsiribojama mokesčių bazės slėpimu. Paprastai mokesčių bazė yra susijusi su apyvarta ar pajamomis.

Pirmasis mikroekonominis mokesčių vengimo modelis buvo pasiūlytas 1972 m. Allingham ir Sandmo. Šio modelio esmė – mokesčių mokėtojas maksimizuoja laukiamą naudingumą, pasirinkdamas, kokią savo pajamų dalį deklaruoti, kai žino, kad egzistuoja tam tikra mokesčių audito tikimybė. Jei mokesčių audito metu nustatoma, kad mokesčių mokėtojas bandė nuslėpti dalį pajamų, jis turi sumokėti trūkstamą mokestį ir baudą. Naudingumo funkcijos išraiška nėra žinoma, tačiau daroma prielaida, kad ji yra įgaubta, t. y. mokesčių mokėtojas nemėgta rizikos.

Tokio pobūdžio problema nagrinėjama pasitelkiant lyginamosios statikos metodą, kuris, esant tam tikroms prielaidoms apie naudingumo funkciją, leidžia nustatyti, kokį poveikį kintamajam (šiuo atveju deklaruojamos pajamos) daro kitų modelio parametrų pokyčiai. Allingham-Sandmo atveju tyrinėtas audito tikimybės, mokesčių tarifo, baudos normos, pajamų pokyčių poveikis deklaruojamoms pajamoms.

Mokesčių mokėtojų elgseną tyrinėja ir eksperimentinės ekonomikos specialistai. Paprastai eksperimentų metu tariami mokesčių mokėtojai turi nuspręsti, kiek pajamų deklaruos, žinodami, kad jų pateikta informacija gali būti patikrinta. Tokiu atveju jiems reikėtų sumokėti trūkstamą mokesčio sumą ir baudą. Eksperimentų rezultatų analizė leidžia įvertinti mokesčių mokėtojų elgesį esant tam tikroms aplinkybėms (pvz., didėjant baudos normai).

Alligham-Sandmo modelis sulaukė didelio susidomėjimo ir pasiūlymų, kaip galėtų būti pakoreguotas. Šio darbo tikslas yra Allingham-Sandmo modelio pagrindu sudaryti naują mikroekonominį mokesčių vengimo modelį, kuris apimtų svarbius dabartinio mokesčių administravimo aspektus.

Modeliuojant mokesčių mokėtojų elgesį, svarbu atsižvelgti į veiksnius, kurie lemia mokesčių mokėtojų spendimą. Pastarieji gali būti suskirstyti atsižvelgiant į jų šaltinį, t. y. ar veiksniai susiję su mokesčių mokėtoju (vidiniai veiksniai), mokesčių administravimo sistema (išoriniai veiksniai) ar kitomis (išorinėmis) aplinkybėmis.

Nagrinėjant išorinius veiksnius, reikia pažymėti, kad mokesčių administratorius ne visada gali nustatyti visas mokesčių mokėtojo pajamas/apyvartą, be to, tik nedidelė mokesčių mokėtojų dalis gali būti patikrinama dėl ribotų mokesčių administratoriaus išteklių. Todėl mokesčių mokėtojai yra atrenkami auditui, atsižvelgiant į turimą informaciją apie juos. Praktikoje taip pat gali būti atvejų, kai mokesčių mokėtojas bando papirkti mokesčių auditorių, todėl pažeidimai gali būti nuslėpti bendru sutarimu.

Mokesčių mokėtojas priima sprendimus pagal savo paties suvokiamą teisingumo jausmą, t. y. pagal savo požiūrį į bendrą mokesčių naštą, surinktų lėšų panaudojimą, procedūrų mokesčių mokėtojų atžvilgiu vykdymą ir pan. Be to, mokesčių mokėtojui įtaką daro ir visuomenės vertybės – jei dauguma visuomenės narių pateisina mokesčių vengimą, tokios nuostatos gali tapti priimtinos ir sąžiningiems mokesčių mokėtojams.

