BUSINESS PERSPECTIVES

LLC "CPC "Business Perspectives"
Hryhorii Skovoroda lane, 10, Sumy, 40022, Ukraine

www.businessperspectives.org

Received on: 16th June 2017
Accepted on: 7th September 2017

Nataliia Kuzmynchuk, Doctor of Economics, Professor, Department of Economic Cybernetics and Marketing Management, National Technical University "Kharkov Polytechnic Institute", Ukraine.

Tatyana Kutsenko, Ph.D., associate Professor, Department of Economic Cybernetics and Marketing Management, National Technical University "Kharkov Polytechnic Institute", Ukraine.

Tetiana Nazarova, Ph.D. of Economy, Senior lecturer, Department of Finance and Foreign Economic Affairs, National Technical University "Kharkov Polytechnic Institute", Ukraine.

Elena Druhova, Ph.D. of Economy, associate Professor, Department of Finance and Foreign Economic Affairs, National Technical University "Kharkov Polytechnic Institute", Ukraine.

Nataliia Kuzmynchuk (Ukraine), **Tatyana Kutsenko** (Ukraine), **Tetiana Nazarova** (Ukraine), **Elena Druhova** (Ukraine)

ANALYSES DYNAMICS OF TAXPAYERS BEHAVIOR FATING THE INFLUENCE OF SOCIAL-PSYCHOLOGICAL FACTORS

Abstract

In this study, the main attention is paid to the problem of "shadowing" the Ukrainian economy in the crisis period. Theoretical approaches to determining the functions of taxes and factors affecting real tax revenues were studied. A scientific study was carried out which would reveal the motives for the behavior of taxpayers, which are explicitly or implicitly laid in the basis of approaches to the formation of the mechanism of taxation and tax policy of the state. Therefore, we tried to determine the reasons why the behavior of each individual taxpayer is completely determined by his individual rational choice, determined by the desire to maximize his own benefit, i.e. does not depend on the choice of the tax behavior of other agents and the effects that individual taxpayers have on each other. Our results show that the reduction of transaction costs in the legal sector of the economy and the creation of conditions that impede the illegal conduct of transactions are not sufficient conditions for the implementation of formal taxation rules.

Keywords Shadow economy, tax revenues, taxation system, taxation mechanism, forecasting of tax revenues

JEL Classification E26, E27

INTRODUCTION

To manage the tax processes is very important for exposing the tax behavior regularity of the economic agents and also accept these main factors which influences for the taking decisions for paying taxes.

The review of the literature below shows that the purpose of the research taxation problem is based on the common assumption that the tax payers themselves break the rules acting as the rational agents comparing benefits and expenses with the risks uncertainty. Out coming from this assumption there are taxation parameters as the main factors determining the tax revenues .From these factors it is not possible to accept the influence for the tax behavior this influence on tax behavior of social. This influence on tax behavior of social-psychological factors, such as belief, behavioral installations, conformism, social influence, etc. which action connect with the information and economic interaction of agents themselves and with their social and economic relations.

The purpose of this project consists of in specification of representations about of tax behaviour laws of economic agents on the basis of revealing and influence on the social – psychological factors.

1. MATERIALS AND METHODS

The statistics shows a growing role of shadow sector of Ukraine economy. Having studied the information authors stated in publications (Kuz'minchuk, 2012; Rejkin, V. S., 2016; Ministry of Economic Development & Trade of Ukraine, 2016; Zueva, Dragan, 2004; Antonenko, Burluc'kij, 2004; Vishnevs'kij, 2004; Kraus, 2007; Ozers'kij, 2005; Pushkarenko, Logvinenko, 2004; Harazishvili, 2006; Shablista, 2000) that it is possible to draw a unfavorable conclusion that the Ukraine budget receives less because economic agents evasion from taxes payment of in the budget and trust funds. According this database of experts of the Ministry of Economics of Ukraine in «shadow» there are above 120 billion grn., and according to Department of economic strategy of the Ministry of Economics for 9 months of 2016 the level black economy has made 50% (Ministry of Economic Development and Trade of Ukraine, 2016).

Practical value of this received results will consist of perfection of forecasting taxes receipts, gathering and obligatory payments in the budget and trust funds, increase budgetary process at different levels of the government development of scientific bases of formation of a tax policy of the state.

The publication analysis (Kuz'minchuk, 2012; Zima, Kuz'minchuk, 2011; Vasylevs'ka, 2003; Ivanov, 2003; Lunina, 2000; Merkulova, 2006; Ministry of Economy of Ukraine, 2006; Ogon', 1997; Lysenko, Mishhenko, Rudenskij, Spiridonov, 2002) shows a presence problem of some differing approaches to definition of social and economic purpose, functions of taxes and the factors influencing on the real tax revenues.

From this point of view research interest represents the discussion of those concepts about motives of behavior of tax bearers which are obviously or implicitly pawned in the basis of approaches to formation of the mechanism of the taxation and a tax policy of the state.

According to the concept of minimization, transaction costs the agents choose legal or illegal way of carrying out of transactions by comparison of the submission price to the law (Olejnik, 2002). Cost of legal activity is connected with necessity of tax payments and secured the social guarantees to the personnel. The illegal activity includes the following basic elements: the costs connected to evasion from legal sanctions (costs on conducting "double" accounts, a payment to advisers, bribes to tax inspectors and other supervising persons), loss of benefit from restriction of opportunities of enterprise activity (carrying out of advertising campaigns, a capture of credits, capitalization of the property, use of legal contracts, realization of long-term projects).

