ISSN 2412-8872

Journal of Tax Reform

Т. 2. № 3 **2016** **Vol. 2, no. 3**

Научно-аналитический журнал
Выходит 3 раз в год
Основан в 2015 г.

Scientific and Analytical Journal
Three times a year
Founded in 2015

Учредители и издатели журнала
ФГАОУ ВО «Уральский федеральный университет имени первого Президента России Б. Н. Ельцина» (620002, г. Екатеринбург, ул. Мира, 19)

ФГБОУ ВО «Байкальский государственный университет» (664003, г. Иркутск, ул. Ленина, 11)

Адрес редакции
620002, г. Екатеринбург, ул. Мира, 19, а/я 10
Тел. +7(343) 375-97-20
E-mail: 5symposium@mail.ru
WEB-SITE: jtr.urfu.ru

Издание зарегистрировано в Федеральной службе по надзору в сфере связи, информационных технологий и массовых коммуникаций (Роскомнадзор). Свидетельство о регистрации средства массовой информации ПИ № ФС77-61465 от 10.04.2015 г.

Founder and publisher
Ural Federal University named after the first President of Russia B. N. Yeltsin (19 Mira St., 620002, Yekaterinburg, Russia)

Baikal State University (11 Lenin St., 664003, Irkutsk, Russia)

Contact information
19 Mira St., 620002, Yekaterinburg, Russian Federation
Phone +7(343) 375-97-20
E-mail: 5symposium@mail.ru
WEB-SITE: jtr.urfu.ru

The Journal is registered by the Federal Service for Supervision in the Sphere of Telecom, Information Technologies and Mass Communications. Registration Certificate ПИ № ФС77-61465 от April 10, 2015

Редакционная политика

Цели:

- создание востребованной информационной площадки для обнародования результатов исследований социально-экономических и иных последствий налоговых реформ и анализе ожидаемых эффектов от различных налоговых преобразований;
- приращение научно-теоретических знаний в области налогов и налогообложения как науки, направленной на поиск новых конструктивных решений в сфере налогообложения;
- разработка комплекса мер практического, организационно-правового, информационного характера, повышающего эффективность и справедливость налогообложения и налоговых преобразований;
- всестороннее международное сотрудничество представителей научного сообщества, общественности, бизнеса и различных государственных органов по совершенствованию налоговой системы.

Стратегические задачи:

- всесторонний и комплексный анализ международного и отечественного опыта реформирования национальных налоговых систем;
- разработка конструктивных мер по актуальным вопросам противодействия и профилактики уклонения от уплаты налогов;
- поддержка междисциплинарного подхода к изучению таких феноменов, как налогообложение и налоговые реформы;
- взаимодействие ученых различных наук (экономики, математики, юриспруденции, социологии и психологии) и практиков в процессе совершенствования национальных налоговых систем.

Editorial policy

Objectives:

- creation of an in-demand information platform to make public the results of studying socio-economic and other consequences of taxation reforms and analysis of expected effects from various tax transformations;
- increase of scientific and theoretical knowledge in the field of taxes and taxation as a science aimed at searching new constructive solutions in the taxation sphere;
- development of a package of measures of practical, organizational and legal, information character increasing efficiency and justness of taxation and tax transformations;
- comprehensive international cooperation of representatives of scientific community, public, business and various governmental bodies in improving the taxation system.

Strategic tasks:

- comprehensive and complex analysis of international and domestic experience of reforming national taxation systems;
- development of constructive measures on topical issues of counteraction and tax evasion prevention;
- support of the inter-disciplinal approach to studying such hardest phenomena as taxation and tax reforms;
- cooperation of scholars of various sciences (economics, mathematics, law, sociology and psychology) in the process of improving national taxation systems.

ISSN 2412-8872

Journal of Tax Reform

Т. 2. № 3 **2016** **Vol. 2, no. 3**

ISSN 2412-8872

Journal of Tax Reform

T. 2. № 3 2016 Vol. 2, no. 3

ISSN 2412-8872

Journal of Tax Reform

Т. 2. № 3 **2016** **Vol. 2, no. 3**

СОДЕРЖАНИЕ

ISSN 2412-8872

Journal of Tax Reform

T. 2. № 3 **2016** **Vol. 2, no. 3**

CONTENTS

УДК 336.225.66, 332.122
DOI 10.15826/jtr.2016.2.3.022

Olga A. Sinenko
Far Eastern Federal University,
Vladivostok, Russian Federation

METHODS OF ASSESSING OF TAX INCENTIVES EFFECTIVENESS IN SPECIAL ECONOMIC ZONES: AN ANALYTICAL OVERVIEW

ABSTRACT. Tax incentives and the tax policy as a whole are components of a system of solutions that are aimed at the economic climate improvement while establishing special economic zones (SEZ). The most common instruments of the tax policy are tax exemption, lower tax rates and tax concessions. One of the key issues of SEZs' performance is the effectiveness of tax advantages applied in particular zone. The purpose of this study is to examine methods of assessing of tax incentives effectiveness in special economic zones. The study includes overview of existing approaches to tax incentives assessing in SEZs, which have been divided into the following groups: estimation of tax incentives effects on individual territorial development indicators, and comprehensive estimation of tax incentives effectiveness in a SEZ. The authors identified subjects of estimations, described each methodology and summarized the results. The authors focused their attention on and classified econometrical and statistical methods among the numerous approaches to assessing of tax incentives effectiveness in SEZs, which were built upon a variety of economic, and mathematical research techniques. The paper describes a method known as "difference in differences" that is widely implemented by scholars to estimate the effect of tax incentives in SEZs on individual territorial development indicators. This work also covers an effect of using tax incentives when conducting a comprehensive evaluation of tax advantages. It is also proposed a classification of quantitative indicators of tax incentives effectiveness in special economic zones. The study makes it possible to implement obtained results in assessing tax incentives effectiveness in the further development of Russian territories.

KEYWORDS. Special economic zones; effectiveness of tax incentives; methods of assessing the effectiveness of tax incentives.

О. А. Синенко
Дальневосточный федеральный университет,
г. Владивосток, Российская Федерация

АНАЛИТИЧЕСКИЙ ОБЗОР МЕТОДОВ ОЦЕНКИ ЭФФЕКТИВНОСТИ НАЛОГОВОГО СТИМУЛИРОВАНИЯ ОСОБЫХ ЭКОНОМИЧЕСКИХ ЗОН

АННОТАЦИЯ. Налоговые льготы, как и налоговая политика в целом, являются частью комплекса мер, направленных на улучшение инвестиционного климата при создании особых экономических зон (ОЭЗ). При этом наиболее распространенными инструментами налоговой политики являются освобождение от уплаты налогов, применение пониженных налоговых ставок и предоставление налоговых льгот. Один из важнейших вопросов функционирования ОЭЗ — эффективность предоставляемых налоговых льгот. Цель исследования — изучение методов оценки эффективности налогового стимулирования в таких зонах. В статье проводится анализ практик оценки налогового стимулирования ОЭЗ, которые были разделены на группы: исследование влияния налоговых льгот на отдельные показатели развития территорий и комплексные оценки эффективности налогового стимулирования в ОЭЗ. Выделяются объекты исследования, описывается методология его проведения и обобщаются результаты. Сре-

ди множества подходов к оценке эффективности налогового стимулирования ОЭЗ, базирующихся на самых разнообразных методах экономико-математических исследований, изучены и классифицированы эконометрические и статистические методы. В работе описывается метод «разность разностей», активно используемый исследователями для оценки влияния налоговых льгот в ОЭЗ на отдельные показатели развития территорий. Кроме того, исследуются эффекты применения налоговых льгот при комплексной оценке налогового стимулирования, классифицируются показатели количественной оценки эффективности налоговых льгот на территориях ОЭЗ. Проведенное исследование позволит использовать полученные результаты для оценки эффективности налоговых льгот на территориях опережающего развития в России.

КЛЮЧЕВЫЕ СЛОВА. Особые экономические зоны; эффективность налоговых льгот; методы оценки эффективности налоговых льгот.

Relevance of the study

Special economic zones had become popular instrument of spurring development and attracting foreign investment in the past few decades and found a wide application globally. According to the International Labour Organization, the number of special economic zones grew from 176 in 46 countries in 1987 to 3 500 in 130 countries in 2007. The success of economic transformations in Singapore, South Korea and Hong Kong are often attributed to SEZs [1]. The most common instruments of the tax policy are tax exemption, lower tax rates and tax concessions. The success of the East Asian countries inspired many developing countries, including some countries in Africa, to establish various types of enterprise zones. However, some zones discrepant results. Tax incentives were often criticised for destroying tax base and shrinking budget revenues without any significant effect on investment inflow. This gives rise to numerous approaches to assessing the effectiveness and impact of various factors on the operational performance of SEZs.

Literature review

The present study of the problem of assessing of tax incentives effectiveness in special economic zones includes an overview of existing approaches to tax incentives assessing in SEZs, which were built upon a variety of economic and mathematical research methods. The scholarly investigation of tax advantages in SEZs was divided into the following parts: estimation of tax incentives effect on individual territorial development indicators, and comprehensive evaluations of tax incentives effectiveness in SEZ. Studies of tax incentives effect on individual development indicators are presented in Table 1.

Research by A. Klemm and S. Van Parys [2] proves that investments respond to tax incentives and tax reductions as a result of competition between countries. The scholars employ a spatial lagged model with fixed effects estimated using instrumental variable assessment considering the distance between neighboring countries. The analysis use macroeconomic and institutional data. The authors analyze relative effect of corporate income tax rate reductions versus tax holidays or investment allowances offered by developing countries. They prove that the tax incentives encourage financial competition. The study takes account of the distance between the countries and the effect of tax regimes in the neighboring countries. The findings suggest that countries react to changes in corporate income tax rates or tax holiday terms that have been offered by other countries, rather than to tax credits.

The second model was employed by the authors to analyze the effect of three tax incentives — the reduced CIT rate, tax holidays and investment tax credits — on private investment and foreign direct investment. None of the variables affect private investment, while FDI crowds out domestically-financed investment. The analysis uses macroeconomic and institutional data as well as effective tax rates (Chen and Mintz [10]). The authors used a dynamic panel model that includes an estimator derived by the generalized method of moments in order to

identify the spatially lagged dependent variable. The tax incentives proved to be more effective in Latin America and the Caribbean countries than in Africa, and the authors concluded that the institutional environment was important for promoting investment [11].

S. Van Parys and S. James [3] analyzed the effect of tax incentives in the tourism sector and noted that the study did not look at the cost of capital or the impact of tax incentives on welfare [6]. The authors obtained data from the Price Waterhouse Coopers worldwide summaries of corporate taxes, macroeconomic and FDI data by sector by the Eastern Caribbean Central Bank (ECCB). They employed econometric panel data analysis technique known as 'difference in differences' with country-fixed effects.

The study of A. Caiumi [4] is notable because along with assessing the effect of

Table 1

Studies of tax incentives effect on individual development indicators in territories

Study	Subject	Findings
A. Klemm and S. Van Parys, 2010 [2]. Model 1: 47 developing countries, for the period 1985–2004	Tax incentives / Lower corporate income tax rate / Tax holidays / Investment tax credit	Lower corporate income tax rates ad tax holidays make an impact on the countries, while tax credits don not
A. Klemm and S. Van Parys, 2010. Model 2: 47 countries, 1985–2004	Private investment / Foreign Direct Investment (FDI) / Lower corporate income tax / Tax holidays / Investment tax credit	A 10 percentage point increase of the CIT rate lowers FDI by 0,3 percentage points of GDP. Over ten years of tax holidays increase FDI by 0,7 % of GDP. Tax credits have no effect on FDI. None of the three variables increases private investment
A. Klemm and S. Van Parys, 2010. 80 countries, 2005–2008	FDI / Income tax rate	Lower effective tax rate increases FDI, especially when the business climate improves
S. Van Parys and S. James, 2010 [3]. 7 Caribbean countries, 1997–2007	Tourism investment / Corporate tax exemptions for 5 to 25 years in Antigua and Barbuda	The extension of corporate tax exemptions in Antigua and Barbuda provided a significantly bigger increase in tourism investment than in other countries
A. Caiumi, 2011 [4]. Italy, Piedmont	Investment / Productivity / Regional investment tax credit	Positive effect on investment. Positive impact on productivity at the firm level
J. Kolko and D. Neumark, 2009 [5]. USA, California	Employment / Tax incentives, especially hiring tax credits	Positive employment effects in some areas. Generally speaking, the tax incentives does not encourage job growth. The authors suggest an improvement to fiscal incentives
D. Bondonio and R. Greenbaum, 2006 [6]. USA, 11 states	Employment, investment, sales and payroll per employee / Tax incentives	Increases in employment in new establishments are offset by losses in established firms
D. Bondonio and R. Greenbaum, 2012. Italy, Piedmont	Employment / Cash subsidies	An increase in employment. Bigger subsidies encourage job growth
P. Givord et al, 2011 [7]. France	Employment / Business creation / Tax exemption on income, property, local taxes and social insurance	A low impact on employment is attributed to the relocation of businesses to distressed areas as small firms
R. Chirinko and D. Wilson, 2008 [8]. Tax credits / Investment	State investment tax credits, investment	Tax incentives in bordering states offsets or reduces the limited positive effect
D. Artana, 2013 [9]. The free zones in Costa Rica, El Salvador and Dominican Republic, 2005–2012	Comparison of firms with and without fiscal incentives through analysis of three variables: the level of earnings, inter-annual growht, and the profit level	Companies enjoying tax incentives did not exhibit improved productivity in comparison with firms that did not have them. Empirical evidence suggests that the opposite is true for small firms

tax incentives on investment it also looks at how they impact productivity. She employs the difference-in-differences method using tax return data. Despite positive effect that locally provided investment tax credits have on investment and production, the author draws pessimistic conclusion that the state loses are significantly more in terms of tax revenues than it gains by attracting investment.

J. Kolko and D. Neumark [5] study the impact of various non-tax factors in 42 enterprise zones in California. The authors employ the «difference-in-differences» method for two factors with a variety of control groups and overdetermined regressions, drawing upon data from a survey of companies. The study proves that fiscal tools didn't spur employment in general, but there was some positive impact on employment in certain areas. The authors proved that the job-creating impact was more significant in enterprise zones that had a relatively low share of manufacturing employment, while enterprise zones were more likely to boost employment when local administrators devoted relatively more effort to marketing and outreach activities.

D. Bondonio и R. Greenbaum [6] studied the impact of hiring incentives that companies in the north of Italy had received for three years through the European Promotion Programme. The authors employ the «difference-in-differences» method and data from a European Promotion Program-sponsored census. The authors find that the impact on employment increases with the amount of the subsidy: from approximately two additional workers per firm with benefits below 10 000 euros to seven workers per firm with benefits greater than 70 000 euros.

P. Givord [7] examines the impact on employment of tax incentives that are provided to businesses in the economically distressed regions of France. The author uses the estimation strategy of «difference-in-differences» regressions that draw upon census data and fiscal databases. Tax incentives included five-year exemption from income tax, property tax, local business taxes and social security contributions. The author observes that tax rebates had a modest effect on employment and concludes that the introduction of incentives spurred the relocation of companies from other regions of France.

D. Artana studies the impact of tax incentives offered to companies in Costa Rica, El Salvador and Dominican Republic on three variables: the level of sales of firms, the level of inter-annual growth they had, and the profit level [9]. The author uses a dynamic panel data model with dependent variables. The estimation shows that companies which receive tax incentives do not exhibit higher productivity than non-incentivised firms.

Analysis of comprehensive assessments of tax incentives effectiveness in SEZs is shown in Table 2. Jin Wang [10] tracks the evolution of China's municipality level economics before, during and after the expansion of special economic zones. The author classifies 326 municipalities into four groups based on their timing of carrying out the SEZ experiment. Group 1 is composed of municipalities which were exposed to the SEZ reform in the early 1980s (1980–1985). Group 2 is composed of municipalities which had the SEZ experiment in the late 1980s (1986–1990). Group 3 is composed of municipalities which were granted the SEZ experiment in the early 1990s (1991–1995). Group 4 includes municipalities which has been implementing the SEZ reform since the late 1990s. To estimate the impact of SEZs on the development of municipalities, information on GDP, investment, employment, foreign direct investment, exports were used and a digital GIS map of the Chinese municipalities was drawn up according to the year when SEZ was created. The findings suggest that SEZs not only attract investment, but also bring in advanced technology and ensure economic growth. The SEZ policy also increases foreign direct investment per capita by 58 %, mainly in the form of foreign investment and export-oriented industrial enterprises; it does not crowd out domestic investment and domestically owned capital stock and increases total factor productivity growth rate by 0,6 percentage points [10].

Table 2

Comprehensive study of the effectiveness of special economic zones

Study	Subject	Findings
J. Wang, 2009. 326 China's municipalities between 1978–2007	GDP, investment, employment, FDI, exports, labor productivity	SEZs not only drives capital flows, but also spurs innovation. The share of FDI and export-driven businesses increased by 58 % per capita
S. Alder, L. Shao, F. Zilibotti, 2015. 276 Chinese cities between 1988–2010	The effect on SEZs on economic development of municipalities	During the first ten years of the operation of the SEZ the city GRP per capita grew by 13 % and by 18 % in subsequent years. There was a positive effect on productivity, investment, and human capital. The impact on neighboring municipalities tend to intensify in the course of time

S. Alder, L. Shao, F. Zilibotti [12] study the effect of special economic zones on the economic development of 276 China's municipalities between 1988 and 2010. The authors carry out a «difference-in-differences» estimation. They find that the establishment of a SEZ is associated with an increase in the level of GDP of about 20 % and boosts total factor productivity, investment and human capital. The authors point to the critical role of the state in ensuring success of SEZs through market liberalisation, promoting investment and introducing innovation. The government's industrial policy that included tax incentives was a catalyst for the development of cutting-edge production facilities in China, which had a positive effect on the national economics as a whole. The authors also find positive spillover effects of SEZs on neighbouring regions and cities.

Proposed methodology and its novelty

Even in case of a successful application of tax incentives, the cost of tax advantages (tax expenditures) might exceed benefits of attracting investment. Before studying the effectiveness of tax incentives in a SEZ, one should estimate their effects. When conducting a comprehensive assessment of SEZ tax incentive policy, scholars identify effects of tax incentives on economics, tax revenues, welfare and infrastructure [10–12]. Depending on the area of application, I. A. Mayburov differentiates between the effects of tax incentives on tax revenues, welfare, economics, public funds, and the environment [13, p. 169]. Each indicator of tax incentives effectiveness could serve as a criterion for deciding on the effectiveness (or ineffectiveness) of a tax incentive. However, for the tax incentive to be considered effective, it seems sufficient to have only one type of effects, i.e., to observe a growth of one of the indicators to a level that exceeds tax expenditures, which will constitute a positive effect [14].

The author notes that distinguishing the effect on the environment might be disputable due to quantification issues, but seems inevitable in the future.

To assess the effectiveness of tax incentives, their effects are presented as quantifiable indicators (Table 3).

Table 3

Effects of tax incentives for purposes of comprehensive assessment of SEZ incentive policy

Effect	Indicator
Economics	Gross regional product annual growth; Foreign direct investment growth; Output growth; Labour productivity growth; Fixed investment dynamics, etc.
Tax revenue	Public income growth driven by tax incentives; Subsequent tax revenues exceed current tax expenditures; Tax expenditures cost less than provision of state subsidies; Public revenue shortfalls over the previous and current periods etc.
Welfare	Higher average wage; Growth in new jobs; Higher employment rate; Better education level; Income inequality reduced, etc.
Infrastructure	More km of roads per square km of area ratio; Electricity and gas supply networks; Expansion of transportation and communication systems, etc.

The effect on economics is shown by economic development indicators and financial and economic indicators of taxpayers' operational performance. The welfare effect reflects the social implications of tax incentives in SEZ. The effect on public revenues indicates the impact of tax incentives on the government budget. The effect on infrastructure reflects the development and reliability of infrastructure in the area.

It is possible to estimate the effectiveness of a tax incentive by looking at the degree of its projected effect. If it exceeds the tax expenditures, i.e., if the effect is positive, or if all indicators have increased in monetary terms, it means the tax incentive has been effective. Another factor of effectiveness is the quality of institutional environment in the region and the effectiveness of oversight authorities. Unfortunately, these indicators are not subject to regular statistical surveys in Russia's regions. However, there appears to be a considerable diversity among the Russian regions in terms of their institutional characteristics. The Corruption Perceptions Index published by Transparency International places Russia at the 119th place (among 168 countries) [15]. There are no indicators that would take into account political (transparency, election), economic (liberalization, corruption), and social factors (media independence, maturity of civil society, culture and local government) in each region of Russia.

The effectiveness of tax incentives in special economic zones is difficult to quantify. Four different types of direct costs are distinguished when performing a comprehensive assessment of tax incentives in SEZs:

– tax revenue shortfalls due to tax incentives (tax expenditures);

– resource allocation costs (additional investment in creation competitive markets that increases government expenditures;

– enforcement and compliance costs (tax administration costs);

– costs associated with corruption and lack of transparency (manual control over tax incentives in SEZs drives up costs associated with corruption) [11].

Being one of the common ways of assessing the effectiveness of incentive policies in SEZs, method of cost-benefit analysis implies that the costs of implementing a SEZ project are estimated in terms of the volume of investments that were made thanks to tax incentives, revenue foregone, and direct financial subsidies. Studies that employed the approach do not provide a true measure of efficiency, because they measure only the costs, and not the jobs created, technology transfer, etc.