Atsižvelgiant į aptartus veiksnius, Allingham-Sandmo modelio pagrindu sudaryti trys modeliai:

1) pirmajame modelyje mokesčių mokėtojas turi priimti sprendimą, kiek savo apyvartos deklaruoti, kai be potencialios baudos, kuri turi būti skiriama nustačius, jog dalis apyvartos slepiama, mokesčių mokėtojas patiria papildomus kaštus, susijusius su reputacijos praradimu. Audito tikimybės funkcija priklauso nuo nesąžiningo elgesio paplitimo visuomenėje. Šis veiksnys turi įtakos ir kaštų funkcijai. Modelyje taip pat įrauktas korupcijos veiksnys, t. y. egzistuoja tikimybė, kad mokesčių mokėtojas ir mokesčių auditorius susitars, kyšio suma yra fiksuota,

2) antrajame modelyje mokesčių mokėtojas turi priimti sprendimą, kurią dalį apyvartos jis deklaruos (o kartu ir kurią mokesčių dalį jam teks sumokėti), jei yra galimybė susitarti su mokesčių auditoriumi, pasiūlant fiksuotą kyšį. Mokesčių audito tikimybė yra endogeninė, t. y. priklauso nuo mokesčių mokėtojo deklaruojamos pajamų dalies,

3) trečiasis modelis skiriasi nuo antrojo tuo, kad kyšis priklauso nuo potencialių mokesčių mokėtojo nuostolių, kuriuos jis patirtų, jei būtų atliekamas mokesčių auditas.

Pirmasis modelis išnagrinėtas lyginamosios statikos metodu: padarius prielaidą apie mokesčių mokėtojo naudingumo funkciją (kad ji yra įgaubta), nustatyta, kaip turėtų pasikeisti mokesčių mokėtojo elgesys, jei keistųsi audito ir korupcijos

tikimybė bei baudos norma. Nustatyta, kad, didėjant baudos normai, mokesčių mokėtojas turėtų elgtis sąžiningiau. Priešingai, didėjant tikimybei susitarti su auditoriumi, mokesčių mokėtojas bus linkęs labiau slėpti mokesčius.

Trečiasis modelis, taip pat supaprastinta jo versija (be galimybės susitarti su mokesčių auditoriumi) buvo panaudoti atliekant optimalios slepiamos mokesčių dalies skaičiavimus, atsižvelgiant į Lietuvos mokesčių administravimo sistemos ypatumus. Skaičiavimams atlikti buvo pasinaudota *MS Excel* funkcija *Solver*.

Kai baudos norma lygi 10 proc., nėra galimybės tartis su mokesčių auditoriumi, agreguotas mokesčių tarifas lygus 10,9 proc. (pagal atliktus skaičiavimus), o audito tikimybė tiesiškai priklauso nuo deklaruojamos apyvartos dalies, priklausomai nuo pasirinktos naudingumo funkcijos, mokesčių mokėtojui optimalu vengti nuo 39 iki 46 proc. mokėtinų mokesčių. Kai baudos norma yra 50 proc., mokesčių mokėtojui, priklausomai nuo naudingumo funkcijos, optimalu slėpti apie 27–33 proc. mokėtinų mokesčių.

Atsižvelgus į galimybę mokesčių mokėtojui ir mokesčių auditoriui susitarti, atlikti skaičiavimai parodo, jog laukiamą naudingumą optimizuojantis mokesčių mokėtojas elgsis žymiai drąsiau, t. y. slėps didesnę mokėtinų mokesčių dalį nei atvejyje be korupcijos.

Orientacinės tikimybės mokesčių mokėtojui ir mokesčių auditoriui susitarti vertinimas buvo atliktas organizuojant eksperimentą. Jo metu tariami mokesčių mokėtojai ir mokesčių auditoriai per 16-a etapų turėjo nuspręsti, ar slėptų dalį apyvartos/sutiktų priimti kyšį. 47 proc. atvejų tariami mokesčių auditoriai buvo linkę priimti kyšį. Be to, šiame eksperimente vienas tariamas auditorius ir vienas mokesčių mokėtojas visada elgėsi sąžiningai. Minėtas eksperimentas gali būti pakartotas koreguojant pasirinktas prielaidas ir didesne apimtimi.