From the concept of performance of fiscal function of the state (Kraus, 2007; Ogon', 1997; Sverdan, 2004) the mechanism of the taxation should provide monetary receipts proceeding in the state funds in quantity, sufficient for performance by the state of the obligations taken before a society. The researches spent within the framework of this concept, are directed on creation of effective mechanisms of the control of tax bearers and the organizations of tax service.

The concept of stimulation of tax bearers (Vasylevs'ka, 2003; Ivanov, 2003; Lunina, 2000; Mel'nik, 2001) proceeds from necessity of such choice of kinds of taxes, tax rates and bases which would allow to keep or even to develop economic potential of tax bearers. One direction of researches within the framework of this concept is based on search of opportunities of increase in tax revenues by decrease in tax burden due to use of the effect displayed by curve Laffera (model Leviafana) (Merkulova, 2006).

In Merkulova (2006), we see, that the main reason of opportunistic motivation is the individual estimation of taxes equivalence and the blessings received from the state, and realization of such motivation depends on economic feasibility of infringement which is determined by incomes and the losses, connected with evasion from taxes. According to this concept of productive function of the state (Ivanov, 2003; Lysenko, Mishhenko, Rudenskij, Spiridonov, 2002; Merkulova, 2006; Merkulova, Mihajlenko, 2007; Pilipchenko, O. O., 2015) tax revenues should be spent for actions on increase of efficiency of all economic system functioning so that to compensate the taxes paid by agents, the blessings of public use given to agents

in exchange. For maintenance of conformity of directions and the sizes of budgetary funds expenses with sources and the sizes of their receipt regulation of budgetary process on a basis intercordance norms of the taxation and use of the state budgetary is offered.

The general common unit for the considered the assumption concepts will be, that the behavior of each separate payer of taxes is completely determined by the individual rational choice caused by aspiration to maximization of own benefit, i.e. does not depend on a choice of tax behavior of other agents and influences which are rendered against each other by separate tax payers.

For tax behavior research of agents is volumes definition of shadow economy. The Russian scientists (Nikitin, Stepanova, Glazova, 2005) mark existence of variety of methods of measurement of shadow economy. Though "all these methods for the lack of any official statistics are rather approximate and conditional" (Nikitin, Stepanova, Glazova, 2005) authors allocate the basic from them – a method of physical expenses and a method of cash which is used alongside with a method of the electric power and is used basically in less developed countries. Except for these methods the methods of expert estimations are based on research of selective number of facilities, multifactorial dynamic models are used on definition of a divergence between official and actual employment.

Today in Ukraine the scientific – methodological base is not in full developed for the analysis and forecasting of shadow economy which would take into account all specific sides of public, industrial, distributive, cost, monetary and financial relations. There is a number of approaches and methodical recommendations (Borodjuk, Turchynov, Pryhod'ko, 1997; Ivanov, 2009; Ministry of Economy of Ukraine, 2006; Nesterenko, 2003; Nikitin, Stepanova, Glazova, 2005; Jurinec', Londar, 1999; Ribchak, O. S., 2013) for the definition and an estimation of shadow economy volumes.

Ministry of Economics of Ukraine "Design procedure of volumes of shadow economy" (Economy of Ukraine, 2006) assumes the definition of volumes of unregister economic activities on the basis of use of the statistical information by the following methods: financial; monetary; electric; a method "expenses of the population – retail trade". The given method is, in our opinion, the optimal at calculation of volumes of shadow economy, as assumes use of the acting statistical information which can be accessible to the broad audience of consumers. Beside it this method allows to estimate in full enough scales of shadow processes more exactly.

We shall name productive and economic system (PES). Researches which we shall be carried out, are based on resulted dynamic model of tax behavior PES and the preliminary theoretical analysis results of this model. The researched model contains the uncertain parameters describing social – psychological factors, influencing on tax bearers. Problems of the project will consist in the following:

- to identify uncertain parameters of model on the basis of the tax payers statistical information on legal persons (the industrial enterprises of the Kharkov region), tax revenues (value-added tax);
- to estimate accuracy of parameters identification of and on this stage to make a decision about adequacy of model or to spend researches of its modification.

Calculation of the variables used in researches, is carried out in two stages. At the first stage the value added volumes $\alpha_{1\Sigma}^{t}$, $a_{2\Sigma}^{t}$ official carrying out of operations and illegal manufactures of the in cost expression on t-period of time, $t = 1, 2, ..., \tau$, where t – number of one quarter in our researches, $\tau = 32$ (the period of time from 2010 to 2016). And also there are the minimal $q^{\min}$ and maximal $q^{\max}$ values specific size q of losses carrying out the illegal operations which are determined.

Volumes parameters of $\alpha_{1\Sigma}^{t}$ $t = (1, 2, \ldots \tau)$ value added cost in Statistics year-book on the Kharkov region. Value of parameter $a_{2\Sigma}^{t}$ $t = (1, 2, \ldots \tau)$ is calculated on the basis of the Design procedure of volumes of shadow economy (Nikitin, Stepanova, Glazova, 2005). For parameter calculation is used the following documentary form: the form 11-MTP "The Report on using results of fuel, the heat power and the electric pow-

er", the form 24-power "Electrobalance, structure of the power equipment and the report on work about power stations (electrogenerating installations)", the form 1 "Balance", the form 2 "The Report on financial results", the form 5 "Notes to the annual financial reporting", and also the data of the Statistics year-books on the Kharkov region (considering each year), the Kharkov regional Management of statistics, the Statistics of Ukraine, National bank of Ukraine, the State tax inspection in Kharkov region.