To measure costs and benefits associated with investment, the following indicators are taken into account:

– the volume of investment that could potentially be undertaken if investors do not receive any incentives;

– «leakages» from the tax base induced by tax incentives, or the relocation of tax payers to tax-free zones;

– tax revenue from tax payers that continue to benefit from tax incentives beyond the period of exemption, or from other activities [16].

The method of cost-output analysis is essentially identical to the method of cost-benefit analysis, but its main difference lies in the use of physical rather than monetary units for measuring benefits. The results of the analysis are easy to interpret.

The main approaches to improve the quality of the estimation of tax incentives in SEZs include creation of tax incentive budgets and tax expenditure reports [17]. In order to compile a unified tax incentive budget, a single coordinated approach is needed to identify all expenditures on public authorities that are involved in SEZ governance (SEZ projects approvals, investment monitoring services, tax control services etc.). The majority of countries, taxation authorities are not responsible for designing and administering tax incentives program in special economic zones. As a rule, among public authorities that are in charge of approving SEZ projects and monitoring investment are several departments Ministry of Economics, foreign investment agencies etc. Main goal of these services is to make sure that investors are coming in, rather than to protect the tax base and ensure tax revenue. A tax

expenditure budget makes it possible to carry out general analysis of direct and indirect tax expenditures on a SEZ project.

Analysis of study results

The effectiveness of tax incentives in SEZs is directly related to the investment climate in the country, as well as to economical and political issues, inadequate protection of property rights, or a poorly functioning legal system. SEZs have proved to be ineffective in the majority of African countries due to ineffective infrastructure and ineffective institutions [18].

Studies conducted in India find that the number of SEZs in the region had negligible effect on economic growth [19]. Moreover, there is significant risk that the national income might shrink following the establishment of SEZs. In 2000, the Indian government cancelled tax incentives for exporters, and granted exemption only to residents of special export-oriented economic zones. That spurred mass tax evasion. Despite insignificant decrease in sales, exporters' profits before tax halved, while their subsidiaries which were registered in SEZs reported a 100 percent increase in profits.

Studies seeking to establish a direct link between the tax burden and FDI prove that taxes have a considerable impact on the volume of investment in SEZ in developed countries. A study by A. Klemm and S. Van Parys that covered 47 developing countries between 1985 and 2004 finds that 10 percentage point increase of the CIT rate lowers FDI by 0,3 percentage points of GDP. Over ten years of tax holidays FDI increase by 0,7 % of GDP. Similar investigations in developing countries generally reveal less correlation between Indicators above [3; 20]. One of the key reasons for that are unattractive conditions for investing that scared away multinational companies: underdeveloped infrastructure, low living standards, lack of political and economic stability, lack of legal transparency, weak judicial system etc. In such cases it is difficult to make up for the unfavorable business climate by providing tax incentives. Yet tax incentives remain one of the most effective development instruments for low-income economics [16].

The effective application of tax incentives in SEZs is measured by taking account of associated costs and considering whether the project has reached its goals. An increase in investment, including FDI, is usually a necessary but not a sufficient prerequisite for development. The effectiveness of tax incentives is a result of taxes imposed by the SEZ, but also of a tax burden in other countries, including the investor's home country and neighboring regions. Our review of foreign literature on the subject of tax incentives in special economic zones shows that when assessing the effectiveness of tax incentive policies in special economic zones the following estimation methods are used:

– econometric models;

– statistical methods of effectiveness assessment.

The statistical estimation techniques are simple methods of quantitative evaluation of SEZs. One can recommend them for use at the early stages of analysis. Among the most commonly used indicators of statistical estimation methods are:

– calculation of mean values;

– time series: absolute change, relative change, growth rate, change trends;

– combination and grouping of economic indicators by certain features;

– competitive comparison over a time span;

– inflation indices (deflators);

– graphical methods.

Statistical methods are essentially about studying the statistics economic effects along with the amount of tax expenditures in SEZs, establishing the volume and frequency of obtaining a certain economic result and producing the most reliable prediction. The statistical methods draw upon big data and require preliminary grouping of facts by shared attributes. For example, simple linear regressions comprise a large number of lagged variables; large amount of information also requires to conduct series of treatments. Simple linear regressions that are designed to reveal the impact of taxes on the economics are subject to identification problems and lim-

itations. The identification problem means that a simple model cannot identify the impact of a discretionary decision of the country government as whether to introduce a tax incentive. This brings about an endogeneity problem in a model when it is impossible to definitely state that fluctuations in tax revenues affect economic dynamics expressed, for example, by GDP, rather than vice versa.

The limitations of such models are due to the fact that it is impossible to take account of shocks in variables that occur outside the model, but have a strong effect on the structure and pace of economic changes. For example, when analyzing tax incentives in a SEZ it is necessary take into account government investment in territorial development. This requires use of complex dynamic models that help mitigate the endogeneity problem and describe economic linkages. Economic processes develop over time, so the issues of analysis and forecasting in time series, including mulita-variate ones, hold an important place in econometrics. The operational performance of SEZs depends on a large number of parameters, which makes it difficult to describe the structure of linkages between these parameters.

In such cases the application of economic and mathematical modelling methods is not only appropriate, but essential. Our overview of approaches to analysing the effectiveness of tax incentives in SEZ shows that the most commonly used estimation methods are dynamic panel regressions, panel data models with fixed effects and the «difference-in-differences» technique.

A big advantage of dynamic panel regression models over simple regressions includes possibility to obtain a large number of observations over a relatively short term horizon by incorporating micro data in calculations. In SEZ investigations, micro data sets are extracted from surveys of enterprise zone based firms.

Panel regression models can take the form of fixed effects models

$$Y_{it} = X'_{it}b + \alpha_i + \varepsilon_{it},$$

random effects models

$$Y_{it} = X'_{it}b + u_{it};$$

$$u_{it} = \alpha_i + \varepsilon_{it},$$

where Y_{it} is the dependent variable; X'_{it} is the deterministic (non-random) variable; ε_{it} is the random (stochastic) component (error term).

In fixed effects models, α_i is the intercept that takes on different values for each unit. The intercept represents the effect of omitted or unobserved variables that describe individual characteristics of units that do not change over time.

In random effects models, α_i, also represents the effect of omitted or unobserved variables that describe individual characteristics of units, but in this case such individual differences are random, their average values are balanced and their variances are identical across samples.

Apart from different interpretations of the intercept, models have different methods of estimating regression coefficients. The fixed effects model allows for data endogeneity, that is, coefficients are estimated when X'_{it} is correlated with α_i. The random effects model implies that explanatory variables in each time period are uncorrelated with the error (exogeneity), which is a fairly strict assumption. Weaker exogeneity of variables in the fixed effects models yields coefficients that are consistent, but ineffective. That means that the estimation method does not produce a minimal variation of coefficients, hence errors as to their statistical significance. This happens because the fixed effects model does not use the entire variation across the data cluster, but only within-entity variation. Between-entity variation is ignored. The random effects model exploits across-cluster variation and produces effective estimations, that might, however be biased in the case of a strong correlation between the error term and explanatory variables [13, p. 165].

Our review of approaches to estimating the effectiveness of tax incentives in special economic zones shows that the «difference-in-differences» technique is often employed for the purpose. This might be due to the difficulty of doing a pure experiment for investigating cause-

and-effect linkages between tax incentives and indicators being studied.

The technique estimates fixed effects in aggregate data. Using the DD method makes it possible to eliminate omitted variable bias by controlling for unobserved omitted characteristics while incorporating observed parameters of entities into the model [21].

J. Wooldridge explains that «the simplest set up is one where outcomes are observed for two groups for two time periods. One of the groups is exposed to a treatment in the second period but not in the first period. The second group is not exposed to the treatment during either period. In the case where the same units within a group are observed in each time period, the average gain in the second (control) group is substracted from the average gain in the first (treatment) group. This removes biases in second period comparisons between the treatment and control group that could be the result from permanent differences between those groups, as well as biases from comparisons over time in the treatment group that could be the result of trends» [22].

Technically, the DD method estimates the effect of SEZ projects as a difference between *Y* (an indicator, e.g., GRP) in two points in time for two groups of regions: the treatment one where the SEZ are being implemented, and the control one where no projects occur (*AC* = *AB* – *CB*).

The standard DD model can be expressed as a regression equation:

$$Y_i = \beta_0 + \beta_1 P_i + \beta_2 T_i + \beta_3 P_i T_i + \Sigma j a_j X_{ij} + \varepsilon_i,$$

where i — indexes the region; j — indexes an auxiliary factor variable; Y_i is the indicator; P_i is a dummy that is equal to one for time period 2 (later observation), and equal to zero for time period 1 (calculation period); T_i is a dummy that is equal to 1 for regions from the treatment group, and equal to zero for regions from the control group; X_{ij} are auxiliary factor variables; ε_i is a random (stochastic) component (error term; β_0, β_1, β_2, β_3, α_j are the regression coefficients; β_0 is the mean value of GRP for control group regions during period 1; $\beta_0 + \beta_1$ is the mean value of the indicator for control group regions during period 2; $\beta_0 + \beta_2$ is the mean value of the indicator for treatment group regions during period 1; $\beta_0 + \beta_1 + \beta_2 + \beta_3$ is the mean value of the indicator for treatment group regions during period 2; β3 d is the difference-in-differences estimate (effect).

The models could include regional-scale fixed effects, which makes it possible to balance the special (first difference) and temporal (second difference) heterogeneity that is unrelated to the regional SEZ. Consequently, DD estimation makes it possible to assess growth determinants that are specific to a particular territory and a particular time frame.

Conclusions

A survey of recent foreign research into tax incentives in special economic zones shows a wide array of approaches to the subject. The effectiveness of tax incentives in SEZs is assessed from the point of view of associated expenditures as well as whether the projects in question meet their objectives. One of the key problems of effect manifestation and estimation has to do with the difficulty of establishing the time lag that is quite unique to each incentive. The effects of tax incentives usually occur in the mid-term or even long-term run. The main problem with estimating tax incentives is carrying out an analysis of the SEZ effectiveness without tax incentives and constructing models that would isolate the effects of tax incentives from the impact of other factors and variables.

By employing the method of cost-benefit analysis for assessing the effectiveness of tax incentives in a SEZ, it is possible to perform a comprehensive analysis of the SEZ and estimate aggregate long-term effect by determining the present value of net benefits by discounting it at a discount rate. The complexity of the method arises from the lack of an objective opportunity to estimate individual effects and outcomes in monetary values. For example, it is difficult to quantify benefits of public expenditures. Additionally, irregular statistical observations make the cost of collecting information unreasonably high.

The «difference-in-differences» method is widely used for analyzing performance of special economic zones in order to assess cause-effect linkages (A. Caiumi, D. Bondonio and R. Greenbaum, P. Givord [4; 6; 7]. Studies by S. Alder, L. Shao, A. Klemm and S. Van Parys show that the econometric methods are fraught with the problem of identifying and taking into account the time lag) [2; 12].

Panel data that are used in the «difference-in-differences» technique make it possible to remove the unobserved heterogeneity in the sample when the omitted variables are fixed in time inside the SEZ. That means that the treatment and control groups should be exposed to the same tax incentives and respond to them «in parallel». For example, when conducting their research, S. Van Parys and S. James used the DD method with country-fixed factors [3]; J. Kolko and D. Neumark used the DD method for two factors in different control groups and overdetermined regressions [5].

In other words, in the absence of an effect from tax incentives in both treatment and control groups of SEZs, the model definitely yields different coefficient estimates, but estimates should change in parallel over time during the considered period. The conditions have to be observed in order to make sure that it was only the effect of tax incentives that could change the trend in the treatment group when compared to the control group.

Panel data ensure higher precision of estimation, make it possible to study the change in dynamics and individual characteristics of the units in the sample; they can identify and measure effects that cannot be traced in time series or spatial data only. For example, research by J. Wang and A. Klemm, S. Van Parys, who use a lagged model with fixed effects that is estimated with instrumental variables, take into account distance between provinces / countries to determine how neighbouring provinces or bordering countries influence one another.

References

1. Wang Jin. The economic impact of Special Economic Zones: Evidence from Chinese municipalities. *Journal of Development Economics,* 2013, no. 101, pp. 133–147.

2. . Klemm A., Van Parys S. *Empirical Evidence on the Effects of Tax Incentives. International Monetary Fund. Working Paper*. Washington, DC., Fiscal Affairs Department, 2009. Available at: https://www.imf.org/external/pubs/ft/wp/2009/wp09136.pdf.

3. Van Parys S., James S. The effectiveness of tax incentives in attracting investment: panel data evidence from the CFA Franc zone. *International Tax and Public Finance,* 2010, no. 17, pp. 400–429.

4. Caiumi A. *The Evaluation of the Effectiveness of Tax Expenditures – a Novel Approach: An Application to the Regional Tax Incentives for Business Investments in Italy*. Italian National Institute of Statistics, 2011. 57 p. Series OECD Taxation Working Papers **5**. DOI: 10.1787/5kg3h0trjmr8-en.

5. Kolko J., Neumark D. *Do Some Enterprise Zone Create Jobs?* Cambridge, National Bureau of Economic Research, 2009. Series NBER Working Paper No. 15206. Available at: http://www.nber.org/papers/w15206.

6. Bondonio D., Greenbaum R. Do tax incentives effect local economic growth? What mean impacts miss in the analysis of enterprise zone policies. *Regional Science and Urban Economics,* 2007, no. 37 (1), pp. 121–136.

7. Givord P., Quantin S., Trevien C. *A Long-Term Evaluation of the First Generation of the French Urban Enterprise Zones*. European Regional Science Association (ERSA), 2012. Series Working Paper No. G 2012/01. Available at: http://www.insee.fr/fr/publications-et-services/docs_doc_travail/G2012-01.pdf.

8. Chirinko R., Wilson D. *State Investment Tax Incentives: A Zero-Sum Game?* Federal Reserve Bank of San Francisco, 2008. Working Paper Series 2006–47. Available at: http://www.frbsf.org/economic-research/files/wp06-47bk.pdf.

9. Artana D. The effectiveness of fiscal incentives: The case of the export free zone of Costa Rica, El Salvador and Dominican Republic. In Sebastian Augusto, Mario Cuevas, Osmel Manzano (eds). *Partners or creditors? Attracting foreign investment and productive development to Central America and Dominican Republic*. Inter-American Development Bank, 2015, pp. 121–205.

Available at: https://publications.iadb.org/bitstream/handle/11319/6820/Socios%20o%20acreedores%20ENG%202-25-15%20web.pdf?sequence=1.

10. Wang Jin. *The Economic Impact of Special Economic Zones: Evidence from Chinese Municipalities*. London School of Economics, Job Market Paper, 2009. 45 p. Availabe at: http://se.shufe.edu.cn/upload/_info/42910_1001270253311.pdf.

11. Zolt E. M. *Tax Incentives: Protecting the tax base. Paper for Workshop on Tax Incentives and Base Protection. Draft Paper No. 3*. New York, United Nations, Department of Economic and Social Affairs, April 2015. 35 p. Availabe at: http://www.un.org/esa/ffd/wp-content/uploads/2015/04/2015TIBP_PaperZolt.pdf.

12. Alder S., Shao L., Zilibotti F. *The Effect of Economic Reform and Industrial Policy in a Panel of Chinese Cities*. University of Zurich, 2013. 45 p. Working Paper Series no. 207. Available at: http://www.econ.uzh.ch/ipcdp/Papers/ipcdp_wp207.pdf.

13. Maiburov I. A., Ivanov Yu. B. (eds). *Nalogovye l'goty. Teoriya i praktika primeneniya* [Tax Benefits. Theory and Practice of Use]. Moscow, Yuniti-Dana Publ., 2014. 487 p.

14. Mayburov I. A. Evaluation of tax expenditures and tax effectiveness: methodology of problem solving. *Obshchestvo i ekonomika = Society and Economic,* 2013, no. 4, pp. 71–91. (In Russian).

15. Beddow R. (ed.). *Corruption Perceptions Index 2015*. Transparency International, 2016. Available at: http:// http://www.transparency.org/cpi2015.

16. Sinenko O. A. Analysis of practice of performance evaluation of tax expansions of development of special economic zones. *Innovatsionnoe razvitie ekonomiki = Innovative Development of Economy*, 2016, no. 3 (33), pr. 2, pp. 224–232. (In Russian).

17. James S. *Effectiveness of Tax and Non-Tax Incentives and Investments: Evidence and Policy Implications*. World Bank Group, September 1, 2013. Available at: http://ssrn.com/abstract=2401905.

18. Zeng D. Z. *Global Experiences with Special Economic Zones with a focus on China and Africa*. Washington, DC, The World Bank, February 2015. Series Policy Research Working Paper; No. 7240. Available at: http://www.worldbank.org/content/dam/Worldbank/Event/Africa/Investing%20in%20Africa%20Forum/2015/investing-in-africa-forum-global-experiences-with-special-economic-zones-with-a-focus-on-china-and-africa.pdf.

19. Chee K. L. Special Economic Zones and Growth in China and India: An Empirical Investigation. *International Economics and Economic Policy*, 2013, vol. 10, iss. 4, pp. 549–567. DOI: 10.1007/s10368-012-0223-6.

20. Abbas S. M. Ali, Klemm A. A partial race to the bottom: corporate tax developments in emerging and developing economies. *International Tax and Public Finance*, 2013, vol. 20, iss. 4, pp. 596–617.

21. Angrist J. D., Pischke J.-S. *Mostly Harmless Econometrics: An Empiricist's Companion*. New Jersey, Princeton University Press, 2009. 392 p.

22. Wooldridge J. M. Difference-in-differences estimation. *Quantile*, 2009, no. 6, pp. 25–47.

Author

Olga A. Sinenko — PhD in Economics, Associate Professor Far Eastern Federal University School of Economics and Management, Department of Finance and Credit, Vladivostok, Russia (8 Suhanova St., 690950, Vladivostok, Russia); e-mail; sinenko.oa@dvfu.ru.

Информация об авторе

Синенко Ольга Андреевна — кандидат экономических наук, доцент, кафедра финансы и кредит, Школа экономики и менеджмента, Дальневосточный федеральный университет, г. Владивосток, Россия (690950, г. Владивосток, ул. Суханова, 8); sinenko.oa@dvfu.ru.

УДК 336.2
DOI 10.15826/jtr.2016.2.3.023

Elena F. Kireyeva
Belarus State Economic University,
Minsk, Belarus

TAX REGULATION IN AGRICULTURE: CURRENT TRENDS, SELECTION OF A STATE SUPPORT FORMS

ABSTRACT. In the article the problem of selection of state support forms for the agricultural sector is considered as one of the most important sectors of economics. Main purpose of the article is to determine the tax areas in Belarus taking into account international experience in taxation and subsidies of farmers, and processes of integration in the Eurasian Economic Union (EAEU). Agriculture with its sector particularity, social importance in solving problems of poverty, economic growth and food security is defined as a priority area of government funding. Main characteristics of tax incentives in developed countries were summarized based on national tax laws. It was concluded that, despite the preferential subsidies of the agricultural sector, tax regulators were widely used by different countries that allowed taking into account national particularity and priorities. Article reviewed current situation in the agricultural sector of the Republic of Belarus. Were studied directions of government financing of agriculture and peculiarities of its taxation. In the article were also generalized forms of tax exemptions for the producers of agricultural output. Were analyzed special tax regimes for agricultural organizations and peasant (farmer) households. Due to the active participation of the Republic in the integration entities were analyzed as well external factors, which influenced strategy of agricultural financing: commitments to reduce budget funds and taxes on farmers within the EAEU. Conclusions on need of reviewing mechanisms of national tax incentives were made, based on its effectiveness assessment and widening of the range of actions.

KEYWORDS. Tax regulation of the agricultural sector; unified tax on producers of agricultural output; taxation of peasant (farmer) households; tax exemptions; state support of agriculture.

FUNDING. This article was supported by the Belarusian Republican Foundation for Fundamental Research in the framework of the joint research project «BRFFR-RGNF 2015»: «Improvement of tax and budget instruments of a state financial support of agriculture in order to ensure economic and food security» (G15R-2015).

Е. Ф. Киреева
Белорусский государственный экономический университет,
г. Минск, Республика Беларусь

НАЛОГОВОЕ РЕГУЛИРОВАНИЕ СЕЛЬСКОГО ХОЗЯЙСТВА: СОВРЕМЕННЫЕ ТЕНДЕНЦИИ, ВЫБОР ФОРМ ГОСУДАРСТВЕННОЙ ПОДДЕРЖКИ

АННОТАЦИЯ. В статье исследуется проблема выбора форм государственной поддержки аграрного сектора как одного из наиболее значимых секторов экономики. Основная цель — определить направления налогообложения в Беларуси с учетом мирового опыта налогообложения и субсидирования сельхозпроизводителей, а также интеграционных процессов, происходящих в Евразийском экономическом союзе (ЕАЭС). Государственное финансирование сельского хозяйства, обладающего отраслевой спецификой и социальной значимостью в решении проблем бедности, экономического роста и продоволь-

ственной безопасности, определено как приоритетное направление. На основе национальных налоговых законодательств обобщены особенности налогового стимулирования в развитых странах. Выявлено, что, несмотря на преимущественное субсидирование аграрного сектора, налоговые регуляторы активно применяются разными странами. Это позволяет учитывать национальную специфику и приоритеты. Кроме того, в исследовании рассматривается современное состояние сельского хозяйства Республики Беларусь, представлены направления его бюджетного финансирования и особенностей налогообложения, обобщаются виды налоговых льгот для производителей сельскохозяйственной продукции, анализируются специальные режимы налогообложения для сельскохозяйственных организаций и крестьянских (фермерских) хозяйств. В связи с активным участием республики в интеграционных образованиях изучаются внешние факторы, влияющие на стратегию финансирования сельского хозяйства: обязательства по сокращению бюджетных средств и налогообложение аграриев в рамках ЕАЭС. В результате были сделаны выводы о необходимости пересмотра механизмов национального налогового стимулирования на основе оценки их эффективности и расширения спектра действия.