Darant prielaidą, kad mokesčių mokėtojai elgiasi taip, kad maksimizuotų savo laukiamą naudą, darbe pateiktas potencialių mokesčių pajamų prarandamos dalies vertinimas Lietuvoje (pagal trečiąjį modelį ir jo supaprastintą versiją). Apskaičiuota, kad prarandamos mokesčių pajamos dėl nesąžiningo mokesčių mokėtojų elgesio galimai siekia nuo 6,3 – 10,7 mlrd. litų per metus. Išreiškiant prarandamą mokesčių sumą kaip potencialių mokesčių pajamų dalį, mokesčių spraga Lietuvoje gali siekti nuo 19 iki 30 proc. Taigi šalies valdžios siekis surinkti papildomų lėšų, kovojant su šešėline

ekonomika, yra realus, tačiau svarbu pasirinkti tinkamas priemones. Kita vertus, reikia atsižvelgti į tai, kad visiškai išnaikinti mokesčių vengimo neįmanoma.

Atsižvelgiant į mokesčių vengimo priežasčių analizę ir modeliavimo rezultatus, darbe pateikti pasiūlymai dėl mokesčių administravimo sistemos tobulinimo, kurie leistų sumažinti mokesčių vengimo mastus. Viena iš svarbiausių priemonių galėtų būti baudų už nuslėptus mokesčius padidinimas, pvz. iki 100 proc. (dabar maksimali bauda pagal Lietuvos Respublikos mokesčių administravimo įstatymą yra 50 proc.). Kita priemonė – viešas skelbimas mokesčių mokėtojų, kurie buvo nustatyti vengiantys mokėti mokesčius. Tai itin nepatraukli bausmė tiems mokesčių mokėtojams, kuriems svarbi jų reputacija.

Nesąžiningo mokesčių mokėtojų elgesio modeliavimas gali būti plėtojamas ateityje į mikroekonominius mokesčių vengimo modelius įtraukiant sudėtingesnes endogenines mokesčių audito funkcijas, taip pat jas tikrinant eksperimentų metu. Tokių tyrimų rezultatai būtų svarbūs kuriant atrankos mokesčių auditui scenarijus, kurių įgyvendinimas praktikoje būtų naudingas mažinant mokesčių mokėtojų paskatas elgtis nesąžiningai.

TRUMPOS ŽINIOS APIE AUTORĘ

Aurelija Anciūtė 2000-2004 m. studijavo Vilniaus universiteto Ekonomikos fakultete ir baigė ekonomikos bakalauro studijas (specializacija - finansai), kartu papildomai baigė Matematinės ekonomikos minoro programą.

Autorė 2006 m. Vilniaus universiteto Ekonomikos fakultete baigė magistro studijas (kryptis – ekonominė analizė ir planavimas). Nuo tų pačių metų – Kiekybinių metodų ir modeliavimo katedros doktorantė, nuo 2008 m. dėsto Vilniaus kooperacijos kolegijoje.

Aurelija Anciūtė nuo 2004 m. dirba Valstybinėje mokesčių inspekcijoje prie Lietuvos Respublikos finansų ministerijos. Pagrindinės veiklos kryptys yra rizikos valdymas ir informacinių technologijų, padedančių valdyti įvairias mokestines rizikas, kūrimas ir plėtra.

Autorė prisidėjo prie kitų ES valstybių narių specialistų atnaujinant Mokestinių prievolių vykdymo rizikos valdymo vadovą mokesčių administratoriams (angl. *Compliance Risk Management Guide for Tax Administrations*). Šis leidinys

pateiktas viešai Europos Komisijos puslapyje kaip geros praktikos pavyzdys mokesčių administravimo srityje.