The data on an interval $\left[q_{\min},\ q_{\max}\right]$ uncertainty of parameter q is supposed to receive by the supervisers questioning of the enterprises. Results of everyone $\left(i=1,\ 2\ \ldots\ m\right)$ questioning will receive ranges $\left[\lambda_i^{\min},\ \lambda_i^{\max}\right]$ possible values λ_i, where λ_i – specific size (for the normative tax amount) definition of agent benefit or losses when the taxes are not paid, m – the number of questioning ones. On sizes $\lambda_i^{\min}$, $\lambda_i^{\max}$ for the everyone questioning is defined the interval $\left[q_{\min}^i,\ q_{\max}^i\right]$ possible values q^i. Proceeding from set $q_{\min}^i$, $q_{\max}^i$ $\left({}^{3}=1,\ 2,\ \ldots\ m\right)$ an interval $\left[q_{\min},\ q_{\max}\right]$ is determined by the possible values for PES as a whole.

In conformity with $\alpha_{1\Sigma}^t$ and $\alpha_{2\Sigma}^t$ frequency is calculated p^t official carrying out by the operations agent on the every t-period. On the basis of sizes $q_{\min}$, $q_{\max}$ find the parameter R – the factor which is taking into a range of "disorder" of possible values q. A time number p^t, $t=1,\ 2,\ \ldots,\ \tau$ and parameter R consider as known parameters of economic-mathematical model of reflective inertial behavior of agents PES.

At the second stage a method of the least squares (MLS) according to the formula (4) is calculated parameters s_{0i}, s_{1i}, s_{2i}, $\left(i=1,\ 2\right)$, determining frequencies p^t $\left(t=1,\ 2,\ \ldots,\ \tau\right)$ official carrying out by the agent of operations (see formulas (1), (Vasenko, 2016). Under formulas (2), (5) is calculated parameter b with dependence of $B\left(p^t\right)$ determining the maximal losses, coefficient of proportionality c_1, c_2 defining change direction frequencies p^t, parameter d of dependence $D\left(p^t,\ p^{t-1},\ p^{t-2}\right)$ benefits and loses connected by increasing or decreasing the changes rate frequencies p^t. Parameters b, c_1, c_2 and d are the main research ones on the base of interpreter the resalts.

2. RESULTS

The tax agent behaviour of PES is counted by sequence of sizes $p^t\left(t=1,\ 2,\ \ldots,\ \tau\right)$, where t – number of the period of time of functioning PES to which it corresponds an interval of time $\left[\left(t-1\right)\Delta,\ t\Delta\right]$, Δ – the fix_{ed} time interval (quarter), p^t – frequency of official carrying out by the operations agent on t-period, $p^t=\frac{\alpha_1^t}{\alpha^t}$, α_1^t – are

the volume of manufacture (works, services) in the cost expression, corresponding officially carried out to the operations on an interval of time t; $\alpha_1^t=\alpha^t-\alpha_2^t$, α^t, α_2^t are the – total amount and volume illegal manufactures (works, services) in cost expression on t-period of time.

According to "classical" representations about tax behavior of agent PES the prize at the end of the period of time t makes the size resulted in the formula:

$$B_{AK}^t\cdot p^t=\left(\left(1-n\right)\cdot p^t+\left(1-q\right)\cdot\left(1-p^t\right)\right)\cdot\alpha^t=$$
$$=\left(\left(q-n\right)\cdot p^t+\left(1-q\right)\right)\alpha^t,$$

where $1-p^t$ – frequency illegal carrying out of operations by the agent on an interval of time t; n – specific size of taxes, $n\in\left[0,\ 1\right)$; q – specific size of losses carrying out of illegal operations, $q\geq 0$.

The condition ρ^t corresponding the maximal expected prize at the end of the period of time t, is formed from the condition:

$$B_{AK}^t\left(\rho^t\right)=\max\left\{B_{AK}^t\left(g^t\right)\middle|\cdot g^t\in\left[0,\ 1\right]\right\}.$$

It is obvious, that $\rho^t=1$, if $q>n$; $\rho^t=0$, if $q<n$. It is supposed, that the agent during the period of time t realizes a condition $p^t=\rho^t$. Thus, in «classical» model of tax behavior uncertainty of size q and previous behaviour PES in this connection it appears is not taken into account, that the agent reaches {achieves} the optimum condition ρ^t "instantly", for one period of time.

Generally the size q of specific losses because of illegal carrying out of operations is represented

to the agent in uncertain size, $q \in [q_{\min}, q_{\max}]$, where $q_{\min}$, $q_{\max}$ – the minimal and maximal possible values of size q. In connection with uncertainty of size q to conditions $\rho^t = 0$ and $\rho^t = 1$ generally there does not correspond the maximal utility. Tax bearers to a greater or lesser extent realize, that tax revenues are spent for the decision of such social problems which reflect also their own problems. Therefore full "leaving from taxes" contradicts values of agents, it is represented to them immoral. At the same time, partial nonpayment of taxes by many agents is justified. It will be arguments, that for business the aspiration to economy of any expenses is natural, and that the paid part of taxes has enough for the decision of essential social problems. Thus, in process of approach of a condition p^t to 0 or to 1 "moral losses" the agent, grows caused by the psychological discomfort by him. In this sense minimal (equal 0) losses correspond to a situation $p^t = 0.5$.