КЛЮЧЕВЫЕ СЛОВА. Налоговое регулирование; аграрный сектор; единый налог; производители; сельскохозяйственная продукция; налогообложение; крестьянские (фермерские) хозяйства; налоговые льготы; государственная поддержка; сельское хозяйство.

ФИНАНСИРОВАНИЕ. Статья выполнена при финансовой поддержке Белорусского республиканского фонда фундаментальных исследований в рамках совместного научного проекта «БРФФИ-РГНФ 2015»: «Совершенствование налоговых и бюджетных инструментов государственной финансовой поддержки агропромышленного комплекса в целях обеспечения экономической и продовольственной безопасности» (Г15Р-2015).

Introduction

In the XXI century agricultural policy remains an essential instrument for achieving sustainable development and poverty reduction. In order agriculture has contributed to solving social and economic problems, it is necessary to improve the management in agriculture at the local, national and global levels[1].

Financial support of agricultural production is a major factor in improving the competitiveness of the country. Long period of the return on investment, dependence on natural and climate conditions, rapid deterioration of agricultural funds, slow response of agricultural production to the conditions and requirements of the market are responsible for the low competitiveness of the sectors of agriculture and significantly reduce its investment attractiveness.

In order to stabilize agricultural production and improve the functioning of agricultural market it is used a system of direct and indirect levers of state financial support: budget subsidies and tax incentives. Complex of conducted performances should lead to an increase in investment activity in agricultural sector. At the same time creation of an attractive investment environment in the agricultural market contributes not only to the growth of gross domestic product, but also to reduction in unemployment, income and living standards increase in rural areas, growth of gross national income by an amount greater than the initial increase in investments, which is called «the effect of multiplier». As it noted in the report «Agriculture for Development» of the World Bank in 2008, the growth of gross domestic product (GDP) in agriculture is at least twice as effective in fighting poverty as growth in other sectors of the economics[2]. In this regard, well-built system of state financial support for agriculture, especially agricultural production, increases

[1] OECD. Agricultural policies, Markets and Trade in OECD Countries: Monitoring and Evaluation, 2013.

[2] URL: http://www.un.org/ru/development/surveys/docs/worlddev2008.pdf.

incomes, and hence the level of the rural population[3].

Selection of a particular method of support depends on several factors (state of agriculture, geopolitical situation, competitiveness of produced outputs, existence and degree of the development of cooperation ties of participants), but primarily focuses on the purposes, which has a particular country [1, p. 6]. Significant impact on the use of financial instruments is provided by processes of integration and accession to the trade and integration unions. Commitments of the country to reduce direct subsidies to the agricultural sector and common approaches to coordinated agricultural policies encourage both agricultural producers and agricultural market as a whole to seek indirect methods of support, applying effective tax forms and mechanisms.

Tax support (tax exemptions granting) is a common management instrument to countries with developed and emerging economics. But the scale of this aid is much more modest in comparison with agricultural producers subsidizing due to the complexity of a specific recipient defining, additional tax administration, lack of methodologies for assessment of additional income earned from tax exemptions and others.

The problem also lies in the fact that one-time application of tax and budget instruments leads to the same result, because of their interchangeability. Thus such a use of tax and budget instruments to promote the development of the agricultural sector of economics can be seen on the one hand as inappropriate from the point of view of economy and losses for the state budget [2, p. 404].

On the other hand it allows having more comprehensive and flexible tools at the disposal of the state [3, p. 93]. That's why the issues of tax instruments improving to promote the development of the agricultural sector, focused on economic growth and competitiveness, are in the spotlight of the state, science and business.

The degree of scrutiny and elaboration of the problem

In the scientific community, issues of taxation in agriculture are widely highlighted. Many works of J. Becker, N. Stern, J. Buchanan, G. Tullock, M. Olson, B. Gardner and others are devoted to state regulation of the agricultural sector in developed countries.

Researches of agricultural taxation particularities in developing countries and countries with economics in transition could be found in E. Ahmad, K. R. X. Gordon, S. Rozelle. General issues of agricultural production taxation were considered by such scholars as L. Khorounzhiy, V. Panskov, M. Romanovsky, M. Shadrin and others.

Works on tax reforms and tax planning in the agricultural sector of American and European scientists were published in the last years, among them: J. M. Williamson (Agriculture, the Tax Code, and Potential Tax Reform), A. B Sharma (BRICS for end to rich nations' farm subsidies), S. Vogel (Farm Income and Costs: Farms Receiving Government Payments), etc. [4–6].

Belarusian scientists actively engaged in issues of pricing and financial support for agriculture: V. G. Gusakov, G. I. Ghanush, G. M. Lych, A. P. Shpak and others.

However, due to recurring changes in the economics as a whole, increasing threats in the global economics, and in the agricultural sector in particular, many theoretical and methodological issues require further study and practice requires better tools of financial support.

One of the most significant shortcomings of the current tax system is that it doesn't sufficiently stimulate the formation of development of the most important proportions in economics, and doesn't assist progressive structural changes in the agricultural sector, which could ensure its competitiveness.

Realizing the importance of conducted researches and the value of the results, it is necessary to note that the issues of agricultural sector taxation in conditions of

[3] USDA Agricultural Projections to 2018. Office of Chief Economist, USDA, Interagency Agricultural Projection Committee, Long-Term Projections WAOB-2009-1, Washington D.C., United States, February, 2009.

integration processes deepening, ensuring of food security of the Belarusian economics require further reflection and development of new effective financial forms and instruments, corresponding trends of the world economic thought.

Recent years, Belarus has made serious steps, backed by legislative acts in the area of tax incentives of the subjects of agricultural activity and the creation of incentive funding mechanisms. Current legislation contains a number of provisions aimed at the use of tax incentives and preferential tax regimes.

In general, a current regulatory framework adequately defines the principles, purposes, directions and mechanisms of the agrarian policy of the state. At the same time in the country there is no scientifically-based strategy for the tax support of agricultural sector. Applicable tax incentive tools are not monitored, there is no methodology to assess their effectiveness, there is a need to further system based improvement of tax exemptions and financial leverages, comprehensive analysis of a tax policy in the conditions of formation of a unified economic space is required.

Tax policy of developed countries in agriculture

Agricultural sector because of its specificity is under special control of the state. Annually subsidies to this sector count billions of dollars. This is confirmed by the example of the European Union, where agricultural policy received considerable attention.

Despite the domestic subsidies and the allocation of funding from the EU funds, each state provides a number of measures stimulating agricultural production due to the nature of the production cycle, social significance, the aggravation of food risks, and other factors. Thus, agriculture in the global tax practice is seen as a specific object to which various tax exemptions and preferential regimes are applied. Moreover, this approach is almost universally used, along with the release of targeted subsidies and other budget mechanisms of state support for the agricultural sector [7, p. 12].

Generally in the structure of taxes paid by agriculture in developed countries, there are national taxes — corporate income tax, value added tax and local — land, agricultural and others.

Agriculture, as a rule, has a preferential indirect taxation: VAT, sales tax.

There are different approaches to the establishment of VAT rates for farmers (for example, in a number of EU countries it depends on the level of the farmer's income), but mostly rates range depends on the type of product and its social and economic significance: reduced rates applied to agricultural and food products. Thus, the agricultural enterprises in Germany, France are fully exempted from VAT[4]. In China agricultural outputs, produced and implemented by farmers on their own are not taxed. In the US, in some states food is not subject to sales tax, or taxed at a reduced rate. Preferential regime for farmers is that when buying raw materials, plant and equipment for agriculture, this is not taxed.

Income corporate tax in most cases refers to national taxes, therefore, the order of payment and rates are set by fed-

4 The taxation of agriculture in the EU [Electronic resource]. URL: https://agrotypos.com/2016/01/27/the-taxation-of-agriculture-in-the-eu.

Table 1

Subsidies and taxes in the agricultural sector, 2010–2014 EU-28

Indicators	2010	2011	2012	2013	2014
Product subsidies less taxes, million EURO	5 497	4 966	4 200	3 820	3 300
Production subsidies less taxes, million EURO	46 096	48 472	46 705	47 062	46 831
Subsidies less taxes as a share of value added at producer prices, %	35,9	34,6	32,4	31,4	31,4

Source: URL: http://ec.europa.eu/eurostat/statistics explained/index. php/File:Subsidies_ and_ taxes_in_the_agricultural_sector,_2010–14_YB15.png.

eral legislation in all countries. Within the framework of direct taxation this tax applies different mechanisms and forms of incentives for the agricultural sector. The procedure of tax base reduce or tax exemption is widely applied.

For example, Australian milk producers on the hottest period — summer and early autumn — are exempted from paying certain taxes and pay for others in smaller amounts (overall decline of about 35 %). Income less than 18 200 thousand Australian dollars per year is not taxed, and the rate of income tax is reduced to 28,5 % for companies with an annual taxable income less than 5 million Australian dollars. Also in India, individuals' income less than 200 thousand Indian rupee is not subject to income tax [8].

China has an exemption from corporate income tax (growing vegetables, cereals, oilseeds, pulses, sugar crops, fruits and nuts, breeding of new varieties of crops, livestock and poultry, as well as primary processing of products produced) and a 50 % reduction of tax rate's basic of 12,5 % (growing flowers, tea and other plants, which are the materials for the manufacture of beverages and flavors, as well as primary processing of products produced). Peasants are exempted from agricultural tax, slaughter tax and tax on special agricultural products; in addition, all kinds of rural deductions were abolished: the accumulation fund, the social fund, and fund administration at the village level [8].

In France livestock cooperatives and consortia of cooperatives are exempt from corporate tax. In Italy, during the first 10 years since the establishment of agricultural cooperatives for the primary processing of agricultural products are exempt from paying tax on income of legal entities and local income tax.

In several countries of the southern EU (Spain, Portugal) and the former Eastern bloc (Poland, Romania, Hungary) there is a special preferential tax regimes for agricultural incomes. In addition, in some countries additional tax exemptions are applied for small farms and young farmers.

Poland is a country with the most favorable tax system for farmers in the EU. Farmers do not pay taxes on received agricultural income. Taxation provides only «rural tax» to their arable land. In 2015, its rate was about 3,4 euros per hectare.

In Romania and Hungary the lowest tax rate of 16 % is applied for farmers.

Spain applies preferential tax treatment for farmers with an annual income from agriculture less than 250 000 euros. It provides for the payment of VAT at the reduced rate, the fuel surcharge and the individual income tax. Also a reduced tax rate is applied for young farmers and producers with small farms[5].

Some European countries apply to farmers a tax mechanism as a non-taxable income. So, Portugal exempts from tax the income from agriculture, which is less than 22 600 euros. In Cyprus, the non-taxable income is 19 500 euros. The United Kingdom has established a tax-free threshold of 10 000 British pounds. The Netherlands — 4 600 euros.

Germany offers a choice of income — the general or the simplified system for small agricultural enterprises (not more than 200 acres of farmland, or 50 head of cattle). Tax-exempt income is 7 664 euros.

In Sweden, the profit (income) of farmers is taxed at a reduced rate of 28,97 %, for young farmers it is reduced to 14,89 % and for older farmers to 10,21 %.

The use of tax deductions system is also widely applied in practice of agricultural taxation. For example, in Germany, in addition to the deductions applicable to all citizens, there is a special deduction for individuals receiving income from agriculture and forestry. In Australia, individuals and legal entities, engaged in activities on land cultivation and animal husbandry have over 10 years the right to deduct the cost of telephone lines and ground clearance, to prevent the erosion of land costs in the year of expenditure.

[5] URL: http://www.eurasiancommission.org/ru/act/prom_i_agroprom/dep_agroprom/sxs/Documents/Анализ%20мировых%20тенденций%20господдержки%20сх.pdf.

In Canada, when making investments that improve the quality of land, its value is subtracted from the taxed income of the farmer.

Accelerated procedure for depreciation of fixed assets. In agriculture, this procedure is stipulated in almost all countries. For example, in Australia they apply seven depreciation rates: 33,33 %, 20 %, 15 %, 10 %, 7,5 %, 5 %, 2,5 %; tax authorities publish guidelines for the use of these rates, but the decision to use a particular rate is taken by the company itself. In India, the depreciation of the equipment is classified in three categories and amounts 25, 40 and 100 %.

Among other tools used for agricultural tax regulation can be emphasized an opportunity to change the tax period. In France, farmers with a certain level of income have a right to establish for themselves the production cycle, which does not coincide with the calendar year, and in the US they have the ability to pay tax once every three years (with the average income). In Canada — average income for the five-year period in order to protect farmers from sharp fluctuations in earnings inherent in the data sectors and in such a way to regulate the distribution of income by years for tax purposes.

In the majority of countries land tax is local. Methods of calculating land tax are different, but in general they are different types of a cadastral method. The tax rate for agricultural land is much lower than the tax rate for non-agricultural land (as a rule, does not exceed 1 % of the value of the land). In land assessing it is taken into account its suitability for agriculture, relief, productiveness, availability of infrastructure.

Laws in many countries also use other methods of providing benefits for land tax:

– complete exclusion of agricultural land from taxation (for example, in the UK and China; melioration cooperatives in Italy, in Czech Republic up to 10 hectares, if it is handled by the owner);

– reduction of a tax rate (in Italy for agricultural cooperatives, located in mountainous areas, the land tax rate reduced by 50 %; in Czech Republic significant tax benefits can be provided to those areas of farmland, where the productivity is significantly lower than normal);

– an alternative to the payment of land tax. In some states of the USA there is an possibility to apply a reduced rate of income tax or a tax credit;

– exemption from the revaluation of land value (lands, where are made drainage, irrigation works, planting of fruit trees, in France, for example, temporarily are not revalueted).

Tax on sale of land plots shall be paid in a number of countries in addition to the land tax. As a basis for its calculation they use the actual sale price of the plot. In China they pay an additional agricultural tax, tax on agriculture (the use of arable land), on an increase of the land value (on a progressive scale from 30 to 60 %), tax on livestock (keeping and breeding of cattle).

The Australian Government in order to finance projects of grain research corporation has approved a special tax on farmers. Each year, the principal organization of the grain industry in Australia — Australian grain producers (GPA) — sets its size: usually it is not more than 0,5 % of the gross value of grain produced by farmers[6].

Main parameters of the tax regulation of agriculture in developed countries show a significant number of similarities: tax policy in countries agriculture uses the entire arsenal of direct and indirect taxation, agricultural producers pay both federal and local taxes[7]. Hereby if the federal taxes in agricultural sector are unified, local taxes may vary considerably and are determined by the tasks of the region, its specific geographical and climatic situation, the national mentality.

---

[6] URL: http://www.eurasiancommission.org/ru/act/prom_i_agroprom/dep_agroprom/sxs/Documents/Анализ%20мировых%20тенденций%20господдержки%20сх.pdf

[7] Taxation trends in the European Union Data for the EU Member States, Iceland and Norway Statistical books [Electronic resource]. Luxembourg : Office of the European Union Publ., 2015. URL: http://ec.europa.eu/eurostat/web/ess/-/taxation-trends-in-the-european-union-2015-edition.

The role of agriculture in the economy of the Republic of Belarus: current status and funding mechanisms

The Belarusian economics, the agricultural sector has a significant share both in consumer market and in foreign trade. Agriculture provides economic growth and sufficient level of rural resident's income, solves food security issues, creates infrastructure in rural areas, and economic growth.

Today, the share of agriculture and forestry is about 6,7 % of the GDP of the Republic of Belarus.

In 2015 the number of employed in the production of agricultural products amounted to about 8 % (320,6 thousand), the export of agricultural products and food products was 16,7 %.

The main share of the agricultural sector belongs to agricultural organizations. More than 70 % of the agricultural organizations are entities of public or mixed (with the state share) ownership.

Dynamics of changes for each type of agricultural organizations represented in the figure 1.

There is a certain orientation of agricultural production. Large farms specialize in products that could be most effectively produced on a large scale and requires significant investments. The sector of private farms on small plots of land growing labor-intensive cultures. The share of small-scale private farms account for a small volume of gross agricultural output. Each type of farmers specialize in their key product groups. Crop production, which allows to receive the most benefits from the efficiency of scale (ie, corn, flax, sugar beet) and animal products, which require substantial investment in infrastructure and equipment (dairy cattle, breeding pigs and poultry), mainly belongs to large agricultural enterprises, while labor-intensive products, such as potatoes, vegetables and sheep (wool), are made by private farms.

The government is actively involved in managing of the sector, defining the production, ensuring the delivery of resources and the purchase of finished products, implementing or financing investments, adjusting prices and controlling wages. These structural constraints and government regulation inhibit private initiative, and (domestic and foreign) investment.

Analysis of key financial indicators for the last 4 years has shown unfavorable trend of faster growth in production costs to revenue and, as a consequence, income reduce of agricultural production.

More clearly, this trend — decline in profits and growth in a number of unprofitable agricultural enterprises can be traced in the figure 2.

The number of unprofitable enterprises has increased 3,5 times over the past 4 years and amounted to 723 organizations, with the most negative trend developed in the agricultural organizations. While in 2012 there were only 56, in 2015 there were 503 organizations. Among the peasant (farmer) households, this trend doesn't have such a negative trend. In 2012, there were 125, in 2015 — 220 organizations.

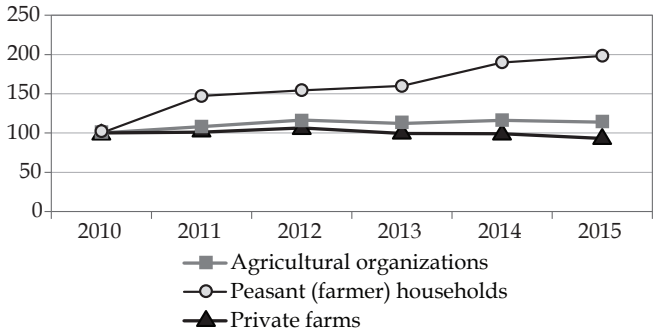

Figure 1. Dynamics of the number of agricultural enterprises by organizational forms for 2010–2015

Source: Agriculture in the Republic of Belarus: Stat. Sat. Mn., 2016. P. 17

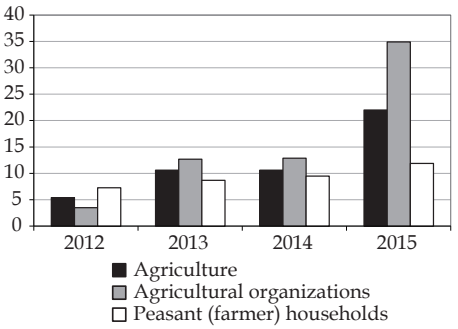

Figure 2. The share of unprofitable enterprises in the total number of organizations, interest

Source: Agriculture in the Republic of Belarus: Stat. Sat. Mn., 2016. P. 174

In the table below we can see significantly deteriorated financial results (sum of the net loss, profitability of sold products, and returns on sales) during the analyzed period. Especially sharp drop in the last year under analysis (almost 11 times) was showed by the profitability of agricultural organizations. This shows once again a decrease in possible sources for payment of taxes.

The agricultural sector in the Republic of Belarus received substantial government support in the form of direct budget support, and through the use of various indirect levers.

The share of budget expenditures on agriculture in 2015 accounted for 7,3 % of the total consolidated budget, which is more than in many other countries, although this figure dropped slightly in recent years.

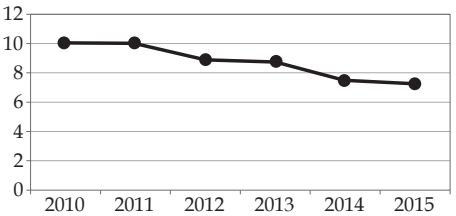

Figure 3. Expenses of the state budget for the financing of agriculture in 2010–2015

Source: Kireeva E. F. Tax regulation of the agricultural sector in Belarus: current state, the choice of forms of government support // Innovative development ekonomiki. 2016. № 3 (33) II. S. 150

Main channels of budget allocations are as follows:

1. Funding of national activities: obligatory insurance, the formation of the state stabilization funds through purchasing and commodity interventions, the creation and development of social infrastructure, scientific conferences, etc.

2. Targeted funding entities directly engaged in agricultural production by subsidizing agricultural output, compensation of losses of agricultural producers in establishing the disparity in prices of industrial producers for goods (services) consumed by the agricultural sector, as well as providing individual state support in accordance with the law.

Table 2

Financial performance of the agricultural organizations of the Republic of Belarus in 2010–2015

Indicators	2010	2011	2012	2013	2014	2015
The sum of the net loss of unprofitable organizations bn. rub.						
Total: Agriculture	77,3	104,1	159,9	478,5	923,8	734,3
Agricultural organizations	76,4	97,4	151,1	462,0	902,0	687,6
Peasants (farmers) households	0,9	6,6	8,9	16,5	21,7	46,7
Profitability of sold products, goods, works, services, %						
Total: Agriculture	0,8	15,8	19,6	4,6	7,1	1,2
Agricultural organizations	1,3	15,4	19,3	4,1	6,5	0,6
Peasants (farmers) households	29,5	36,0	33,3	33,2	34,8	31,1
Return on sales, %						
Total: Agriculture	0,7	12,3	14,7	3,9	5,9	1,1
Agricultural organizations	1,2	12,0	14,6	3,5	5,5	0,5
Peasants (farmers) households	20,5	24,7	22,7	22,7	23,5	21,8

Source: Agriculture in the Republic of Belarus: Stat. Sat. Mn., 2016. S. 173–174.

3. Compensate for the loss of commercial banks and the Development Bank of the Republic of Belarus in the issuance of loans to entities operating in the field of agriculture production on preferential basis.