Taking into account uncertainty of size q, utility $\Pi_A^t(p^t)$ for agent PES of his condition p^t we shall present in the following:

$$\Pi_A^t(p^t) = \left(Hp^t + (1-q_c)\right)\cdot\alpha^t - B(p^t),$$

where H – an estimation of size q-n in view of uncertainty of parameter q, $H = R\cdot(q_c - n)$, R – the factor which is taking into account of a range of "disorder" of possible values q,

$$R = \frac{n\cdot(1-n) - (n-q_{\min})\cdot(q_{\max}-n)}{n\cdot(1-n) + (q_c-n)^2},$$

$q_c = \frac{q_{\min}+q_{\max}}{2}$ – average value of size q specific losses, $B(p^t)$ – size of "moral losses" agent in a case when his condition p^t appears and closes to extremely possible conditions 0 or 1.

Let's see, that with reduction of a range $q_{\min} - q_{\max}$ possible values q from 1 up to 0 value R grows from 0 up to 1. Thus

$$(n-q_{\min})\cdot(q_{\max}-n) < 0,$$

if $n < q_{\min}$ or $q_{\max} < n$;

$$(n-q_{\min})\cdot(q_{\max}-n) < 0, \text{ if } q_{\min} < n < q_{\max}.$$

For expression of the losses arising the affinity to limiting conditions, we shall choose the following form:

$$B(p^t) = b\left(0.25 - p^t\cdot(1-p^t)\right),$$

where b – parameter of dependence $B(p^t)$, determining the maximal losses: $0.25b = B(0) = B(1)$. Thus $B(0.5) = 0$.

Prize of each agent PES on an interval of time t, received by him as a result of change of a condition p^{t-1} on a condition p^t, we determine in size

$$B_A^t = B_A^t(p^t, p^{t-1}, p^{t-2}) =$$
$$= \begin{cases} B_{A1}^t = \Pi_A^t(p^t) - C_1 - D, \text{if } p^1 \le p^{t-1}, \\ B_{A1}^t = \Pi_A^t(p^t) - C_2 - D, \text{if } p^1 \le p^{t-1}, \end{cases}$$

where C_i – size of expenses and the losses arising because of change of a condition of the agent,

$C_i = C(p^t, p^{t-1}) = c_i(p^t, p^{t-1})^2$, $i = 1, 2$;

c_i – the factor of proportionality which is taking into account a direction of change of a condition of the agent, $i = 1, 2$; D – size of expenses and the losses caused by increase or reduction of rate of changes, $D = D(p^t, p^{t-1}, p^{t-2}) = dg^2 = d(p^t - h)^2$;

d – parameter of dependence $D = D(p^t, p^{t-1}, p^{t-2})$;

g – a difference between rates of changes on intervals of time t and $t-1$, $g = p^t - p^{t-1} - (p^{t-1} - p^{t-2})$, $h = 2p^{t-1} - p^{t-2}$.

Introduction of parameters $C_i(i = 1, 2)$, D allows to take into account that circumstance, that the choice agents of the actions occurs not only depending on an estimation of the current benefit, but also under influence developed practical activity and tendencies of their change.

Conditionally optimum condition p_{opt}^{ti}, $i = 1, 2$, corresponding to increase $i-1$ or to reduction $i = 2$ frequencies of official carrying out by the agent of operations, is from the formula:

$$\frac{dB_{Ai}^t}{dp^t} = R + b\left(1 - 2p^t\right) - 2c_i\left(p^t - p^{t-1}\right) -$$
$$-2d\left(p^t - h\right) = 0.$$

Also makes size

$$p_{opt}^{ti} = s_{0i} + s_{1i} \cdot p^{t-1} - s_{2i} \cdot p^{t-2}, \quad (1)$$

where

$$s_{0i} = \frac{R+b}{v},\ s_{1i} = \frac{c_i + 2d}{v},\ s_{2i} = \frac{d}{v}, \quad (2)$$

$v = b + c_i + d$. Thus the agent on an interval of time t chooses such condition

$$p^t = p_{opt}^{ti}, \quad (3)$$

To which there corresponds the greatest possible prize B_A^t:

$$B_A^t\left(p^t,\ p^{t-1},\ p^{t-2}\right) =$$
$$= \max\left\{B_{Ai}^t\left(p_{opt}^{ti},\ p^{t-1},\ p^{t-2}\right),\ i = 1,\ 2\right\}. \quad (4)$$

If the agent on each interval of time t chooses the condition according to conditions (1), (4) we shall speak, that he operates according to reflective inertial behaviour (REP) model.