Indirect measures of a state support are expressed primarily in the form of public procurement, price regulations and the application of tax exemptions or special tax regimes[8].

Tax exemptions and special regimes for farmers Belarus

The main benefits in the field of agricultural production and processing of agricultural products in food are presented in Table 3.

While assessing the likely effect of the existing exemptions, it should be noted that the number of organizations to apply exemptions for income tax is not big. While in 2011 the number of taxpayers who have benefited, was 318 subjects, then a year later in 2015 it decreased by more than a third (196 subjects) [8, p. 88]. This is primarily due to the low profitability and loss of agricultural production. The trend has developed for a number of reasons, among which there are objective — the general economic situation, the decline in sales in foreign markets, adverse weather conditions, as well as certain measures of state influence: price limits, low efficiency and productivity, including due to inefficient management.

Only 7 companies apply exemptions for land tax (0,5 % of all taxpayers), and for real estate tax it is 254 organizations (16 % of all taxpayers). Total amount of benefits that stimulate agricultural production and processing of all the grounds in 2015 was — 398,1 billion rubles (0,4 % of total revenue) [9, c. 91; 10].

Thus, the conclusion was that existing system of granting tariff preferences of a general tax system for agriculture did not fully meet its function; it had a limited effect and insignificant volumes. This was one of the reasons for the abolition of exemptions for income tax for agricultural production from 2016.

[8] URL: http://ec.europa.eu/eurostat/web/ess/-/taxation-trends-in-the-european-union-2015-edition.

Table 3

The main tax incentives for agricultural producers in Belarus

Tax	Tax exemptions
Cost-added tax — base rate — 20 %	It is applied a reduced rate of 10 %: For plant products, wild products, beekeeping, animal husbandry (except for fur production) and fish. Products must be made in the territory of the Republic of Belarus and do not include agricultural products used for decorative purposes. Food products and products for children. The exemption granted on the basis of a special list for produced or imported products
Corporate income tax — base rate — 18 %	Tax exemptions: Profit of organizations on sales — for plant products, wild products, beekeeping, animal husbandry (except for fur production) and fish. Products must be made in the territory of the Republic of Belarus and do not include agricultural products used for decorative purposes. Profit of organizations on sales of produced baby food
Property tax	Tax exemptions: Buildings, facilities and other capital structures used for agricultural production. Buildings, facilities and other capital structures shopping destination and catering consumer cooperatives, which are located in rural areas
Land tax	Tax exemptions: Agricultural land, contaminated as a result of the Chernobyl disaster
Mandatory contributions to the FSNE — base rate — 24 %	It is applied a reduced rate of 24 %: Employers engaged in the production of agricultural products (more than 50 % of the total)

Source: compiled from the data of the Tax Code of Belarus (special part) of December 29, 2009. № 71-W // (as amended from 30.12.2014g N 224-W). URL: www.ncpi.gov.by.

Because of the importance and priority of the industry, many countries implement for agriculture or for its individual manufacturers special tax regimes. In Belarus, this mechanism is represented by introducing a special regime for agricultural producers — the unified tax for producers of agricultural products and the taxation of private (peasant) farms.

Organization, which proceeds from the sale of certain types of manufactured agricultural products is the total output of not less than 50 % has the right to apply a unified tax.

Taxpayers are exempted from a number of tax payments: land tax and income tax, except for the profits from the sale of securities (shares) dividend. This form of taxation is, in fact, the use of turnover tax in the amount of 1 % of revenue and a simplified form of accounting. Despite the fairly attractive conditions (at first sight) the number of payers of a unified tax is reduced.

What caused this? Special regime of the unified tax for producers of agricultural products actually replaces the payment of land tax and income tax.

Unified tax payers pay on general grounds: excise duties, VAT, taxes and general taxes, compulsory social payments, environmental taxes and recycling.

The exemption for income tax in accordance with the general tax legislation eliminates the advantages provided by a unified tax, and the amount of land tax is insignificant. Thus, applied tax regime has almost one advantage: the possibility of using a simplified accounting. To increase interest in moving to a unified state tax rate decreased in 2011 from 2 % to 1 %. However, this did not change the trend of reducing the number of subjects using this tax regime. For the unified tax for producers of agricultural products on the background of nearly constant number of payers (100,1 % compared to 2014) the growth rate of tax was 95,4 %, which is directly linked to the reduction in revenue from sales of organizations operating in the field of agriculture.

If we evaluate the unified tax for agricultural producers in terms of the budget revenues, it also should be noted its insignificant value. According to the tax authorities the amount of the single tax for producers of agricultural products was 0,5–0,4 % of total revenues for the period 2009–2015. Taking into account the above, we can make another conclusion, that the practice of imposing a special tax regime did not give positive results for any increase in the budget, nor to stimulate the development of the agricultural sector.

Taxation of peasant (farmers) households

Peasants (farmers) households are certain categories of taxpayers, for which the Tax Code of the Republic of Belarus establishes peculiarities of taxation. Virtually for them are set tax holidays.

These subjects within 3 years from the date of state registration are exempted from almost all taxes in the part of activities in production of agricultural crop production, animal husbandry, fish farming and beekeeping.

Peasants (farmers) households as a whole are entitled to refuse the features established by the Tax Code for this particular category of payers and go to the general taxation regime.

Hereby, when it refuses, household will be the payer of taxes in accordance with the established procedure: VAT, income tax and property tax (real estate, land and environmental).

If household abandons the use of imposed features of taxation, and it is considered as payer of all taxes, it can apply incentives for taxpayers who use the general taxation procedure (Fig. 4).

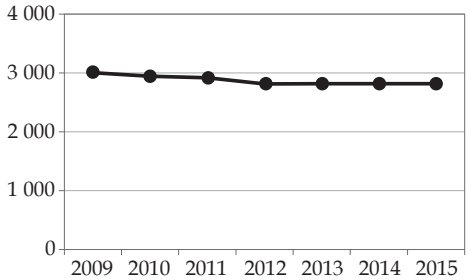

Figure 4. Dynamics of changes in the number of single taxpayers with agricultural producers for 2009–2015

Source: On the tax burden on the economy of the Republic of Belarus in 2015. URL: http://www.nalog.gov.by/uploads/documents/Nalog Nagr-MNS-2015.doc

The number of these entities has grown steadily, while in 2011 the number was 2 118 households, by 2015 already 2 482 households. For many financial indicators peasants (farmers) have a more favorable trend: the number of loss-making among them is only 9,5 %; the profitability of sales — 34,8 % (in the agricultural organizations — 6,5 %); return on sales — 23,5 % (–5,5 % in the agricultural organizations)[9].

This confirms the thesis that in the context of self-management and the provision of tax holidays for aligning the starting conditions, this form of organization of agricultural production is more efficient.

Financial support for agriculture in the EAEU: mutual commitments and particularities of the national taxation

The most important and fundamental issue of creating a common market of the EAEU and ensure equal competitive conditions are common approaches to the definition of state support for agriculture financing.

Given that common agricultural market is highly competitive, and the borders are open, the adverse effects on the supply of subsidized imports from one country are quite sharp and are subject to constant monitoring by interstate authorities.

Member States of EAEU can use without restrictions only state support measures, which doesn't have distorting effect on agricultural products trade between Member States [11].

These criteria are consistent with the criteria adopted by the WTO. Thus, it is expected that the measures are not distorting effects on trade these are measures of «green box» [12].

The authorized level of state support for agricultural is calculated as a percentage of the amount of state support for agriculture to the gross value of agricultural commodities produced in the whole and must not exceed 10 per cent. For the Republic of Belarus was set a transitional period until 2016 in order to minimize the negative effects of reduced state support for the agricultural sector. During this period, the permitted amount of state support of agricultural measures should also be reduced to 10 percent.

Of the five Member States of EAEU four are members of WTO and in the framework of the EAEU in the Republic of Armenia, the Republic of Kazakhstan, the Kyrgyz Republic and the Russian Federation there are commitments, applied when joining WTO. In accordance with the terms of WTO membership for the Republic of Armenia commitments on the level of domestic support from 2008 are 5 % of the gross value of agricultural output (the level of de minimis), before 2008 — 10 %. For the Republic of Kazakhstan — 8,5 %, for the Kyrgyz Republic — 5 %. Russia should reduce the maximum size from $9 bln in 2012 to $4,4 bln in 2018[10].

Certainly, in these circumstances, the need to reduce budget subsidies to improve the efficiency of tax incentives for farmers are quite relevant. Moreover, the effectiveness of the applicable tax instruments should be seen not only in the national efficiency and competitiveness of local farmers in the common market.

Principles of taxation of agricultural producers in EAEU countries have a common basis, ie the level of tax burden for this category of economic agents is significantly lower than other sectors of the economy (through special preferential tax regimes or the use of tax incentives).

Comparative calculations carried out by the Eurasian Economic Commission, show that the tax burden on Belarusian agricultural producers per 1 ha of farmland is 3 and 10 times greater than that of the Russian and Kazakhstan, respectively[11]. This once again confirms that there are a lot of possibilities of expanding the forms of tax incentives for farmers in the Belarusian tax system.

[9] URL: http://ec.europa.eu/eurostat/web/ess/-/taxation-trends-in-the-european-union-2015-edition.

[10] URL: http://www.eurasiancommission.org/ru/act/prom_i_agroprom/dep_agroprom/monitoring/Documents/АНАЛИЗ%20общий%20ЕАЭС.pdf.

[11] URL: http://www.eurasiancommission.org/ru/act/prom_i_agroprom/dep_agroprom/monitoring/Documents/АНАЛИЗ%20общий%20ЕАЭС.pdf.

Table 4

The types and rates of main taxes in the Member States EAEC in 2015, %

Type of tax	Republic of Armenia	Republic of Belarus	Republic of Kazakhstan	The Kyrgyz Republic	Russian Federation
Unified tax for producers of agricultural outputs	–	1[2]	–	–	6[3]
Unified land tax	–	–	0,5[1]	–	–
Land tax:					
For legal entities	15[5]	–	–	20[6]	–
For agricultural producers	0	–	–	0	–
Value added tax:					
For legal entities	20	20	Corporate tax 12	12[7]	18
For agricultural producers[4]	–	10	12	–	10
Profit tax:					
For legal entities	20	18	20	10	–
For agricultural producers[4]	–	–	10	–	20
Tax on individual income	From 24,4[8]	13	11	10	13
Social tax:					
For legal entities	–	28	11	–	34
For agricultural producers[4]	–	24	–	–	–
Tax on sales (Individuals)	Not set	–	–	1 (2 For services)	–
Property Tax	0,3 — of the tax base for public buildings and industrial differents	Differentiated rate 0,1–2	Differentiated rate 0,05–1,5	0,35 — for residential buildings; 0,8 — for property used for economic activities; 0,3 — industry coefficient for agricultural production buildings	Differentiated rate ≤ 2,2

Note: 1 — the basis for calculating land tax is the land area multiplied by the estimated value; 2 — subject to taxation at a unified tax is the gross revenue from the sale of goods; [3] — subject to taxation at a unified tax is the net proceeds from the sale of goods; 4 — for employers engaged in agricultural production, which amounts to over 50 % of total production; 5 — subject to taxation for agricultural lands is net income, determined by a cadastral estimation of the land; 6 — the basis for calculating land tax is the area of land specified in the certifying documents, the base rate for land tax is charged at a separate scale for irrigated land and rainfed for 1 g; 7 — the rate calculated net income determined by the cadastral value; 8 — the main supply of agricultural products of own production are exempt from VAT.

Source: Analysis of the existing agri-food market regulation systems in the Member States of the EAEC in taxation, credit, insurance, price regulation and licensing system. URL: http://www.eurasiancommission.org/ru/act/prom_i_agroprom/dep_agroprom/monitoring/Documents/ANALIZ%20obschiy%20EAES.pdf.

Conclusions

International experience demonstrates the priority for funding agriculture, due to the peculiarities of industrial production, social significance in solving the problems of poverty, economic growth and food security, which is defined as a priority area of public funding.

In this regard, many countries are reviewing their agricultural policies and return to the issue of increasing domestic production to meet the needs of their countries in the food and creating or increasing public stocks. This in turn leads to significant costs for the economics in the form of direct transfers, ie budget ex-

penditures for such activities, and / or as a diversion of productive resources by the most effective sectors.

As one of the alternatives to direct subsidies, which has no substitute, but complementary effect and are focused more on stimulating influence of certain groups of producers (farmers and other small forms, youth), serving industry with high innovation effect (new technologies in the production of agricultural machinery and equipment, feedstuffs, biological products, breeding), and others is the tax policy.

The Republic of Belarus has a developed agricultural sector, high export and internal potential that provide food security. The system of state regulation and budget support for agriculture in the country played an important role in improving the performance of the agricultural sector. At the same time, the emergence of internal and external threats that led to a deterioration in the financial condition of the agricultural sector, a narrowing of the market, lack of occupancy of the budget do not allow for the existing high level of budget financing of expenses to support the agricultural sector. Serious pressures have also commitments to reduce financial support for agriculture within the EAEU. Subsidies for export-oriented sectors of agriculture provide competitiveness of Belarusian products, but is practically subsidizing of the importing country.

Analysis of the existing rules of the national tax legislation and taxation of agricultural producers on the general market of EAEU showed less attractive tax conditions for Belarusian farmers and, as a consequence, loss of competitiveness due to this factor. Applied in Belarus tax incentives for agriculture do not bring the desired effect for its development and do not represent the values of the fiscal budget.

What to choose? State subsidies or tax incentives? The answer lies in a different plane, not by any means, but for what purposes. In order to stabilize and improve the functioning of the agricultural market is necessary to reorient the system of financing on the growth of investment activity in the agricultural sector. First of all, support should be oriented on the most efficient farms producing competitive products. The tax system also requires a review to assess the effectiveness of tax incentives, to stimulate small businesses and innovative projects.

References

1. Heady D., M. Alauddin, D. S. Prasada Rao. Explaining agricultural productivity growth: an international perspective. *Agricultural Economics*, 2010, vol. 41 (1), pp. 1–14.

2. Rausser G. C., Chalfant J. A., Love H. A., Stamoulis K. G. Macroeconomic linkages, taxes, and subsidies in the U.S. agricultural sector. *American Journal of Agricultural Economics, Agricultural and Applied Economics Association*, 1986, vol. 68 (2), pp. 399–412.

3. Bird R. M. *Taxing Agricultural Land in Developing Countries.* Cambridge, MA, Harvard University Press, 1074. 144 p.

4. Williamson J. M. Agriculture, the tax code, and potential tax reform. *American Journal of Agricultural economics*, 2013, Vol. 28, iss. 2, pp. 12–16.

5. Sharma A. B. BRICS for end to rich nations' farm subsidies. The *Indian Awaaz*, 2012. Available at: http://theindianawaaz.com.

6. Vogel S. *Farm Income and Costs: Farms Receiving Government Payments*. Available at: http://www.ers.usda.gov/topics/farm-economy/farm-sector-income-finances.aspx.

7. Veen H. B., van der, Meulen H. A. B., van der, Bommel K. H. M., Doorneweert B. *Exploring Agricultural Taxation in Europe*. Hague, LEI, 2007. 162 p.

8. Moiseeva L. A. Taxation of agriculture in foreign countries. *Koncept*, 2015, vol. 13, pp. 221–225. Available at: http://e-koncept.ru/2015/85045.htm. (In Russian).

9. Kireeva E. F. Tax regulation of the agricultural sector in Belarus: current state and selection the forms of the state support. Innovatsionnoe *razvitie ekonomiki = Innovative development of economy*, 2016, no. 3-2 (33), pp. 149–153. (In Russian).

10. Kireeva E. F., Luk'yanova I. A. National tax system: trends and prospects of modernization. *Belorusskii ekonomicheskii zhurnal = Belarusian Economic Journal*, 2015, no. 3. pp. 84–97. (In Russian).

11. Lerman Z., Sedik D. *Agricultural Cooperatives in Eurasia*. Budapest, FAO Regional Office for Europe and Central Asia Publ., 2014. 19 p. Series: Policy Studies on Rural Transition, no. 2014-3.

12. Legg W. Agricultural Subsidies: Measurement and Use in Policy Evaluation. *Journal of Agricultural Economics*, 2003, no. 54, iss. 2, pp. 175–200.

Author

Elena F. Kireyeva — Doctor of Economics, Professor, Head of the Taxes and Taxation Department, Belarus State Economic University, Minsk, Belarus (26 Partizanskiy prosp., 220070, Minsk, Belarus); e-mail: kireeva-e@yandex.ru.

Информация об авторе

Киреева Елена Федоровна — доктор экономических наук, профессор, заведующий кафедрой налогов и налогообложения, Белорусский государственный экономический университет, г. Минск, Республика Беларусь (220070, г. Минск, просп. Партизанский, 26); e-mail: kireeva-e@yandex.ru.

УДК 336.201
DOI 10.15826/jtr.2016.2.3.024

Yulia V. Leontyeva
Ural Federal University named after the first President of Russia B. N. Yeltsin, Yekaterinburg, Russia
Igor A. Mayburov
Ural Federal University named after the first President of Russia B. N. Yeltsin, Yekaterinburg, Russia;
Far Eastern Federal University, Vladivostok, Russia

THEORETICAL FRAMEWORK FOR BUILDING OPTIMAL TRANSPORT TAXATION SYSTEM

ABSTRACT. The purpose of this article is to analyze the theoretical and methodological basis of building an optimal transport taxation system. That includes establishing classification criteria, functions and principles of building the system. The article systematizes economic views on the nature of transport taxes and outlines the genesis of transport taxation. The article substantiates that the genesis of studies on transport taxation involved the development of economic measures of the size of compensation which followed the special-to-general model, that is, from compensation for the use of particular road network facilities to compensation for the entirety of negative externalities and the use of the whole road network. The article systemizes functions of transport taxation and analyses its two main functions: fiscal and regulatory ones. The article rationalizes that the regulatory function in transport taxation is equally significant. The article analyzes negative external effects resulting from accelerated growth in car ownership. In addition, it substantiates that pure public benefits relating to motor vehicle use tend to transform into mixed benefits in the course of mass car ownership, which, in turn, remain non-excludable, but become rivalrous in consumption. The work presents an original classification of transport taxes based on the main classification criteria. Transport taxes are classified based on types and designation of transport payments, stages of the life cycle of a motor vehicle, the way the tax is levied, the influence it has on the intensity of car use and the purpose of revenue spending. The work offers a system of principles of optimal transport taxation consisting of well-known and new ones. The article further develops the benefit principle in transport taxation as well as the social optimum principle. In addition, it provides definitions for original principles identified by the author: the principle of comprehensiveness, the principle of differentiation, the principle of payment collection at time of service, and the principle of designation.

KEYWORDS. Transport taxation; taxes; fees; para-fiscal taxes; classification; function; principles of optimal taxation.

Ю. В. Леонтьева
Уральский федеральный университет им. первого Президента России Б. Н. Ельцина, Екатеринбург, Россия
И.А. Майбуров
Уральский федеральный университет им. Первого Президента России Б. Н. Ельцина, Екатеринбург, Россия;
Дальневосточный федеральный университет, Владивосток, Россия

ТЕОРЕТИЧЕСКИЕ АСПЕКТЫ ПОСТРОЕНИЯ ОПТИМАЛЬНОЙ СИСТЕМЫ ТРАНСПОРТНОГО НАЛОГООБЛОЖЕНИЯ

АННОТАЦИЯ. Целью данной статьи является анализ теоретико-методологических основ построения оптимальной системы транспортного налогообложения с выделением классификационных признаков, функций и принципов постро-

ения такой системы. В работе систематизированы экономические воззрения на природу транспортных налогов и представлен генезис транспортного налогообложения. Аргументируется, что генезис исследований в области транспортного налогообложения состоял в развитии экономических обоснований величин компенсаций, развивавшихся по логике от частного к общему, т. е. от компенсации за пользование отдельными объектами дорожно-транспортной сети до обоснования компенсации совокупности всех отрицательных экстерналий и всей дорожно-транспортной сети. Систематизируются функции транспортного налогообложения, проводится анализ двух основных функций: фискальной и регулирующей. Доказывается, что регулирующая функция в транспортном налогообложении является паритетно значимой, анализируются отрицательные внешние эффекты, связанные с форсированной автомобилизацией населения. Кроме того, обосновывается, что чистые общественные блага, используемые при эксплуатации автотранспорта, в процессе массовой автомобилизации трансформируются в смешанные блага, которые в свою очередь сохраняют свойство неисключаемости, но отличаются конкурентностью в потреблении. В результате исследования разработана оригинальная классификация транспортных налогов по основным классификационным признакам, представлены классификации по видам и характеру транспортных платежей, стадиям жизненного цикла транспортного средства, способу взимания платежа, характеру влияния на интенсивность использования транспортного средства и цели его использования. Предлагается система принципов оптимального транспортного налогообложения, включающая известные и оригинальные принципы, развиваются принцип выгоды в транспортном налогообложении и принцип социального оптимума. Сформулированы оригинальные принципы: комплексности, дифференциации, приближенности платежа к услуге, принцип маркировки.

КЛЮЧЕВЫЕ СЛОВА. Транспортное налогообложение; налоги; сборы; парафискалитеты; классификация; функции; принципы оптимального налогообложения.

Introduction

The influence of taxes on the economic behavior of individuals and organizations is an undeniable fact. The idea of tax regulation of economic agents' behavior was developed in the works of A. Wagner, F. Quesnay, J. M. Keynes and other economists at the end of the 19th century, is still an essential tool of state social and economic regulation. Moreover, while at the early stages of development the idea was mainly limited to the regulation of distribution and consumption thus influencing economic development, now it encompasses all social, political and economic goals of the state.

Transport is a specific sphere of human activity which requires active and immediate regulation, with the help of tax tools among other things. Moreover, the problem is vital in the sphere of affordable and comfortable motor transport. Nowadays peculiarities of motor transport are determined by two trends which have taken shape in the last two decades. On the one hand, motor transport is an independent sector of national economics (motor transport sector) which aims to satisfy the demand for cargo and passenger transportation. On the other hand, one can see accelerated development of the personal car fleet which aims to satisfy private needs. Both the motor transport sector and the use of private motor transport aim to produce similar useful effects and, as achieving this effect involves the use of the same infrastructure, both private and public transport tend to compete against each other. Growing competition for the use of infrastructure, road network and environment at the first place, results in numerous negative consequences [1; 2].

The change in requirements for the level and quality of transport services led to a slump in the transport industry in the late 1990s and at the beginning of the 21st century. Since 1990th the number of private cars has grown fivefold and at present there are 3 cars for every ten citizens. At the same time passenger traffic carried by motor transport dropped threefold and cargo turnover fell by 16 percent. A sharp

(almost uncontrolled) growth of private car ownership has resulted in increasing traffic congestions, limited space, intensified pollution by mobile sources and higher road accident rates.

One of the reasons for growing competition between private and public transport, and negative consequences of such a competition is, in our opinion, the transport taxation system that has taken shape across the world in the last 20-30 years (it was introduced in Russia 15 years ago).

The purpose of this article is to analyze theoretical and methodological frameworks for building an optimal system of transport taxation and to establish classification criteria, functions and principles of building such a system.

Genesis of theoretical models relating to transport taxes

The history of transport taxation began in ancient times, road tolls (charges for passage) being the first «transport taxes». The use of roads and bridges called for the formation of specific tools of transport taxation. At that time, it was not the vehicle itself that was taxable, but its use, which involved the use of certain infrastructure. Given the absence of any theoretical substantiation for those mandatory payments, they were perceived as a charge for the use of road infrastructure facilities. Thus, the payment was a compensatory one and was aimed at compensating for the costs of construction and maintaining road infrastructure. The development of transport infrastructure and means of transport led to further development of such fiscal tools and gradual formation of the system of vehicle taxes and other taxes incorporated into this system of mandatory payments at the end of the 19th century [3, p. 228].

Theoretical studies of transport taxation issues and, first and foremost, the determination of the transport tax size, did not begin until the middle of the 19th century. On the one hand, economists strongly criticized road charges that were predominantly chaotic and unsubstantiated for hampering trade. On the other hand, they substantiated the need for a well-organized road network which would ensure strategic and economic advantages, including those promoting the development of trade. The genesis of theoretical substantiations of transport taxation is shown in Fig. 1.

In the 19th century the French School of Bridges and Roads (École Nationale des Ponts et Chaussées) was the most successful one in substantiating road toll payments. Its representatives (J. Vauban, J. Dupuit, M. Allais et al.) defined a tax as the price of public services that is set in terms of the marginal utility theory. According to them, the tax (or the toll) is an instrument of collecting consumer surplus that contributes to the funding of public infrastructure, while the demand for trips is a function of the size of the charge paid [4; 5]. However, it should be noted that representatives of the French school never applied those approaches to automobile roads and used them exclusively for the estimating of the cost of passing bridges, railways and waterways.

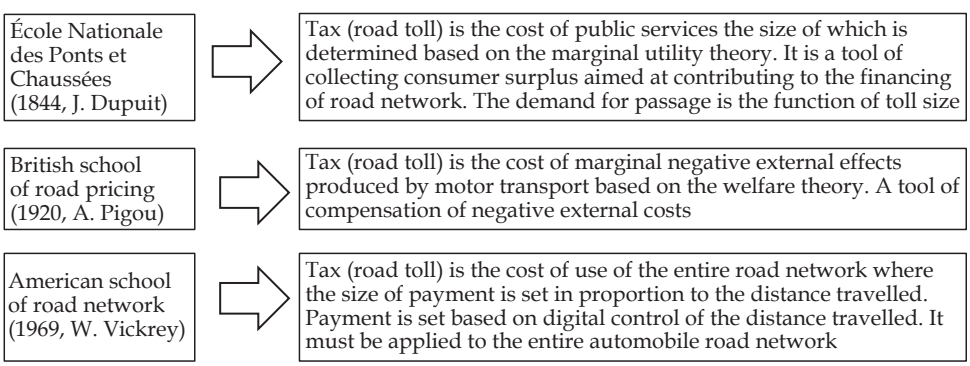

Figure 1. Main schools working on the subject of transport taxation

Active development of the car fleet at the beginning of the 20th century and consequences resulting from its use led to the formation of new methodological approaches to determining the size of transport taxes presented by the British school of road pricing. One of its representatives, A. Pigou [6], suggested that transport taxes should be viewed as a way of internalizing negative externalities that occur in the process of automobile use. In this case, the size of transport taxes should reflect the tax price of the negative external effects so that the car owner pays them his money. Most of those effects are paid for by local governments that have to increase spending on road maintenance services, health care, emergency services and environmental services, etc. It is the implementation of the «user-pays principle» [7]. The studies conducted by this school resulted in equations which make it possible to determine the size of externalities on one route (road).

The approach of American economists became a landmark in determining the size of transport taxes. Studies by W. Vickrey in the second half of the 20th century were aimed at evaluating the total cost of road network use and compensation of externalities. However, unlike French and British schools he made evaluations not for particular infrastructure facilities or road sections but for the entire road network in an urbanized territory. This approach enabled him to offer an economic substantiation of the size of vehicle tax as a function of the vehicle run time. Vickrey's pioneering idea was the substantiation back in the 1960s of the requirement that the total amount of the tax to be paid should be determined based on electronic control of mileage [8].

Each of the abovementioned methodological approaches to transport taxes has a logical substantiation and was used to form different kinds of taxes and mandatory payments associated with motor vehicles.

Thus, the genesis of studies on transport taxation involved the development of economic assessments of compensation amounts which followed the special-to-general model, that is, from compensations for the use of particular road network facilities to compensations for the entirety of all negative externalities and entire road network. It is obvious that a single payment does not compensate all kinds of negative effects and that a system of payments is required.

Analysis of effects relating to accelerated motorization

Active studies of theoretical substantiation, classification and evaluation of externalities relating to motor transport use were conducted only in the past 30 to 40 years. American and European authors M. Hanson, G. McKenzie, M. Delucci, B. de Borger, I. Mayeres, R. Coase and others have contributed most to the studies [9–11]. Russian economists started to pay attention to the issue of balanced development of motor transport only in the last 10 to 15 years.

As we know, any activity that includes public goods is accompanied by various externalities and internal costs.

Externalities are traditionally understood as factors whose benefits and costs are not reflected in the market price of goods and services, unlike internal costs that are reflected in market prices. Consequently, internal costs are covered by car users themselves, while externalities are paid for by the entire society (local community).

Positive externalities are benefits that are enjoyed by a third-party as a result of an activity of another party without any pay from the former. Economic agents are, therefore, willing to pay for benefiting from positive externalities.

Negative externalities are a loss in the welfare of one party resulting from an activity of another party, without there being any compensation for the losing party. In this case, economic agents are prepared to pay for avoiding negative externalities.

At the same time, the market itself is unable to create a system of market-based prices that would encourage producers of negative externalities to reduce their impact, and consumers of positive

externalities to pay for the positive external effects. Internalization of externalities make it possible to remedy this inability of the market reflect the occurring effects in pricing. Internalization of externalities is the process of incorporating externalities into the market mechanism of production that provides for their conversion into internal (private) costs that are accounted for in prices. This process is sometimes referred to as correction of externalities.

The concept of externalities was first developed by Arthur Pigou [6]. He theoretically proved that resources are not distributed efficiently in the presence of negative externalities. Consequently, the state has to intervene to solve the problem of internalizing externalities. Such intervention involves imposing a tax that is set equal to the negative externalities. Under Piguo's concept, externalities are internalized through taxation.

R. Coase [9] approached the internalization of externalities from a new angle. He proved a theorem stating that any externality can be internalized through the allocation of property rights. In this case, the inability of the market to factor externalities into prices is circumvented through the allocation of property rights to economic agents with the possibility of their further exchange. Externalities are, therefore, internalized through the allocation of property rights without any further involvement of the state.

The Coase theorem has found its implementation in secondary markets of emissions permits. At the same time, the practical applications of the Coase theorem are limited and the internalization of externalities proves impossible with intervention from the state [12].

The operation of motor transport involves the use of two major types of public goods: the road network and air. The environment as a pure public good used to be considered non-excludable and non-rivalrous. But with the development of technology, economics have long been facing the problem of a limited carrying capacity of the environment and the need to limit access to this good.

Roads are a pure public good, too, that was also considered non-excludable and non-rivalrous until vehicle ownership rates reached a certain level. Vehicle ownership expansion here is understood as the process of motor vehicle saturation in a certain territory (region). Rising car ownership has aggravated the problem of traffic congestion. Road construction is lagging behind the growing amount of cars, while major cities have, for the most part, exhausted their resources for road expansion. The need is ripe for limiting access to this public good as well.

It is possible to conclude that the pure public goods that are used for the operation of car transport are transformed into impure goods as car use increases and remain non-excludable, but become rigorous.

Positive externalities of transport are well known. These include labour mobility, fast shipping of goods, interregional cooperation and holiday and recreation opportunities, which leads to higher labour productivity.

At the same time, negative externalities intensify as vehicle ownership expands. The impact is most prominent in big cities where car use increases spontaneously and people continue to prefer private cars to public transport. In such cities, the negative externalities of motor transport start to outpace the positive ones: traffic speed drops because of congestion; road accident rates go up; drivers are less observant of parking regulations; pedestrian and recreational spaces shrink to allow for bigger roads and parking lots; air quality gets worse and people's general health deteriorates, and so does motorists' mental health.

Table presents the characteristics of the key negative externalities of car use that need to be corrected through transport tax. It has to be noted that the presented externalities are the ones that are most apparent at a higher rate of car ownership when a considerable part of the population of a territory develops strong automobile dependency [13–15].

Characteristics of key negative externalities of excessive automobile use in big cities

Externality	Characteristics of externality uncompensated by car users
Pollution	Damage caused by exhaust gases, fuel evaporations, particle pollution, costs of ill-health
Traffic jams	Time lost in traffic jams; additional air emissions in traffic jams and at lower traffic speeds
Road accidents	Uncompensated damage to involved drivers; time lost by all travelers; uncompensated higher costs of emergency medical care and of restoring traffic after collision
More space for parking	Costs of uncompensated use of pedestrian and recreational spaces for parking, congested pedestrian and public transport traffic, esthetic degradation of streets and neighborhoods
More urban land devoted to roads	Costs of reallocating land in cities for the sake of road construction, higher prices of land for housing construction, higher cost of multi-level interchange projects
Noise pollution	Costs of building roadside noise barrier; costs of ill-health and increased irritability
Road wear	Costs of unscheduled road surface repairs due to intense traffic, time lost by all travelers because of road closures

Classification of transport taxes

Classification of transport taxes is a substantiated division of transport taxes, fees and other mandatory payments into groups based on a certain distinguishing feature that is done for the purposes of systematization and comparison.

Any classification must comply with two important requirements:

1. Any classification must be based on a definite classification criterion.

2. Any classification must serve particular practical or scientific purposes, that is, it must be relevant to the theory and practice of transport taxation.

There are different classifications based on what is liable to tax, the source of taxation and kind of budgets. But we are going to focus on six most relevant classifications of transport taxes (Fig. 2) which are essential for the purposes of analysis and comparison.

1. Classification by type of levy. The system of transport taxation in any country is made up of levies which vary in their legal nature: taxes, excise taxes and duties, non-tax (fiscal) levies, para-fiscal taxes. Such diversity is needed to make the system of transport taxation more flexible as regards the legal regulation and spending of revenue from the levies.

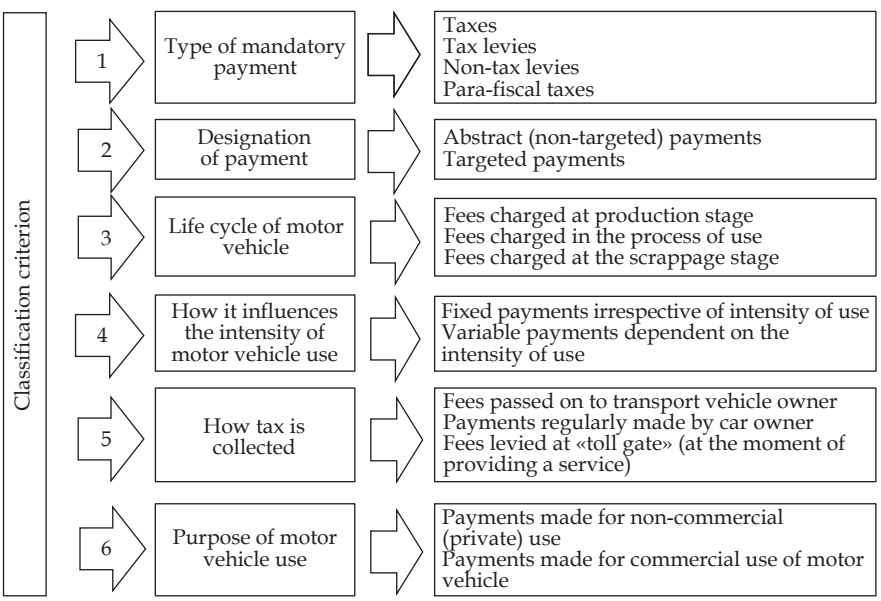

Figure 2. Main classifications of mandatory transport-related payments

Essentially, the levy (excise) as a tax payment differ from the fiscal levy (duty) as a non-tax one in that they are proportioned differently to the cost of the service (or rights) provided by the state. The general rule says that the size of the fiscal levy has a compensatory role, that is, its size offsets the monetary value of the taxable matter (for example, payments for a negative impact on the environment which offset monetary value of damage caused by airborne pollutants), or provide state with the compensation for the cost of service which was provided (for example, the cost of producing and issuing license plates). Consequently, the size of a fiscal levy should match the size of the benefit got by the payer, or be equal to the cost of service provided to the payer.

To sum up, the enforcement of the state's monopoly on certain actions or services for car owners should be coupled with the payment of a tax, its size doesn't depend on the costs that the state bears. A fiscal levy should be introduced as a charge for a service (a parking fee, a toll for passing a bridge) and its size should correspond to the appropriate costs incurred on the state, or to the special benefit got by the payer; the levy should be designated for a specific purpose and be remitted to extra-budgetary funds. Para-fiscal taxes, fulfill their compensatory role as well (truck tolls being an example here). They also have a targeted function, but can be regulated by by-laws and remitted to legal entities of public law or legal entities of private law [16, p. 113].

2. Classification by the nature of levy. The purpose of this classification is to separate revenue from transport taxes according to the objectives of spending.

Abstract (non-targeted) taxes are transport taxes and fees revenue from which is accumulated in a budget, lose their tagging and are spent on general purposes in line with the budget priorities.

Targeted taxes are transport taxes, fees and para-fiscal taxes that are strictly designated for specific expenditures that have to do with road maintenance and the development of the road network and infrastructure.

Giving a designation to payments in transport taxation provides strategic advantages as that makes it possible to form targeted sources of funding for road funds on a long term basis and to make car owners more interested in paying them.

3. Classification by stages of vehicle life cycle. We define the lifecycle of a vehicle as the period of time between its production and its scrappage [17]. Consequently, the period can be divided into three main stages: production, use, and scrappage. We suggest classifying all payments according to each stage of the vehicle lifecycle (Fig. 3).

The classification makes it possible to differentiate tax burdens at each lifecycle stage, shifting the tax load to the stage of use.

4. Classification by impact on the intensity of vehicle use. The classification divides all taxes and levies into two groups.

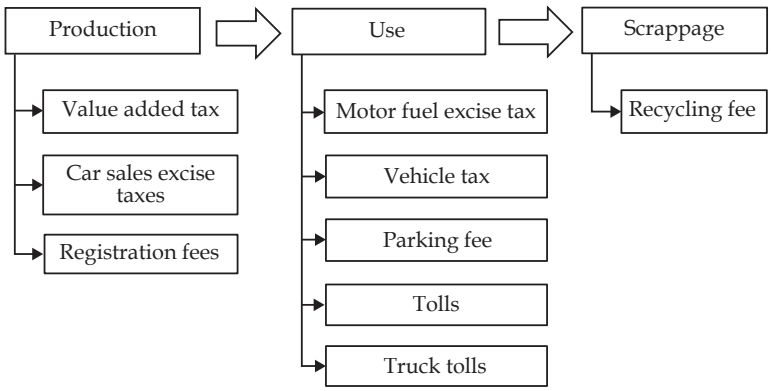

Figure 3. Types of fiscal payments in Russia at various vehicle lifecycle stages

Fixed taxes. The tax rates are not pegged to the intensity of car use, which means they do not directly involve car owner in the process of negative externalities compensation. Yet their size is a determining factor in the affordability of a car; it influences the level of car ownership in society and the desire (of individuals at the first place) to own a vehicle. High fixed taxes could be used as an instrument of shutting out some people (usually those with low income) from owning a car and, consequently, from driving one. Theory-wise, fixed taxes are essentially Ramsey taxes and ensure certain tax revenues for the government from car owners [11; 13; 18].

The amount of variable taxes which is determined by the intensity of car use. In this case, the size of transport taxes should reflect the tax price of negative externalities, while each car owner should pay an amount that is equivalent to the total of negative externalities caused by the operation of his/her car. A sophisticated system of variable taxes makes it possible to effectively administer the process of recovering marginal external costs while precisely factoring in all kinds of impact. Foreign studies show that in the case of the absence of fixed transport taxes, the amount of variable taxes is higher than marginal external costs. This makes it possible to also ensure a positive Ramsey component in taxes. From the theoretical perspective, these groups of taxes are Pigouvian taxes [13; 18].

In Russia, fixed transport taxes include value added tax (VAT), stamp fee on the purchase of a vehicle, registration fees, recycling fee, and annually paid vehicle tax. In Russia, variable taxes include fuel excise duties, parking fee, tolls, truck tolls.

5. Classification by method of tax collection. The classification is important for the purposes of analyzing technical arrangements for the system of transport taxation and, most importantly, it is essential for the purposes of functional analysis.

Tax payments that passed on to the owner of the vehicle. Such taxes and duties are paid by the manufacturer (of a motor vehicle, petrol, motor oil, spare parts) and are then shifted onto the consumer as part of the price. The payments are primarily used for the purposes of government revenue collection. Their role as a regulatory factor is insignificant because these taxes are hidden in the price and consumers do not observe them as relevant signals.

Tax payments that are made directly by the owner. Such payments have proper fiscal and regulatory potential. Payments that are contributed by the owner of a motor vehicle on a monthly, quarterly or yearly basis are fully felt by him or her. Their main drawback, however, is that they are inherently fixed and do not encourage owners of motor vehicles to use them less frequently and intensely.

Payments that are collected «at the toll gate» (the moment the service is provided). Such payments have the biggest potential to have a regulatory impact on the behavior of car owners. When the fee is paid exactly at the moment when the consumer gets access to road infrastructure, it may change their travel behavior and even discourage them from using their own car. In this situation the behavioral effect may prove even stronger than the fiscal one (as is the case with the parking fee). The number and application of such payments should inevitably expand along with the growth in car ownership rates.

6. Classification by purpose of vehicle use. This classification is important for the sake of the analysis of tax payments that are associated with private or commercial use of a motor vehicle. Extra taxes should be levied on commercially used vehicles (passenger vehicles, trucks) in addition to taxes that are levied on the use of personal cars. Taxes on financial results serve the purpose. These are taxes on business activities. They are viewed as the tax price that is paid for running a passenger transportation business. In Russia, taxes on financial results include income tax, the single tax on imputed income, and the transport operator license fee.

Functions of transport taxation

We believe that all payments that form the system of transport taxation should fulfill the following functions:

1. Fiscal function, i.e. to have a significant distributive and allocative potential. It is about giving the transport taxes the ability to correct the market failure in the area of financial resourcing of construction and repair of roads. The market fails to ensure the development and use of the road network on the principles of individual retribution and equivalence. This task is taken over by the state and is solved by introducing a group of transport taxes. With the help of transport taxes government should accumulate a significant portion of the financial resources of the population and businesses in the budget and target these resources to focus on the development of the road network. Accordingly, the fiscal purpose of transport taxes should ensure the targeted provision of financial resources to road construction funds, and these resources should be sufficient for road construction. In addition, all users of the road network should participate in its funding.

2. Regulatory function, i.e. to have a significant regulatory and behavioral potential. In an aspect of the implementation of this function, transport taxes should encourage economic agents to be environmentally responsible while using motor vehicles. There should be an effort to buy a car of a higher ecological class and use fuel of higher ecological class. Transport taxes should not discourage the desire of economic agents to use vehicles. This rule should be more common in countries where the main mean of transportation is a car.

Through the simultaneous implementation of fiscal and regulatory functions, the transport taxes embody the idea of double dividend, where environmentally oriented behavior of car owners will be accompanied by the formation of stable revenue sources for road construction and environmental protection.

The need to address the regulatory function of the transport fees and the use of fiscal instruments for the promotion of environmentally-oriented behavior of producers and owners of vehicles and related products is recognized by most analysts and researchers [10; 17; 19].

Principles of optimal transport taxation

When building up a system of transport taxation, both state and car owners would, of course, like their country to have optimal transport taxation.

An optimal system of transport taxation is the one in which interests of all entities and beneficiaries of transport taxation are aligned in the best way possible, while the negative effects of transport taxation are minimized, and the positive ones are maximized.