If all agents PES operate according to model RIB and PES as a whole will show reflective inertial behavior. Condition PES will be defined by frequency p^t of official carrying out by agents PES of the operations. The size p^t will pay off under the formula: $p^t = \alpha_{1\Sigma}^t / \alpha_\Sigma^t$, where to sizes $\alpha_{1\Sigma}^t$, α_Σ^t there correspond the sums of value α_1^t, α^t all agents PES. Utility for PES these conditions p^t will be expressed to be defined by the formula:

$$\Pi_\Sigma^t = \left(H \cdot p^t + \left(1 - q_c\right)\right) \cdot \alpha_\Sigma^t - B\left(p^t\right),$$

and its prize received as a result of change of a condition p^{t-1} on a condition p^t, will be defined by size $B_\Sigma^t = B_\Sigma^t \cdot \left(p^t,\ p^{t-1},\ p^{t-2}\right)$.

$$B_\Sigma^t = B_\Sigma^t(p^t, p^{t-1}, p^{t-2}) =$$
$$= \begin{cases} B_{\Sigma 1}^t = \prod_\Sigma^t (p^t - C_1 - D, if\ p^t \geq p^{t-1}, \\ B_{\Sigma 1}^t = \prod_\Sigma^t (p^t - C_2 - D, if\ p^t \geq p^{t-1}. \end{cases}$$

Thus model RIB PES will be described by the formula (1) and the following condition:

$$B_\Sigma^t\left(p^t,\ p^{t-1},\ p^{t-2}\right) =$$
$$= \max\left\{B_{\Sigma i}^t\left(p_{opt}^{ti},\ p^{t-1},\ p^{t-2}\right),\ i = 1,\ 2\right\}.$$

3. DISCUSSION

Parameters s_{0i}, s_{1i}, s_{2i} models RIB are on the basis of the data on actual frequencies $p^t\left(t = 1,\ 2,\ ...,\ \tau\right)$ official carrying out by agents PES of the operations on a method of the least squares from a condition:

$$\sigma_i\left(s_{0i},\ s_{1i},\ s_{2i}\right) =$$
$$= \min\left\{\begin{array}{l} \sigma_i\left(k_{0i},\ \mathrm{k}_{1i},\ \mathrm{k}_{2i}\right) = \\ = \sum_{t \in T_i}\left(k_{0i} + \mathrm{k}_{1i} p^{t-1} - k_{2i} p^{t-2} - p^t\right)^2 \end{array}\right\} \quad (5)$$
$$\left(i = 1,\ 2\right),$$

where T_i – set of the periods of time corresponding to increase $\left(i = 1\right)$ or decrease $\left(i = 2\right)$ of frequency p^t of official carrying out of operations; $\sigma_i\left(k_{0i},\ \mathrm{k}_{1i},\ \mathrm{k}_{2i}\right)$ – size is nonviscous for sample T_i, $i = 1,\ 2$, corresponding to values $k_{0i},\ \mathrm{k}_{1i},\ \mathrm{k}_{2i}$ parameters of model RIB.

Accuracy of identification of parameters of model RIB can be appreciated by sizes:

$$K_i = \frac{\sqrt{\sigma\left(s_0,\ s_1,\ s_2\right)}}{p_{cp}}\ \left(i = 1,\ 2\right),$$

where $p_{cp} = \sum_{t \in T_c} \frac{p^t}{|T_i|}$, $|T_i|$ – quantity of elements in sample T_i.

Formula (2) establishes conformity between

parameters s_{0i}, s_{1i}, s_{2i} and sizes b, c_i, d. Considering formula (2) as with three unknown sizes b, c_i, d is possible to receive system of the equations:

$$b = \varphi_b\left(s_{0i},\ s_{1i},\ s_{2i}\right),\ c_i = \varphi_{c_i}\left(s_{0i},\ s_{1i},\ s_{2i}\right),$$
$$d = \varphi_d\left(s_{0i},\ s_{1i},\ s_{2i}\right),\ \left(i = 1,\ 2\right). \quad (6)$$

The values of sizes designed on these expressions b, c_i, d define actual "contribution" to behavior of agents of factors corresponding to them: «moral losses», arising because of affinity to limiting conditions, and also expenses and the losses arising because of change of a condition of the agent, and caused by increase or reduction of rate of changes. If results of calculations will show, that $K_i \le 0.1,\ b,\ c_i,\ d > 0\ \left(i = 1,\ 2\right)$, it is possible to draw a conclusion on adequacy of model RIB.

CONCLUSIONS

Thus, the main result of the project should be a scientific substantiation of model RIB. Researches should show, that decrease transaction costs in legal sector of economy and creation of the conditions complicating illegal carrying out of transactions, are not sufficient conditions for performance of formal norms of the taxation. The proof of adequacy of model RIB will allow to confirm the following assumptions:

Dynamics of functioning PES essentially depends on initial propensity of agents to realization of operations official or nonofficial in the way;

For the certain part tax behavior agents are connected to expense the time and risk of material losses about what becomes known other part of agents which is compelled by arranging to inertial behavior of the contractors, or realize inertial tax behavior by virtue of the conformism;