The theory of optimal taxation addresses the problem of establishing a structure of taxes on various goods (services). The structure of taxes is crucial for generating a set amount of revenue to finance government while reducing inefficiency to a minimum, i.e. minimizing the excess burden of taxation as posited by A. Harberger [20]. Consequently, the criterion of reducing the excess burden of taxation should be the target for designing the transport taxation system. The principles on which the system is built should also be based on the above criterion. We shall outline the principles of an optimal system of transport taxation as follows.

1. Benefit principle. The key principle that transport taxations build on is the benefit principle. The use of transport entails the consumption of two key types of public goods: the road network and the environment. There are, therefore, two things that are critical for identifying private benefits from paying transport taxes. Transport taxation based on the benefit principle requires that taxes are perceived as a tax price for using the road network. The tax rate should represent the tax cost of road construction and maintenance. Transport taxes should also be considered as a way of internalizing negative externalities of car use [6; 9]. In this case, the size of transport tax payments should also reflect the tax cost of negative externalities so that the car owner rather than the whole community pays for mitigating them, which is in line with the «user pays» principle [7].

For each car owner, transport tax payments should, therefore, be equal to a sum

of two components: tax price of using the road network and the tax cost of negative externalities of using the car.

It is much easier to translate the first component of the tax price into practice than the second one. The component reflecting the tax cost of road construction and maintenance for a specific motorist is most accurately represented by excise taxes imposed on the sale of petrol (natural gas) that are transferred to a motorway fund that is dissociated from the treasury. In this case, tax payments are directly linked to the amount of fuel purchased, with its consumption being indicative of the intensity of road use. Consequently, fuel tax is an approximate measure of benefits, and by means of the tax motorists modify their financial contribution to road construction and maintenance.

The measure is approximate because of certain assumptions that are inevitable in the application of fuel tax. Most importantly, it has to be assumed that fuel tax is not entirely targeted and personalized. For example, government can spend tax receipts from a motorist using motorway A on repairing motorway B that is used by another motorist. The assumption produces the problem of equitably splitting tax receipts among road funds (the federal, regional and local ones) that finance interstate, regional and local roads correspondingly. Besides, the tax does not reveal motorists' preferences as regards new road construction.

The second component of the tax price is much harder to employ in practice because the negative externalities are numerous [21]. Specifically, among the negative costs of growing car ownership is recurring traffic congestion, higher road accident rates, growing neglect of parking regulations, the shrinking of pedestrian and recreational spaces to allow for bigger roads and parking lots, increasing air pollution, deterioration of people's health and mental disorders in motorists [22]. These effects are differentiated as per size and territories.

At the same time, it is quite difficult to link all types of negative externalities to a certain fiscal charge. The easiest option would be identify the key negative externalities and associate each of them with a corresponding fiscal charge. It is desirable to make sure that the size of payments charged reflects the specific contribution that each car owner makes to generating negative externalities in a particular territory, which by itself is hard enough [6; 10; 19].

2. ***Principle of comprehensiveness.*** An optimal system of transport taxation should be designed as a comprehensive system that includes two different groups of taxes. Its comprehensiveness should show through the inclusion of Pigovian taxes that it takes into account negative externalities, and Ramsey taxes that quantify the benefits of car owners from owning a vehicle. Under the above classification, fixed payments which do not depend on the intensity of car use should follow the Ramsey taxation pattern, while variable payments which depend on the intensity of car use should be based upon the Pigouvian tax model.

The implementation of the principle of incorporating tax price in the size of variable transport taxes proves to be difficult because the number of negative externalities caused by cars grows along with an increase in car ownership. In Table 1 we highlight various types of externalities brought about by motor vehicles. The effects are hard to measure and are differentiated by size and uneven in time and space.

According to European scholars, an optimal system of transport taxation should address the following externalities in order of priority. First of all, it is necessary to deal with the issue of road congestion: when transport-related payments are used for regulating the demand for the road network, it will make it possible to balance the demand against the throughput of the road network. In order to address the task, both variable and fixed taxes could be effectively used as the latter restrict the spread of car ownership.

When the throughput of the road network is sufficient and the problem of road congestion does not exist, variable trans-

port taxes could be used to offset external effects that are associated with the maintenance and management of transport and road infrastructure, to fund emergency services, to prevent airborne and noise pollution, etc.

3. Differentiation principle. Under Harberger's formula, the excess burden of taxation increases proportionately to the price elasticity of either supply or demand for a good or service. This means that if two goods or services are both taxed at the same rate, the one with higher price elasticity of demand will bear a heavier excess burden of taxation [20]. This rule must be taken into account when introducing differentiated rates of fixed and variable taxes in different areas.

The price elasticity of demand for transportation goods and services is rather high in the case when the area has a well-developed public transport network. In this situation a hike in transport taxes leads to lower demand for trips by car and a considerable increase in the demand for public transport services. The excess burden of taxation will be minimal in the case of a well-developed public transport network. If public transport is uncompetitive in terms of price and quality of services, the price elasticity of demand for transportation goods and services will decrease considerably. In this case, situation occurs when an increase in transport taxes will not bring down the intensity of car use, while the overall excess burden of taxation will increase [13; 23].

4. Principle of payment collection at time of service. The point of payment collection should be as close as possible to the place where externalities occur, that is, it should be as close as possible to the location where transport infrastructure is. This idea serves as a major aspect of the optimization of the variable component of transport taxes. It sends the right price signals to car users who adjust their behavior, trying to reduce costs of car use as much as possible. The system of variable transport taxes can therefore encourage car owner to use his or her car (or discourage them from doing so) during certain time periods and in certain areas. If it is necessary to increase the discouragement effect on car owners, the number of payments charged at the time of service («at the toll gate») should grow. If car owners do not have to pay anything at the time of service, they develop a neutral attitude to the intensity of vehicle use, which makes the population of the area more cars dependent.

5. Principle of designation. A growing tax burden can cause discontent among car owners. It has to be noted that revenue from transport taxes must be spent exclusively on transport-related purposes. When designating transport taxes to a specific purpose it is extremely important to make sure that they are strictly assigned to a specific local government budget. Fixed part of transport taxes can be remitted to federal road funds, while the variable part should be a source of funding for road funds in the area where it is collected and where it shapes public opinion. The spending of money from road funds should be carefully examined from the point of view of technical necessity, priority and public appropriateness.

6. Principle of social optimum. The systemic nature of transport taxes should become an essential prerequisite for building an optimal system of transport taxes. The system of transport taxes consists of separate elements and is at the same time part of a higher tier system of government transport policy. The system of taxes cannot, however, deliver the expected effect if it is not supplemented with an appropriate pricing policy for public transport, a vast and well-developed public transport network, administrative bans and restrictions, etc.

The search for a social optimum in traffic allocation was pioneered by J. G. Wardrop [24]. In 1952, he studied an equilibrium distribution of public and private transport flows within a section of a road network. The point of equilibrium was determined by comparing total disutility (total costs) of all travellers. Wardrop proved that when each road user chooses their preferred means of

transport, this choice is not socially optimal (Fig. 4).

The passenger flow *P* moves along the abscissa to the right for the *A*-curve (total expenses of a motorist) and from right to left for the *T*-curve (total expenses of a public transit passenger). In an ordinary situation, the dependences of aggregate costs on the density of the traffic flow for private and public transport intersect at point *IE*.

The point is the equilibrium point of individuals' preferences. A number of city dwellers (*PA*) decide to travel by automobile, while another part (*PT*) of them prefer public transport (*PA* > *PT*). The aggregate expenses of all city dwellers are given by the area of the triangle restricted by line T_1.

V. Vuchic [25] argues that individuals' preferences as to the means of transport are pretty stable. Despite any swings of the preferences, urbanites will eventually return to the point of equilibrium. In order to move the equilibrium point to the left towards the social optimum and ensure the stability of the new combination of individuals' preferences it is necessary to simultaneously take a set of measures. It is necessary to implement incentives encouraging the use of public transport. At the same time, it is necessary to adopt measures to discourage the use of private transport.

If any of the sets of measures is adopted in isolation, the structure of the passenger flow will change insignificantly. For example, if incentives are provided for the development of public transport only, the *T*-curve will shift to the position T1, while equilibrium will move to the point B. The time of travel

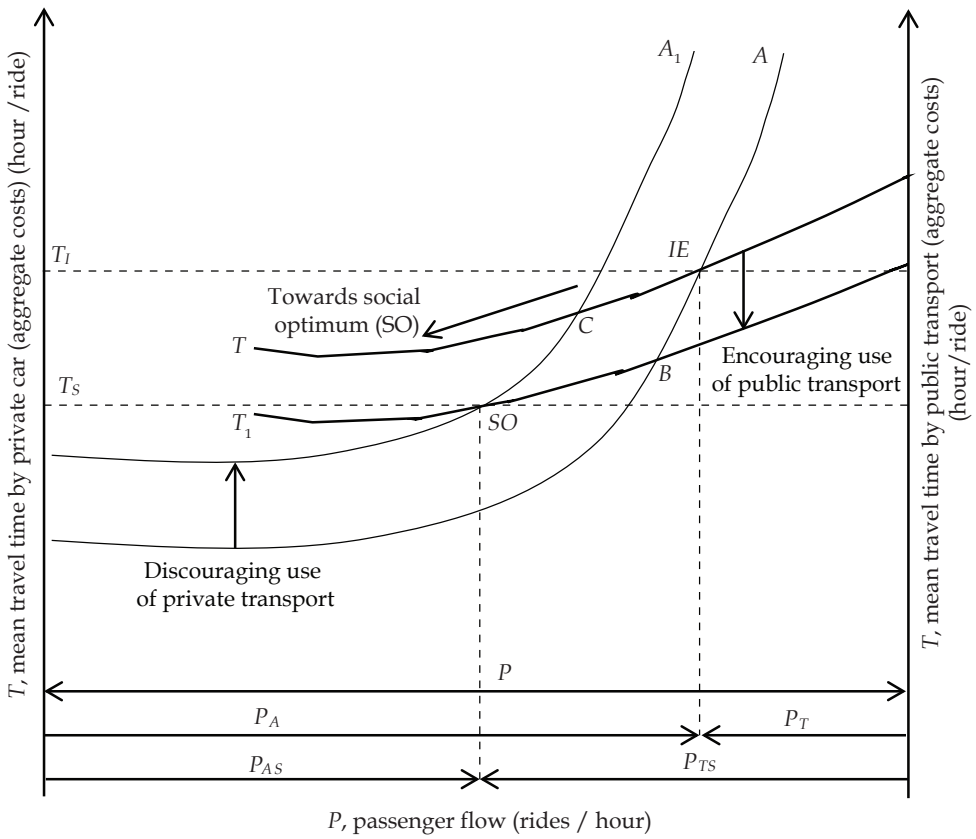

Figure 4. A combination of transport policy measures aimed at shifting equilibrium of individuals' preferences towards the social optimum (SO)

will change only a little and there will be a certain growth in the number of public transport users. If only measures discouraging the use of private cars are introduced, effects will be insignificant either, with the *A*-curve moving to the position A_1. Equilibrium will move to the point *C*.

Only combined adoption of all measures of transport policy ensures a shift of the both curves, while equilibrium moves to the social optimum point (SO) that has a completely different set of parameters. There, passenger flows are almost equally divided between public and private transport ($PA \sim PT$), while aggregate expenses of all urban dwellers who use both private and public transport are significantly reduced. The social optimum can, therefore, be defined as the point SO where total expenses of all road users are minimized.

A city public transport system that governs itself and functions in accordance with the laws of the market ensures equilibrium of individuals' preferences at the level *IE*. Such a system is less effective in all cases and generates bigger negative effects than a regulated transport system that provides targeted incentives and discourages various preferences towards the social optimum SO [26].

Specific ways that each urban agglomeration works out in order to shift the curves of preferences for private and public transport towards the social optimum should become the foundation of a long-term transport policy.

Conclusion

A hyperactive development of the private car fleet that serves personal needs calls for theoretical innovations in the field of transport taxation. Scholarly investigations of optimal transport taxation will prove highly relevant in the mid-term run as theoretical works on the subject are extremely scarce.

We consider the following concepts theoretically proven.

The price of the planned trip will be the key choice factor, so taxes and charges levied upon the trip will have the greatest influence on changing the travel behaviour of car owners. Transport taxes and charges are not essentially homogeneous; they have different impacts on the behaviour of car owners. Similarly to fixed and variable costs, it is useful to divide mandatory transport charges into fixed and variable ones. High rates of variable taxes have the greatest effect on people's current travel behaviour. Urban agglomerations in Europe actively use variable taxes such as fuel excise duties, toll charges, vignettes, congestion charges, distance-based electronically collected tolls, toll lanes, paid parking. In Russia, only fuel excises have found wide application, while paid parking and road tolls are only starting to be introduced. The process, however, is extremely slow and meets strong opposition from car owners. There are no examples to be cited of congestion charges and distance-based road tolls in Russian urban agglomerations. The fiscal burden of fuel excises is insignificant.

Russian urban territory must develop new fiscal instruments that would meet the following fundamental requirements:

– toll revenues must be spent strictly on the objectives of transport policy in the urban agglomeration where the road system was used;

– tolls must be levied according to the distance and be related to the type of the road (federal, regional or municipal);

– the charge should vary depending on the day of the week and the time of the day (the highest during peak hours and a minimal charge during the rest of the day);

– the minimal charge should match the marginal costs of road use, while the maximum rate should also include a surcharge. The surcharge would balance demand for the road network and its capacity.

Russian urban territory must adopt radically new approaches to long-term transport planning. It is necessary to introduce programs of public transport development and rail transit development in the first place.

References

1. Mayburov I. A., Leontyeva Y. V. Prospects of regulating car use in Russia by means of taxation. *Innovation, Entrepreneurship and Digital Ecosystems. Book proceedings of 9th EuroMed Conference of the EuroMed Academy of Business*. University of Warsaw, Digital Economy Lab, 2016, pp. 1249–1255.

2. Mayburov I. A., Leontyeva Y. V. Ecologization of transport taxes as a perspective vector of their improvement. *Finansy = Finance*, 2014, no. 9, pp. 35–39. (In Russian).

3. Mayburov I. A., Ivanov Yu. B. (eds). *Entsiklopediya teoreticheskikh osnov nalogooblozheniya* [Encyclopedia of theoretical bases of taxation]. Moscow, Yuniti-Dana Publ., 2016. 503 p.

4. Derycke P.-H. Road pricing — analysis and policies (a historical perspective). *Recherches Economiques de Louvain,* 1998, vol. 64, iss. 1, pp. 63–74.

5. Lindsey R. Do economists reach a conclusion on road pricing? *Econ Journal Watch,* 2006, vol. 3, no. 2, pp. 292–379.

6. Pigou A. C. *The Economics of Welfare*. London, Macmillan and Co. Publ., 1920, 896 p.

7. Newbery D. M., Santos D. G. Road taxes, road user charges and earmarking. *Fiscal Studies,* 1999, vol. 20, iss. 2, pp. 103–132.

8. Vickrey W. Pricing in Urban and Suburban Transport. *American Economic Review*, 1963, vol. 52, iss. 2, pp. 452–465.

9. Coase R. H. The problem of social cost. *Journal of Law and Economics*, 1960, vol. 3 (1), pp. 1–44.

10. De Borger B. Optimal congestion taxes in a time allocation model. *Transportation Research Part B — Methodological,* 2011, vol. 45, iss.1, pp. 79–95.

11. De Borger B., Mayeres I. Optimal taxation of car ownership, car use and public transport: Insights derived from a discrete choice numerical optimization model. *European Economic Review*, 2007, vol. 51, pp. 1177–1204.

12. Baumol W. J. On taxation and the control of externalities. *The American Economic Review,* 1972, vol. 62, no. 3, pp. 307–322.

13. Litman T. A. *Using Road Pricing Revenue: Economic Efficiency and Equity Considerations*. Victoria Transport Policy Institute Publ., Canada, 2011. 15 p.

14. Mayburov I. A., Leontyeva Y. V. Transport tax in Russia as a promising tool for reduction of airborne emissions and development of road network. *WIT Transactions on Ecology and the Environment. Air Pollution XXIII*, 2015, vol. 98, pp. 391–401. DOI: 10.2495/AIR150341.

15. Small K. A., Verhoef E. *The Economics of Urban Transportation*. Routledge. New York, 2007. 238 p.

16. Mayburov I. A., Sokolovskaya A. M. *Teoriya nalogooblozheniya. Prodvinutyi kurs* [Theory of Taxation. An Advanced Course]. Moscow, Yuniti-Dana Publ., 2011. 591 p.

17. Mayburov I. A., Leontyeva Y. V. Reducing the negative impact of motor transport on the environment: prospects for the use of fiscal instruments in Russia. *WIT Transactions on Ecology and the Environment. Energy and Sustainability*, 2014, vol. 186, pp. 863–874. DOI: 10.2495/ESUS140771.

18. Clarke H., Prentice D. *A Conceptual Framework for the Reform of Taxes Related to Roads and Transport*. Canberra, La Trobe University Publ., 2009. 69 p.

19. Delucchi M. Do motor-vehicle users in the US pay their way? *Transportation Research Part A: Policy and Practice,* 2007, vol. 41, iss. 10, pp. 982–1003.

20. Harberger A. C. The incidence of the corporation income tax. *Journal of Political Economy,* 1963, vol. 70, no. 3, pp. 215–240.

21. Litman T. A. *Transportation Cost and Benefit Analysis: Techniques, Estimates and Implications*. Victoria Transport Policy Institute Publ., Canada, 2003. 19 p.

22. Verhoef E. External effects and social costs of road transport. *Transportation Research,* 1994, vol. 28a, no. 4, pp. 273–287.

23. Levinson D. M. Equity effects of road pricing: a review. *Transport Reviews,* 2010, vol. 30, iss. 1, pp. 33–57.

24. Wardrop J. G. Some theoretical aspects of Road Traffic research. Road Paper № 36. *Proceedings of the Institution of Civil Engineers,* 1952, vol. 1, pr. 2, pp. 325–362.

25. Vuchic V. R. *Urban Public Transportation: Systems and Technology.* Englewood Cliffs, NJ, Prentice-Hall, 1981. 673 p.

26. Holden D. J. Wardrop third principle: urban traffic congestion and traffic policy. *Journal of Transport Economics and Policy,* 1989, vol. 23, no. 3, pp. 239–262.

Authors

Yulia V. Leontyeva — PhD in Economics, Associate Professor, Department of Finance and Tax Management, Ural Federal University named after the first President of Russia B. N. Yeltsin, Yekaterinburg, Russia (19 Mira St., 620002, Russia, Yekaterinburg); e-mail: uv.leonteva@mail.ru.

Igor A. Mayburov — Doctor of Economic Sciences, Professor, Head of the Department of Finance and Tax Management, Ural Federal University named after the first President of Russia B. N. Yeltsin, Yekaterinburg, Russia (19 Mira St., 620002, Russia, Yekaterinburg); Chief Researcher of the Department of Finance and Credit, Far Eastern Federal University, 8, Suhanova St., Vladivostok, (8 Suhanova St., 690950, Russia, Vladivostok); e-mail: mayburov.home@gmail.com.

Информация об авторах

Леонтьева Юлия Владимировна — кандидат экономических наук, доцент, доцент кафедры финансового и налогового менеджмента, Уральский федеральный университет им. первого Президента России Б. Н. Ельцина, г. Екатеринбург, Россия (620002, г. Екатеринбург, ул. Мира, 19); e-mail: uv.leonteva@mail.ru.

Майбуров Игорь Анатольевич — доктор экономических наук, профессор, заведующий кафедрой финансового и налогового менеджмента, Уральский федеральный университет им. первого Президента России Б. Н. Ельцина, г. Екатеринбург, Россия (620002, г. Екатеринбург, ул. Мира, 19); главный научный сотрудник кафедры финансы и кредит, Дальневосточный федеральный университет, г. Владивосток, Россия (690950, г. Владивосток, ул. Суханова, 8); e-mail: mayburov.home@gmail.com.

УДК 336.02
DOI 10.15826/jtr.2016.2.3.025

Valentine P. Vishnevsky
Institute of the Economy of Industry of the NAS of Ukraine,
Kiev, Ukraine
Alexey V. Polovyan
Institute of Economic Research,
Donetsk, Ukraine

FISCAL OR MONETARY STIMULUS? EVOLUTIONARY ARGUMENTS FOR TAX REFORMS

ABSTRACT. The article deals with the problem of substantiation of the emergent economies development regulatory measures (fiscal and / or monetary), using the evolutionary modelling methods. For this purpose, the mathematical model was constructed that simulates the co-evolution process of the advanced and developing countries, linked by global value chains. In this model, each country is characterized by its original structure of economic entities, defined by the ratio of the egoistic enterprises (predisposed to conservative behaviour) to the altruistic enterprises (predisposed to innovation), as well as by specific population and demographic processes. The results of the computational experiments have shown that the success of economic regulation fundamentally depends on the peculiarities of the initial state of the institutional environment. In the institutional environment with the «transparent» long behaviour and, accordingly, a long economic planning horizon, the best result in the form of average annual production growth rate of the emergent economies is provided by the cheap money policy combined with the high European taxes. A different situation is observed in more realistic short behaviour and, accordingly, short (under 5 years) economic planning horizon. In this case, any tax policy (neither low nor high taxes) together with any money (neither cheap nor expensive), to a certain extent loses its significance, as the initially backward innovative system does not allow to quickly get good results, and the long-term benefits of the potential economic growth are not taken into consideration. However, low taxes and cheap money are important as they create better conditions for survival of the altruistic enterprises, facilitating their investment activities, which can multiply increase their technical performance and economic efficiency. Still, in the context of the evolutionary economics and following the conducted computational experiments, the fiscal policy in terms of emerging markets retains its regulatory capacity, and therefore requires further reforms in the context of the «new reality» based on the global value chains.