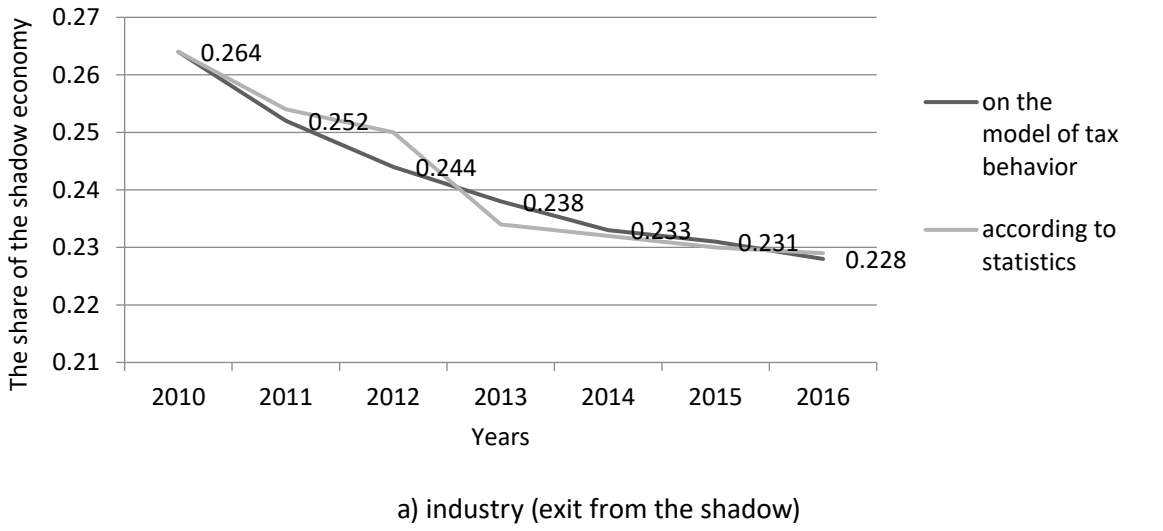
Action of "the human factor" causes occurrence in all group of agents of beforehand not planned, spontaneously developing delay in change of habitual circuits of carrying out of operations in a direction of their optimization.

In this practical work is based on the perfection of forecasting of taxes receipts, gathering and obligatory payments to the budget and trust funds, increase on this basis of efficiency of budgetary process at different levels of the government, development of scientific bases of formation of a tax policy of the state.

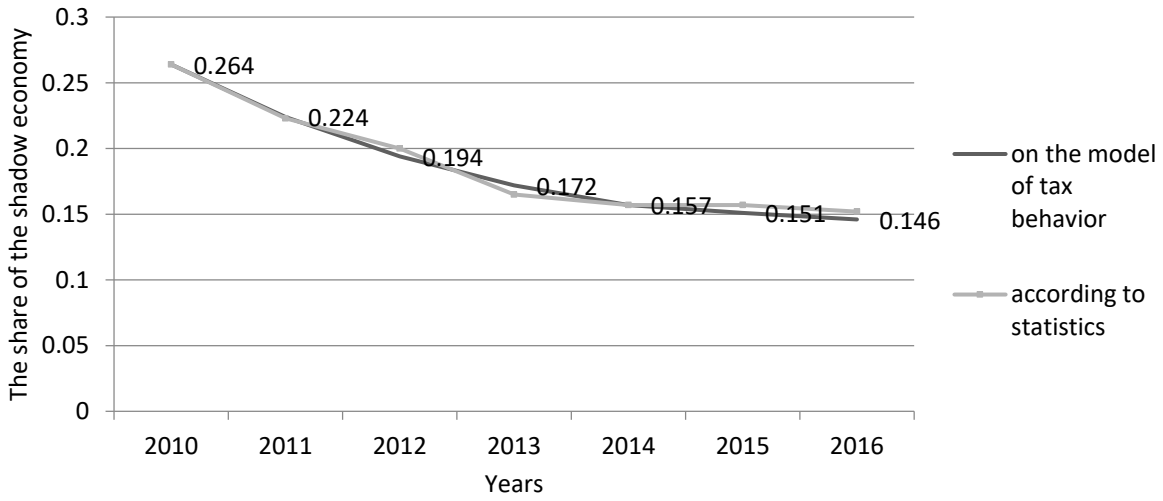
On the basis of real data, an analysis of the tax behavior of economic entities of the Kharkiv region for 2010–2016 was carried out. In the context of branches (types of economic activity) using the model of behavior of taxpayers and the method of determining the volume of shadow activity, which is based on monetary and financial methods. The results of calculating the share of shadow economy by branches of the Kharkiv region are presented in Figure 1.

As can be seen from Figure 1 enterprises of industry and agriculture, hunting, forestry come from the "shadow", as evidenced by the growth of charts of smoothed values. It should be noted that according to some calculations, the largest share in the structure of shadow economy in Ukraine, calculated by the financial method, belongs to the industry, which is explained by its significant contribution to the economy of the GFS (28%) at the level of shadowing by 22%.