KEYWORDS. Fiscal policy; monetary policy; taxes; evolutionary economics; co-evolution; institutional environment; mathematical model; enterprises; investment; economic growth.

В. П. Вишневский
Институт экономики промышленности НАН Украины,
г. Киев, Украина
А. В. Половян
Институт экономических исследований,
г. Донецк, Украина

НАЛОГОВОЕ ИЛИ МОНЕТАРНОЕ СТИМУЛИРОВАНИЕ? ЭВОЛЮЦИОННЫЕ АРГУМЕНТЫ В ПОЛЬЗУ НАЛОГОВЫХ РЕФОРМ

АННОТАЦИЯ. Статья посвящена исследованию проблемы обоснования мер регулирования развития эмерджентной экономики — фискальных и (или) монетарных, с использованием методов эволюционного моделирования. Для это-

го была построена экономико-математическая модель, имитирующая процессы коэволюции развитой и развивающейся стран, связанных через глобальные цепочки создания стоимости. В этой модели каждая из стран характеризуется собственной исходной структурой экономических субъектов, определяемой соотношением предприятий-эгоистов (предрасположенных к консервативному поведению) и предприятий-альтруистов (предрасположенных к инновационному поведению), а также специфическим населением и демографическими процессами. Результаты вычислительных экспериментов показали, что успех того или иного способа экономического регулирования принципиально зависит от особенностей исходного состояния институциональной среды хозяйствования. В институциональной среде с «прозрачными» длинными правилами игры и, соответственно, длинным горизонтом хозяйственного планирования наилучший результат в виде высоких темпов роста производства в эмерджентной экономике дает политика дешевых денег в сочетании с высокими «европейскими» налогами. Иная ситуация наблюдается в более реалистичной ситуации с короткими правилами игры и, соответственно, коротким (не более 5 лет) горизонтом хозяйственного планирования. В этом случае любая налоговая политика (низкие или высокие налоги) в сочетании любыми деньгами (дешевыми или дорогими), в определенном смысле теряет значение, поскольку изначально отсталая инновационная система не позволяет быстро получать высокие результаты, а преимущества экономического роста в отделенном будущем не принимаются во внимание. Вместе с тем, для постепенного формирования лучшей инновационной системы низкие налоги и дешевые деньги имеют важное значение, поскольку создают лучшие условия для выживания предприятий-альтруистов, облегчая им инвестиционную деятельность, способную принести многократный прирост технической производительности и экономической эффективности. В любом случае, в контексте эволюционной экономической теории, исходя из проведенных вычислительных экспериментов, налоговая политика в условиях эмерджентных рынков сохраняет свой регуляторный потенциал, и, таким образом, требует дальнейшего реформирования в контексте «новой реальности», основанной на глобальных цепочках создания стоимости.

КЛЮЧЕВЫЕ СЛОВА. Фискальная политика; монетарная политика; налоги; эволюционная экономика; коэволюция; институциональная среда; математическая модель; предприятия инвестиции; экономический рост.

Introduction

To overcome the consequences of the global financial and economic crisis the world's leading countries are widely using the monetary policy (mainly the quantitative easing), as the fiscal policy receded into the background and was largely limited to the procyclical budget austerity measures.

The active actions of the G7 central banks did indeed stabilized the situation. However, fundamentally the global issue of the transition to the sustainable economic growth has not been solved. As it is noted in «The Economist»: «Despite central banks' efforts, recoveries are still weak and inflation is low. Faith in monetary policy is wavering. As often as they inspire confidence, central bankers sow fear. Negative interest rates in Europe and Japan make investors worry about bank earnings, sending share prices lower. Quantitative easing (QE, the printing of money to buy bonds) has led to a build-up of emerging-market debt that is now threatening to unwind. For all the cheap money, the growth in bank credit has been dismal»[1].

Such circumstances revive the natural interest in more active use of the alternative fiscal policies aimed at promoting the structural reforms in the real sector of economy. In particular, J. Stiglitz and H. Rashid believe that: «…large increases in public investment in infrastructure, education, and technology will also be needed. These will have to be financed, at least in part, by the imposition of environ-

[1] Out of ammo? Economist.com, 2016. URL: http://www.economist.com/news/leaders/21693204-central-bankers-are-running-down-their-arsenal-other-options-exist-stimulate.

mental taxes, including carbon taxes, and taxes on the monopoly and other rents that have become pervasive in the market economy — and contribute enormously to inequality and slow growth» [1]. M. Feldstein notes that «…there is no alternative to fiscal policy if we want to reverse the current downturn» [2]. The IMF experts concluded that: «Infrastructure investment is needed across a range of countries and should be attractive in a setting of very low real interest rates. Countries with fiscal space should not wait to take advantage of it. …Tax reform, even when budget neutral, can create demand if well targeted, while simultaneously improving labour force participation and enhancing social cohesion»[2]. At the «Communiqué G20 Finance Ministers and Central Bank Governors Meeting» it was stated that: «Our fiscal strategies aim to support the economy and we will use fiscal policy flexibly to strengthen growth, job creation and confidence, while enhancing resilience and ensuring debt as a share of GDP is on a sustainable path. We are also making tax policy and public expenditure more growth-friendly, including by prioritizing high-quality investment»[3].

That is one way to look at it. While on the other hand, the arguments against the active countercyclical fiscal policy remain very serious. Its introduction is usually associated with high political costs, time delays required to change the fiscal programs, the weak reaction of the economic agents to the temporary tax cuts. Besides, in the present circumstances, when the economies of many countries are close to full employment, the government funding can crowd out private investment, reducing the potential productivity growth and standards of living, and budget deficits automatically increase government debt and require higher future taxes to pay the interest on that debt, which in turn distorts the economic incentives, etc. [2; 3].

Therefore, much depends on how well under the specific economic conditions of and considering the stated circumstances, the fiscal incentives can be transformed into the growth of the real modern goods and services production, which is the accelerator of the sustainable economic growth[4]. Recent researches showed that «…in advanced economies, stronger planned fiscal consolidation has been associated with lower growth than expected, with the relation being particularly strong, both statistically and economically, early in the crisis. A natural interpretation is that fiscal multipliers were substantially higher than implicitly assumed by forecasters» [4]. However, this conclusion, even if it is a completely fair one, cannot be automatically referred to the emerging markets, including Russia, where the production potential is limited by conventional technologies, the lack of modern equipment, STEM-staff and others, and many businesses are integrated into the Global Value Chains (GVCs) as a raw materials supplier or the low processed. In such conditions, the selection of the best tools of overcoming the recession is deeply contested [5].

The fundamental part of the solution of this problem is the fact, that due to the «past dependence» the GVCs are often built so that their innovative science-intensive and, at the same time, environmentally friendly links are located on some territories, while the resource-intensive links (environmentally unfriendly) are located somewhere else [6]. For example, the relative environmental and economical prosperity of the modern Western European car producing countries is traditionally connected to the low personal income and environmental problems in other countries, which produce coal, ore and smelt metal used for the production of these cars. In fact this is the coevolution, i.e. a historically joint and interdependent development of differentiated communities,

[2] International Monetary Fund. World Economic Outlook: Too Slow for Too Long. Washington, April, 2016.

[3] Ministry of Finance of the People's Republic of China (2016). Communiqué G20 Finance Ministers and Central Bank Governors Meeting. Available at: http://wjb.mof.gov.cn/pindaoliebiao/gongzuodongtai/201604/t20160416_1952794.htm.

[4] http://www.unido.org/fileadmin/user_media_upgrade/Who_we_are/Structure/Policy-making_Organs/Lima_Declaration_RU_web.pdf

which are further referred to as economic and ecological populations, acting within their territories, possessing different process technologies, environmental conditions, labour and natural resources, and directed by different institutes, etc.

On the basis thereof, the purpose of this study is to prove what measures of national economies development regulation — fiscal and/or monetary and in what combination — are better to use in order to change the current unfavourable situation for many developing countries involved in GVCs as auxiliary links.

In this regard, it was required to solve the following tasks:

– to develop and verify a basic model the coevolution of two differentiated populations, linked by GVCs in the «*Emerging market – Developed market*» complex («*E — D*»);

– to apply fiscal and monetary regulators to the basic model and, basing on the computational experiments, to prove what measures of coevolution regulation — fiscal and / or monetary — could improve the present tendencies.

The economic literature presents a number of the economic system evolution models: e.g. R. Nelson [7], T. Wiedmann [8], J. Van den Bergh [9; 10]. As to the coevolution mathematical models, they are much fewer in number. The review by M. Gual [11] and G. Kallis [12] showed that causal models of coevolution are used more often economically than mathematically.

Considering all the above stated this article proposes the model of the coevolution of different economic and ecological populations that uses and develops the following ideas of the predecessors:

– economic evolutionists — that the economic development is determined by the stochastic interaction between the economic agents using the mechanisms of variability, heredity, and selection;

– financial economists — that the effectiveness of fiscal and monetary regulations depends on the extent and stage of development of manufacturing technologies and economic institutions[5].

[5] An important work in this respect is the monograph by C. Perez [13].

Development and verification of a basic model. Cognitive properties of a basic model

There are two territories linked by the goods supply chains, each of which contains the interaction of two subpopulations: economic subpopulation (represented by enterprises) and ecological subpopulation (represented by human population). Together, they constitute the overall economic and ecological population of the given territory. Thus, we understand the economic and ecological population as a set of economic entities (enterprises) and human population, located and operating in a separate territory.

Organizational routines of the population's enterprises form their behaviour patterns, i.e. the predisposition to act in a certain way in a certain kind of situation [14]. It is assumed that such patterns can be of two types: innovative altruistic pattern and egoistic conservative pattern, so hereafter we will relatively divide the enterprises on egoists and altruists.

Both altruists and egoists seek to maximize their welfare (with due regard to the limitations on available resources, the monetary and fiscal stimuli and restrictions, the established institutions, etc.). But the egoists do not consult social interests, and altruists consider them important. That is, the altruists are, in this case, the enterprises engaged in risky development of new production technologies, taking into account the social costs incidental to the environmental pollution, and therefore seek every possible way to improve the cleaning system of the emitted pollution, marshalling their own resources on these matters. In turn, the egoists are the enterprises, which prefer not to engage in the development of new production technologies, do not take into account the social costs incidental to the environmental pollution, and do not seek to improve the emitted pollution cleaning systems[6].

[6] It is assumed that the egoists, even in case of tighter penalties for environmental pollution, will not invest into new eco-technologies, and prefer to decrease their costs, for example, by bribing inspectors, or withdraw from business.

Economic subpopulation produces goods and emits pollution (which is partially removed by the cleaning). Ecological subpopulation consumes a part of the goods and pollution, and in return supplies the economic subpopulation with labour (Fig. 1).

The Figure 1 shows that populations are different from one another.

The first one is located in the Territory *D* and specializes on producing final science-intensive products with high added value and low pollution level. The orientation towards innovation development and low environmental polluting is prevailing.

The second one, located on the Territory *E*, specializes on producing intermediate resource-intensive products with high level of environmental pollution emitting. The orientation towards conservative behaviour and indifference to environmental pollution is prevailing.

There is a link between the economic subpopulations of the territories — the intermediate products of the Territory *E* are the input for the final products of the Territory *D*. Both Territories *D* and *E* consume these products. The ecological populations of the Territories *D* and *E* do not interact (e.g. they do not share borders, or there is an emigration control in Territory *D*).

Pollution, emitted in one territory, does not affect the other one (i.e. cannot be spread by wind, water, etc.).

Mathematical description of the model Economic subpopulation

Production unit. In each of the territories the production output of the enterprise i in the period of t (Q_t^i) is determined by the following production function

$$Q_t^i = \frac{Q_t^i}{F_t^i}\frac{F_t^i}{Lq_t^i}Lq_t^i = A_t^i f_t^i Lq_t^i, \quad (1)$$

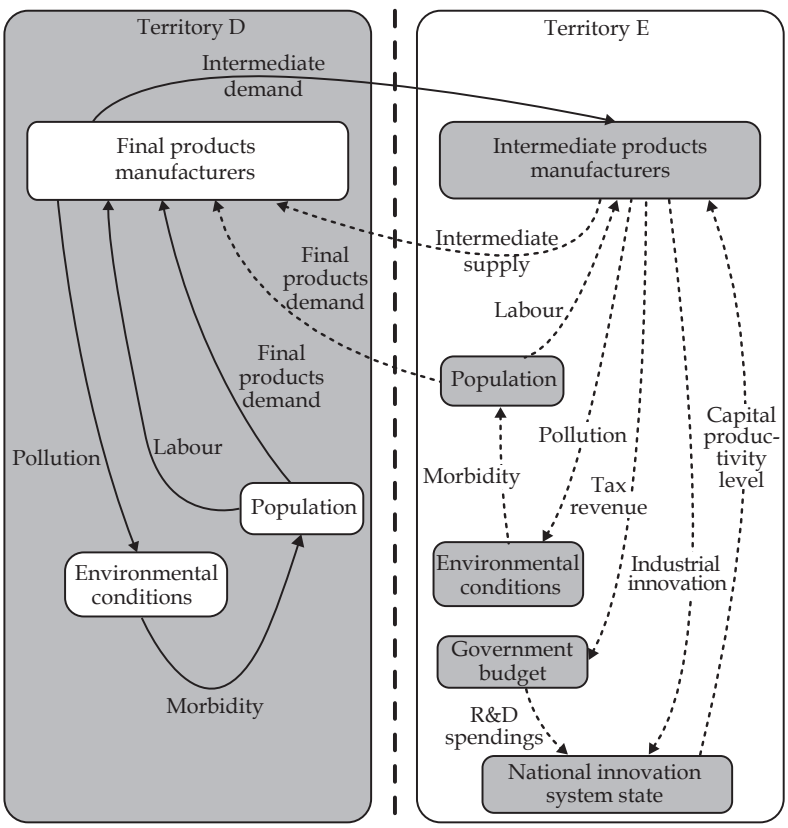

Figure 1. Cognitive model of the interaction between economic and ecological populations, linked by the goods supply chains

where F_t^i is the fixed production assets value of the enterprise i in the period of t; A_t^i is the capital productivity; f_t^i is the capital-labour ratio ($f_t^i = const$); Lq_t^i is the time worked; i is the location number; t is the period number.

In addition to the output of products, every enterprise is engaged in disposing the contamination, associated with this output, or, figuratively speaking, in «cleanness production»:

$$^{+}Qa_t^i = \frac{Qa_t^i}{Fe_t^i}\frac{Fe_t^i}{Le_t^i}Le_t^i = Aa_t^i fe_t^i Le_t^i, \quad (2)$$

$$^{+}Qw_t^i = Aw_t^i fe_t^i Le_t^i, \quad (3)$$

$$^{+}Ql_t^i = Al_t^i fe_t^i Le_t^i, \quad (4)$$

where $^{+}Qa_t^i$, $^{+}Qw_t^i$, $^{+}Ql_t^i$ are the disposal volumes of the air and water emissions, and production waste, respectively, in the period of t; Fe_t^i is the fixed environmental protection assets value of the enterprise i in the period t; Aa_t^i, Aw_t^i, Al_t^i are the capital productivity of fixed environmental protection assets; fe_t^i is the capital-labour ratio (for fixed environmental protection assets $fe_t^i = const$); Le_t^i is the amount of time worked in the environmental protection activities.

The supply of the products made by the enterprise i during the period of t is determined from the following formula:

$$\widehat{Q}_t^i = Q_t^i + Z_{t-1}^i, \quad (5)$$

where Z_{t-1}^i is the unsold product in the period of $(t-1)$:

$$Z_{t-1}^i = \begin{cases} \widehat{Q}_{t-1}^i - Qr_{t-1}^i, & \widehat{Q}_{t-1}^i > Qr_{t-1}^i \\ 0, & \widehat{Q}_{t-1}^i \le Qr_{t-1}^i \end{cases}, \quad (6)$$

where Qr_{t-1}^i is the volume of products sold in the period of $(t-1)$.

The companies are assumed to operate in a competitive market, i.e. the final product pricing is set exogenously (determined by the volume of aggregative supply and demand, not by the enterprises themselves). Therefore, the enterprise's profit (P_t^i) is equal to the difference between the value of products sold and production costs (C_t^i) taking into account the tax payments (τ_t)

$$P_t^i = (Qr_t^i - C_t^i)(1 - \tau_t). \quad (7)$$

To determine C_t^i it is proposed to use the following production function

$$C_t^i = \delta(Fe_t^i + F_t^i)^{\psi}(Q_t^i)^{\nu}k^{\eta} + \\ + (-Qa_t^i)\tau^a + (-Qw_t^i)\tau^w + (-Ql_t^i)\tau^l, \quad (8)$$

where $^{-}Qa_t^i$, $^{-}Qw_t^i$, $^{-}Ql_t^i$ — the environmental contamination by air emissions, water emissions and production waste, respectively, in the period of t; τ^a, τ^w, τ^l are the environmental tax rates; k is the credit interest rate; δ, ψ, ν, τ are the function parameters.

The Figure 2 shows the procedure of distribution of the profit remaining at the enterprise's disposal.

The profit is expected to be fully directed to the production and environmental protection. But the egoists are just simulating the available environmental technologies, when the altruists are involved in the development of new green technologies.

The number of egoists and altruists within the economic subpopulation changes over time as a result of natural selection, which alters the subpopulation structure.

The condition of their reproduction is defined by the following formula:

$$R_t^i = \frac{P_t^i}{C_t^i} \ge Rn, \quad (9)$$

where Rn is the standard level of profitability.

The economic sense of this formula is that if the strategy of the economic entity (whether it is altruist or egoist) leads to the increasing business activity effectiveness, then it reproduces enterprises of its own kind, which will use the same behaviour patterns. If not, then the reproduction does not occur.

At the same time, each territory has its historically formed level of profitability, which is relevant to the specific features of its institutional environment.

If $F_t^i \le Fn$ (where Fn is the standard fixed assets value) or the enterprise has been standing the losses for the previous 3 periods ($P_t^i < 0$), then the entity fails (removes itself from the subpopulation).

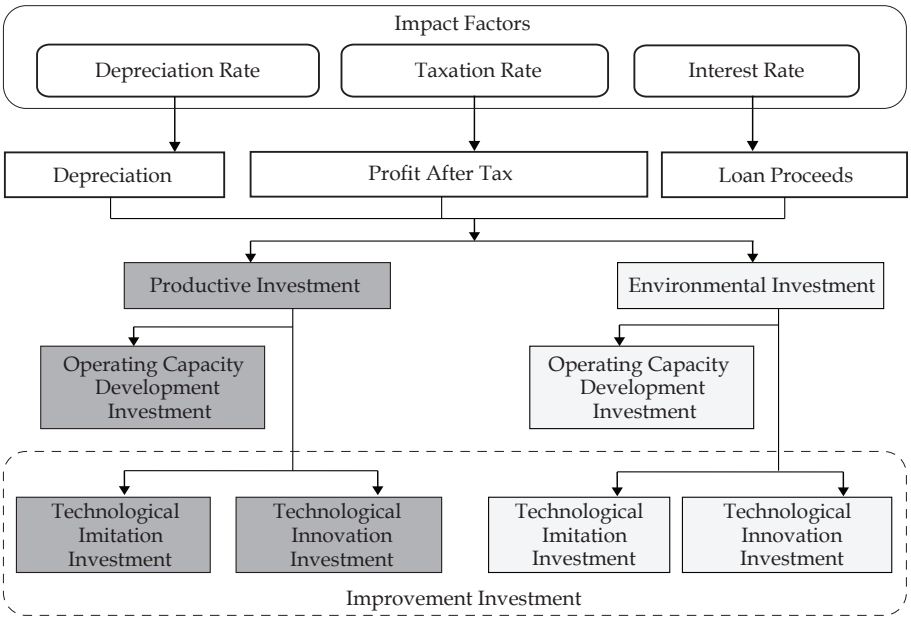

Figure 2. The scheme of formation and distribution of industrial enterprise investment

Thus, the structure of economic subpopulation is dynamic and may change due to the comparative advantages of the altruistic or egoistic behaviour.

Both egoists and altruists can direct their profits into expanding the existing facilities and / or their modernization (through simulating the known technologies or developing new ones). They engage in the enterprise modernization only if the current profitability rate ($R_t^i = P_t^i / C_t^i$) is lower than a threshold figure (which is sufficient to maintain the business activity).

The development of the investments in expanding the existing capacities causes an increase in fixed assets value:

$$F_t^i = \begin{cases} F_{t-1}^i - NA \cdot F_{t-1}^i + I_t^i = \\ = F_0^i - \int_0^T D_t^i dt + \int_0^T I_t^i dt, \quad P_t^i > 0 \\ F_{t-1}^i - NA \cdot F_{t-1}^i = \\ = F_0^i - \int_0^T D_t^i dt, \quad P_t^i \le 0 \end{cases} \quad (10)$$

where NA is the amortization rate; D_t^i is the amortization payment; T is the total number of periods.

The amount of investment (I_t^i) (see Fig. 2) is determined as follows:

$$I_t^i = f^I(P_t, D_t^i, K_t),$$

where K_t is the loan proceeds amount ($K_t = f^k(k_t)$), k_t is the average credit rate.

The facilities modernization and the research-and-development (R&D) process, associated with it, are logically proposed in seminal work by R. Nelson and S. Winter [7]. The R&D generates new capital productivity values using the two-stage stochastic process.

The first stage is characterized by independent random variables *dm* and *dn*, which can be equal to either 0 or 1. According to the values of these random variables enterprise begins (or not) the modernization process.