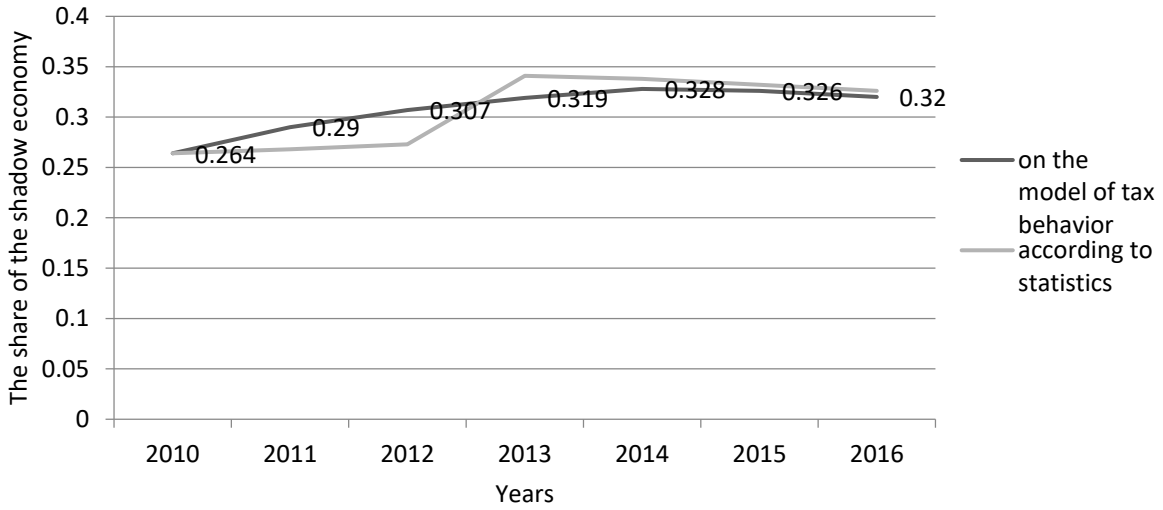
Another trend is observed in the construction industry – the departure to the "shadow", where the smooth reduction of the smoothed values is clearly monitored. As noted by the authors of the work today the scope of shadow turnover for this type of activity in Ukraine is 66%, after the trade – 80%.



a) industry (exit from the shadow)



b) agriculture, hunting, forestry (exit from the shadow)



c) construction (leaving in the shade)

Figure 1. The results of calculating the share of shadow economy by branches of the Kharkiv region

Prediction of tax revenues to budgets of different levels is based on the proposed model of tax behavior and allows determining the future level of tax revenues not only under the current tax legislation, but also with possible changes in it.

Thus, the developed economic-mathematical model of tax behavior of economic entities taking into account economic and psychological factors of motivation of taxpayers, as well as the dynamic nature of their behavior, allows to increase the accuracy of forecasting of tax revenues and fees to the budget, which creates the basis for improving and improving the efficiency of the system. Taxation and is aimed at improving the forecasting of tax receipts, fees and mandatory payments to the budget and trust funds, increase on the basis of the effectiveness of the budget process at different levels of government, the development of scientific foundations for the formation of the state tax policy.

REFERENCES

1. Antonenko, V. M., Burluc'kij, B. V. (2004). Визначення втрат податкового потенціалу України від тіньової економіки [Vyznachennia vtrat podatkovoho potentsialu Ukrainy vid tinovoi ekonomiky]. *Nauchnye trudy Doneckogo nacional'nogo tekhnicheskogo universiteta, 87,* 27-35.
2. Borodjuk, V., Turchynov, O., Pryhod'ko, T. (1997). Методи розрахунку обсягів тіньової економіки [Metody rozrakhunku obsiahiv tinovoi ekonomiky]. *Ekonomika Ukrainy, 5,* 24-34.
3. Harazishvili, Ju. M. (2006). України у розрізі основних видів діяльності [Ukrainy u rozrizi osnovnykh vydiv diialnosti]. *Statystyka Ukrainy, 4,* 38-45.
4. Ivanov, Yu. B. (2009). *Альтернативні системи оподаткування: Монографія [Alternatyvni systemy opodatkuvannia: Monohrafiia],* Kharkiv: INJEC
5. Jurinec', V., Londar, S. (1999). Особливості функціонування тіньової економіки в Україні [Osoblyvosti funktsionuvannia tinovoi ekonomiky v Ukraini]. Retrieved from http://www.soskin.info/ea.php?pokazold=19991278&n=11-12&y=1999
6. Kraus, N. M. (2007). Про структуру тіньового сектора економіки в умовах трансформаційних перетворень [Pro strukturu tinovoho sektora ekonomiky v umovakh transformatsiinykh peretvoren]. *Naukovyi visnyk Poltavskoho universytetu spozhyvchoi kooperatsii Ukrainy, 1,* 31-34.
7. Kuz'minchuk, N. V. (2012). *Забезпечення фінансово-бюджетного регулювання розвитку регіонів: підходи, методи, напрямки реалізації [Zabezpechennia finansovo-biudzhetnoho rehuliuvannia rozvytku rehioniv: pidkhody, metody, napriamky realizatsii],* Lviv: Institute of Regional Studies of NAS of Ukraine
8. Lunina, I. (2000). Налоговая политика Украины в контексте создания условий для экономического роста [Nalogovaya politika Ukrainy v kontekste sozdaniya uslovij dlya ehkonomicheskogo rosta]. *Ekonomika Ukrainy, 12,* 40-49.
9. Lysenko, Ju. G. (2005). *Механизмы налогового менеджмента: Монография [Mekhanizmy nalogovogo menedzhmenta: Monografiya],* Donetsk: OOO "South-East Co., Ltd".
10. Lysenko, Ju. G., Mishhenko, S. G., Rudenskij, R. A., Spiridonov, A. A. (2002). *Механизмы управления экономической безопасностью [Mekhanizmy upravleniya ehkonomicheskoj bezopasnost'yu],* Donetsk: DonNU.
11. Mel'nik, P. V. (2001). *Розвиток податкової системи в перехідній економіці [Rozvytok podatkovoi systemy v perekhodnii ekonomitsi].* Irpen: Academy of State Tax Service of Ukraine.
12. Merkulova, T. V. (2006). *Інституційні основи оподаткування та податкового регулюванняе кономіки [Instytutsiini osnovy opodatkuvannia ta podatkovoho rehuliuvanniae konomiky] The institutional framework of taxation and tax regulation of economy,* Kyiv: Du IEF NASU.
13. Merkulova, T. V., Mihajlenko, V. G. (2007). Оптимізація податкового навантаження у різних моделях держави [Optymizatsiia podatkovoho navantazhennia u riznykh modeliakh derzhavy], *XII Vseukrainska naukovo-metodychna konferentsiia «Problemy ekonomichnoi kibernetyky»,* 84-85.
14. Методика розрахунку обсягів тіньової економіки: затверджено Наказом Міністерства економіки України № 222 від 27.06.2006 р. [Metodyka rozrakhunku obsiahiv tinovoi ekonomiky: zatverdzheno Nakazom Ministerstva ekonomiky Ukrainy № 222 vid 27.06.2006 r.]. Retrieved from http://www.kiev.ukrstat.gov.ua/p.php3?c=255&lang=1
15. Загальні тенденції тіньової економіки в Україні за 9 місяців 2016 р. Міністерство економічного розвитку і торгівлі України [Zahalni tendentsii tinovoi ekonomiky v Ukraini za 9 misiatsiv 2016 r. Ministerstvo ekonomichnoho rozvytku i torhivli Ukrainy]. Retrieved from http://zakon1.rada.gov.ua/cgi-bin/laws/main.cgi?nreg=z0833-06#top

16. Nesterenko, G. M. (2003). *Моделювання у моніторингу тіньової економіки [Modeliuvannia u monitorynhu tinovoi ekonomiky].* Retrieved from http://nc.ufei.ukrsat.com/Kyrsi%202003/tezi/images_tezi/025.htm

17. Nikitin, S., Stepanova, M., Glazova, E. (2005). Теневая экономика и налогообложение [Tenevaya ehkonomika i nalogooblozhenie]. *Mirovaya ehkonomika i mezhdunarodnye otnosheniya, 2,* 24-30.

18. Ogon', C. G. (1997). Податкова політика і доходи бюджетів України [Podatkova polityka i dokhody biudzhetiv Ukrainy], *Finansy Ukrainy, 5,* 74-85.

19. Olejnik, A. N. (2002). *Институциональная экономика: Учебное пособие [Institucional'naya ehkonomika: Uchebnoe posobie],* Moscow: INFRA-M.

20. Ozers'kij, I. V. (2005). Тіньовий сегмент економіки [Tinovyi sehment ekonomiky]. *Ekonomika, finansy i pravo, 1,* 28-31.

21. Pilipchenko, O. O. (2015). Методи оцінки тіньової економіки та їх класифікація [Metody otsinky tinovoi ekonomiky ta yikh klasyfikatsiia]. *Sudova apeliatsiia, 2*(39), 58-64.

22. Pushkarenko, P., Logvinenko, M. (2004). Генезис і соціально-економічні наслідки тіньової економіки [Henezys i sotsialno-ekonomichni naslidky tinovoi ekonomiky]. *Ekonomika Ukrainy, 10,* 43-49.

23. Rejkin, V. S. (2016). Методи оцінки обсягів тіньової економіки**:** балансовий підхід [Metody otsinky obsiahiv tinovoi ekonomiky: balansovyi pidkhid]. *Intelekt XXI, 2,* 79-87.

24. Ribchak, O. S. (2013). Організаційно-економічні передумови детінізації економіки України. Економіка та підприємництво [Orhanizatsiino-ekonomichni peredumovy detinizatsii ekonomiky Ukrainy]. *Ekonomika ta pidpryiemnytstvo, 2,* 16-22.

25. Shablista, L. M. (2000). *Податки як засіб структурної перебудови економіки [Podatky yak zasib strukturnoi perebudovy ekonomiky].* Kyiv: Institute of Economics of NAS of Ukraine.

26. Sverdan, M. M. (2004). Бюджетно-податкові проблеми України [Biudzhetno-podatkovi problemy Ukrainy]. *Visnyk Kyivskoho instytutu biznesu ta tekhnolohii, 1,* 19-20.

27. Vasenko, V. K. (2016). Тіньова економіка України та шляхи її детінізації [Tinova ekonomika Ukrainy ta shliakhy yii detinizatsii]. *Ekonomichni nauky s, 1,* 15-23.

28. Vasylevs'ka, G. V. (2003). Податкова політика у регулюванні економічного зростання [Podatkova polityka u rehuliuvanni ekonomichnoho zrostannia]. *Finansy Ukrainy, 2,* 39-43.

29. Vishnevs'kij, V. (2004). Ухилення від сплати податків і моделювання вибору та дій економічного суб'єкта [Ukhylennia vid splaty podatkiv i modeliuvannia vyboru ta dii ekonomichnoho subiekta]. *Ekonomika Ukrainy, 1,* 9-15.

30. Zima, O. G., Kuz'minchuk, N. V. (2011). Анализ факторов, влияющих на принятие налогоплательщиками решения об уплате налогов и сборов [Analiz faktorov, vliyayushchih na prinyatie nalogoplatel'shchikami resheniya ob uplate nalogov i sborov]. *Biznes Inform, 2*(2), 54-56.

31. Zueva, L. S., Dragan, O. I. (2004). Подолання тіньової економіки - нагальна проблема суспільства України [Podolannia tinovoi ekonomiky - nahalna problema suspilstva Ukrainy]. *Ekonomika, finansy i pravo, 7*, 26-38.