At the second stage, the probability of investment success is estimated:

$$\Pr(dm = 1) = \frac{K\_rm_t^i - K\_rm_t^{\min}}{K\_rm_t^{\max} - K\_rm_t^{\min}};$$
$$\Pr(dn = 1) = \frac{K\_rn_t^i - K\_rn_t^{\min}}{K\_rn_t^{\max} - K\_rn_t^{\min}}, \quad (11)$$

where $K\_rm_t^{\max}, K\_rm_t^{\min}$ are, correspondingly, the maximum and minimum

costs for the simulation of known technologies by the enterprises of the sector in the period of t; $K\_rn_t^{\max}$, $K\_rn_t^{\min}$ are, correspondingly, the maximum and minimum– costs for the new technologies development by the enterprises of the sector in the period of t.

Investments, as Figure 2 shows, may be directed to the technologies imitation and / or technological innovations.

If the enterprise gets an imitation, then it should find and imitate the best practice in the industry. If the enterprise gets an innovation, then it selects a technology, proceeding from the technological capabilities distribution in the industry An_t:

$$An_t = f^n(d_t^{Ind},\ d_t^{VVP}), \qquad (12)$$

where d_t^{Ind} is the industrial contribution to GDP; d_t^{VVP} is the R&D spending from the government budget.

The latter, in turn, is defined as follows:

$$d_t^{VVP} = f^d(\tau_t, k_t).$$

The economic sense of this formula is that the raising enterprise taxes reduces the resources of the enterprises, but increases the government revenues, which are directed to the R&D funding among other things.

The capital productivity value for the enterprises, which got both simulation and innovation, is defined by the following expression:

$$A_{t+1}^i = \max(A_t^i, \tilde{A}_t, An_t), \qquad (13)$$

where $\tilde{A}_t$ is the highest (corresponding to the best practice) productivity level in the sector.

If the enterprise does not get neither simulation nor innovation, then the capital productivity remains the same[7].

As the enterprise evolves, F_t^i and Fe_t^i also change, and therefore in the assumption $f_t^i = f_0^i = const$ changes the total amount of labour used $L_t^i = Lq_t^i + Le_t^i$.

The enterprise's composite demand for labour $\tilde{\Lambda}_t^i$ is

$$\tilde{\Lambda}_t^i = \frac{F_t^i}{f_t^i} + \frac{Fe_t^i}{fe_t^i} = \tilde{\Lambda} q_t^i + \tilde{\Lambda} e_t^i. \qquad (14)$$

The enterprise's total filled demand for labour (Lf_t^i) is defined by the labour market offers in the territory ($\widehat{L}_t^i$):

$$L_t^i = \begin{cases} \tilde{\Lambda}_t^i, & \widehat{L}_t^i \geq \sum_{i=1}^n \tilde{\Lambda}_t^i \\ \dfrac{\tilde{\Lambda}_t^i}{\sum_{i=1}^n \tilde{\Lambda}_t^i} \widehat{L}_t^i, & \widehat{L}_t^i < \sum_{i=1}^n \tilde{\Lambda}_t^i \end{cases}, \qquad (15)$$

where n is the number of enterprises (entities) in the territory.

In turn, the enterprise's demand for production labour is determined by the formula

$$Lq_t^i = \begin{cases} \tilde{\Lambda} q_t^i, & \tilde{\Lambda} q_t^i = L_t^i \\ \dfrac{\tilde{\Lambda} q_t^i}{\tilde{\Lambda}_t^i} L_t^i & \end{cases}. \qquad (16)$$

The filled demand for environmental activity labour is calculated as follows:

$$Le_t^i = \begin{cases} \tilde{\Lambda} e_t^i, & \tilde{\Lambda}_t^i = \widehat{L}_t^i, \\ \left(1 - \dfrac{\tilde{\Lambda} q_t^i}{\tilde{\Lambda}_t^i}\right) \widehat{L}_t^i & \end{cases}. \qquad (17)$$

Environmental protection. The cleanness production results in environmental pollution reduction. The pollution balance is defined as follows:

$$\begin{cases} {}^{-}Qa_t^i = {}^{-}Qa_0^i + \int_0^T {}^{-}Atm_t^i dt - \int_0^T {}^{+}Qa_t^i dt \\ {}^{-}Qw_t^i = {}^{-}Qw_0^i + \int_0^T {}^{-}Wat_t^i dt - \int_0^T {}^{+}Qw_t^i dt, \\ {}^{-}Ql_t^i = {}^{-}Ql_0^i + \int_0^T {}^{-}Lan_t^i dt - \int_0^T {}^{+}Ql_t^i dt \end{cases} \qquad (18)$$

where ${}^{-}Qa_t^i$, ${}^{-}Qw_t^i$, ${}^{-}Ql_t^i$ are the balances of pollution by air emissions, water emissions and the waste disposal, respectively, in the period of t; ${}^{-}Atm_t^i$, ${}^{-}Wat_t^i$, ${}^{-}Lan_t^i$ are the amounts of pollution by air emissions, water emissions and the waste disposal, respectively, in the period of t.

[7] Enterprises do not know a priori, whether their attempts to become innovators (simulators) will be justified or not, and specifically what level of R&D expenditure they may need. For any of them, the answer to this question depends on choices made by other enterprises.

The calculation of the volumes of pollution by air emissions, water emissions and the waste disposal in the period of t, is carried out according to the following formulas:

$$\begin{cases} {}^{-}Atm_t^i = f^{Atm-}(Q_t^i) \\ {}^{-}Wat_t^i = f^{Wat-}(Q_t^i) \\ {}^{-}Lan_t^i = f^{Lan-}(Q_t^i) \end{cases}, \quad (19)$$

where f^{Atm-}, f^{Wat-}, f^{Lan-} are the pollution functions.

It is assumed that enterprises only utilize their own pollution.

Ecological subpopulation. As noted above, the ecological subpopulation is represented by the human population living in a given territory (E or D), which is divided into four age groups (0–14, 15–24, 25–64 and over 64 years).

The human population size in dynamics is defined by the formula:

$$PL_t^v = PL_{t-1}^v + Rb_t^v - Rd_t^v + Rs_t^{v-1} - Rs_t^v,$$

where PL_t^v is the population in the group of v; Rb_t^v is the birth rate for the group of v, $Rb_t^v = const$; Rd_t^v is the mortality rate for the group of v; Rs_t^{v-1}, Rs_t^v is the rate of the transition from one age group to the other.

The mortality rate for the relevant group of population depends on the aggregated environmental pollution:

$$Rd_t^v = f^{Rd}({}^{-}AQ_t^i, {}^{-}WQ_t^i, {}^{-}LQ_t^i).$$

The labour market offers of each territory ($\widehat{L}_t^i$):

$$\widehat{L}_t^i = f^l(PL_t^2 + PL_t^3), \quad (20)$$

where PL_t^v is the population size in the 2d and 3d groups.

The interaction between populations. The interaction of populations, operating within the Territories E and D, goes in the following directions.

First, the population of the Territory E and D determine the amount of demand for the products of the Territory D:

$$\sum_{i=1}^{n} \tilde{Q}E_t^i = f^Q(PLE_t^v, PLY_t^v),$$

where PLE_t^v, PLY_t^v are the population size in the 2–4 age groups in the Territory D and E, respectively.

Secondly, the production volume of enterprises in the Territory D depends on the production of the enterprises in the Territory E. To account this dependence, the production of the enterprises in the Territory D is adjusted by a factor of (η), which is defined by the following logistic function:

$$\eta = \frac{1}{\alpha\beta^{QY_t} + \gamma},$$

where QY_t is the total output in the Territory E; β, α, γ are the function's parameters, $0 < \beta < 1$, $\alpha > 0$, $\gamma > 0$.

With proper selection of the function's parameters, the growth of total output in the Territory E will provide the value, approximately equal to 1. At the same time, the total output reduction will cause a decrease of the rate to 0.

Third, the total output in the Territory D determines the demand for products manufactured in the Territory E:

$$\tilde{Q}Y_t = f_Q(\tilde{Q}E_t). \quad (21)$$

The implementation of the model, its parameterization and verification

The model of populations' coevolution has been implemented in the development environment AnyLogic 6.0[8], which supports agent based and system dynamics simulation (Fig. 3).

Two countries, which may be considered typical representation of the Territories D and E, have been chosen as objects for the model's parameterization: Germany (the advanced economy with innovative production technologies and institutions, promoting environmentally-friendly behaviour), and Ukraine (the emerging economy with traditional manufacturing technologies and institutions promoting environmentally-unfriendly behaviour).

Each object is characterized by the structure of its economic subpopulation — altruists-egoists ratio (ψ).

During parameterization for each object, these ratios have been chosen so that

[8] URL: http://www.anylogic.com/.

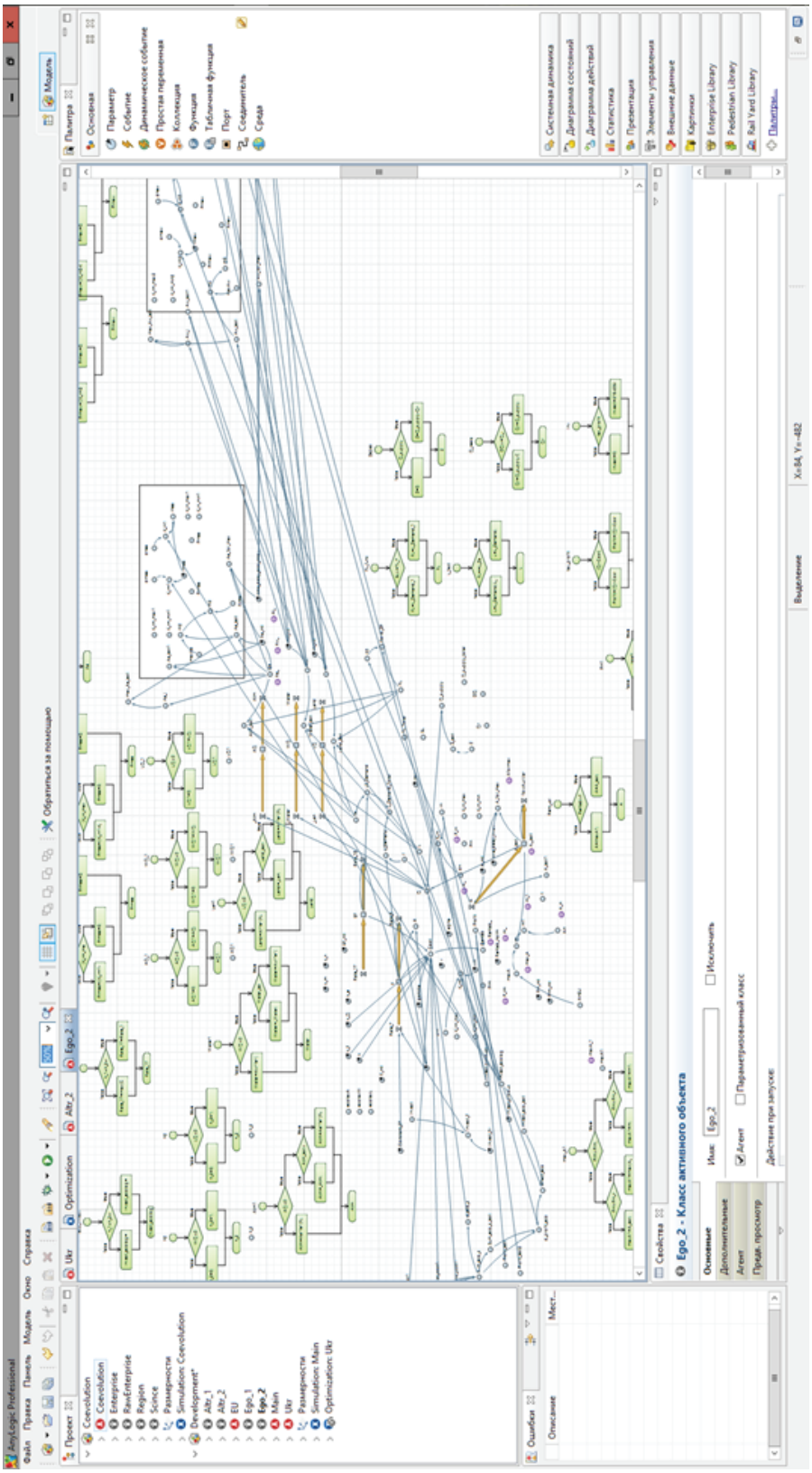

Figure 3. A detail of the mathematical model of populations' coevolution, implemented in AnyLogic 6.0 development environment

the dynamics and values of the populations' developments, determined by the behaviour peculiarities of the altruists and egoists, respond actual observed trends during the entire period of the approximation (2008–2013) (Table).

Parameterized and verified basic model enables the computational experiments, designed to determine the patterns of interdependent development of two populations of economic subjects with different levels of production, innovation and environmental activities.

For this purpose, the following computational experiments were carried out:

– A_1 — the coevolution continuing current trends, when economic populations of the Territories *D* and *E* rely on their own production technologies;

– A_2 — the European type of coevolution, when the economic population of the Territory *E* gets the access to the technologies developed in the Territory *D*.

Experiment A_1 is the coevolution, continuing current trends; the economic populations of the Territories D and E rely on their own production technologies

In the assumption on the independent development of the production technology, the indicators dynamics, characterizing the situation in the Territories *E* and *D*, have different trends.

The Territory *D* has been showing steadily increasing production output (average annual growth rate of +2,0 %) (Fig. 4) and decreasing total resident population size, which is not related to the environmental pollution (–0,06 %) (Fig. 5), and the gradual reduction of anthropogenic impact on the environment (Fig. 7). It comes from the fact that in the Territory *D* the enterprises with advanced production technologies and altruistic (innovative) behaviour type ($\psi = 0{,}55$), which are accustomed to the permanent production modernization (which positively reflecting on the capital productivity dynamics — Fig. 6), and also take into account social costs related to the environmental pollution and therefore seek to improve the ways of emitted pollution cleaning, are prevailing.

The Territory *E* has also been showing the decreasing total resident population size at the rate of (–0,15 %) during the simulated period, but it can be explained by increasing anthropogenic impact on the environment — the average annual pollution growth rate (as opposed to the Territory *D*) is positive. This in turn causes the decrease in the working-age population and labour shortages, which results in the long-term decrease in production output. In addition to the stated factor and general low production technology level, the reason is the prevailing in the Territory *E* is egoistic enterprises with conservative behaviour, which seek quick results to the detriment of innovative future, and do not take into account the environmental pollution spillovers.

Model's verification results (mean values for 2008–2013)

Parameter	Unit	Ukraine			Germany		
		Actual	Estimated	Deviation	Actual	Estimated	Deviation
Resident population size	%	100,0	98,9	–1,1	100,0	99,6	–0,4
Industrial output	%	100,0	102,8	+2,8	100,0	91,9	–8,1
Stationary air pollution	%	100,0	91,8	–8,2	100,0	100,0	0,0
Water body pollution	%	100,0	105,6	+5,6	100,0	105,7	+5,7
Industrial pollution	%	100,0	106,8	+6,8	100,0	89,6	–10,4
Mean absolute deviation	pp	–	–	**4,9**	–	–	**4,9**

The statistical data (population size, production output, research and development expenditures, environmental pollution level, etc.) used for the model parameterization is obtained from the websites: URL: http://www.ukrstat.gov.ua; URL: http://data.un.org; http://www.oecd-ilibrary.org; URL: http://epp.eurostat.ec.europa.eu; http://apps.who.int.

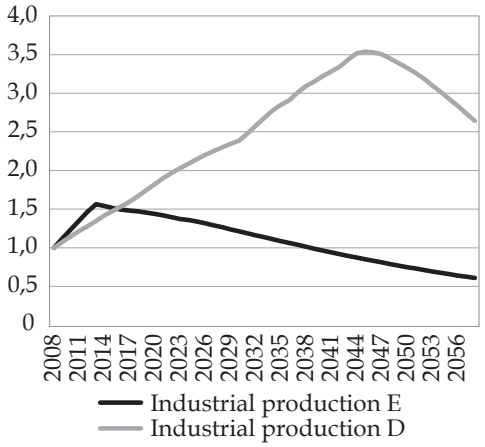

Figure 4. Experiment A_1. Expected production output dynamics (base index)

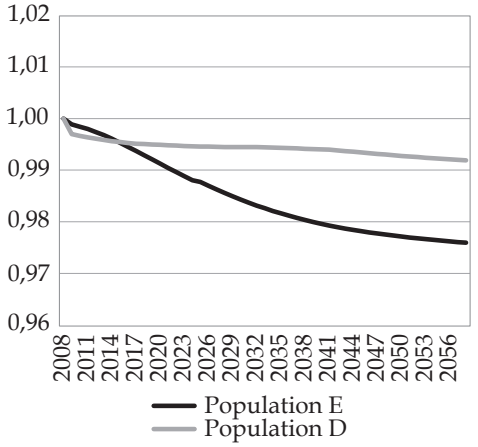

Figure 5. Experiment A_1. Expected resident population dynamics (chain index)

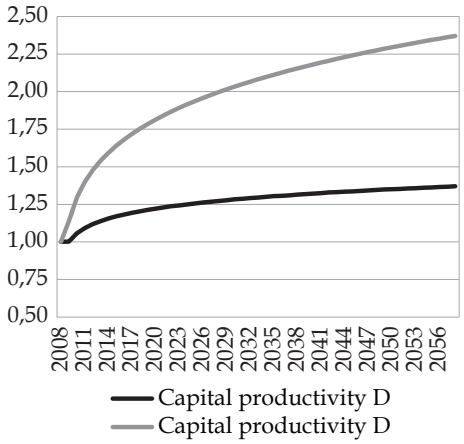

Figure 6. Experiment A_1. Expected capital productivity dynamics (base index)

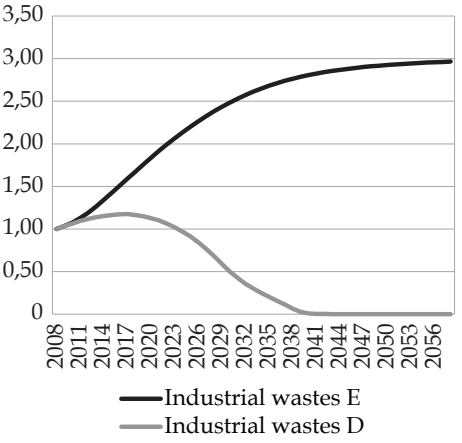

Figure 7. Experiment A_1. Expected industrial waste dynamics (base index)

Experiment A_2 — the European type of coevolution; the economic population of the Territory E gets the access to the technologies developed in the Territory D

If the economic population *E* gets the access to the advanced foreign technologies, then the territorial development parameters change drastically. Now, the economic population (the industrial enterprises of the Territory *E*) has the ability to occasionally copy, and then after a while to replicate massively these technologies, which results in productivity growth of the production and environmental activity, the increase in production output (Fig. 8), and better cleaning of emitted environmental pollution. As a result, the ecological population situation improves, which reflects positively on the resident population size dynamics of the Territory *E* (Fig. 9).

However, it should be noted that the results obtained in the experiment A_2 are rather a demonstration of the capacity of the European development vector, than real policy for the Territory *E*.

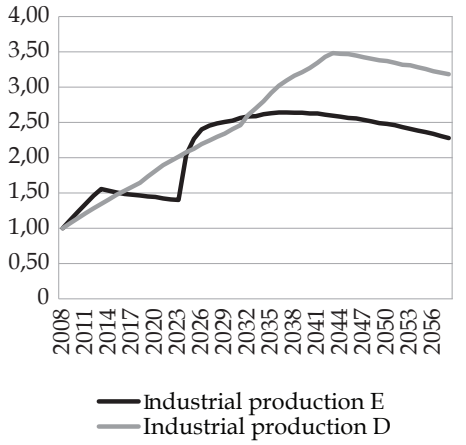

Figure 8. Experiment A_2. Expected production output dynamics (base index)

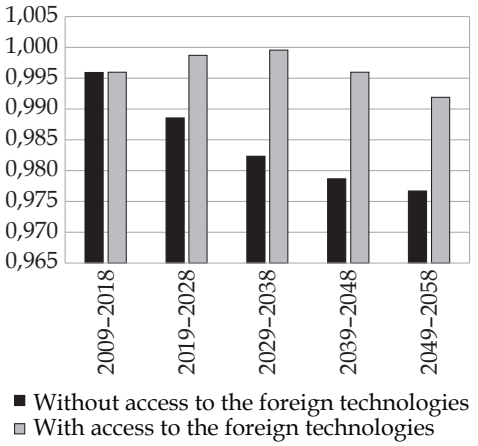

Figure 9. Experiment A_2. Average population decrease rate in the Territory E (chain indexes)

In order to simulate technologies successfully (and especially to create them), the appropriate scientific and technological potential is required (a rather high level of scientific and technological culture, qualified personnel, innovation traditions, etc.), which enables the country to open the window of opportunities in using technological experience of more advanced countries. The dynamics of all these processes is well described in the well-known monograph by C. Perez [13]. The common principle is that the ability to copy and mass-replicate new technologies depends on the recipient's scientific and technical development, which, in turn, is determined by the cumulative (for many years) R&D expenditures of the government and enterprises. As noted by V. Dementyev [15], there is a certain threshold of initial scientific and technical knowledge, failing which they raise the marginal costs infinitely large. And conversely, the higher initial knowledge is the easier it gets to acquire additional knowledge [15, p. 37].

As is known, the total R&D level in the emergent countries is substantially lower than in advanced countries. But several post-Soviet economies retained the national scientific and technical potential (especially in the military-industrial complex). It is obvious that the capacity development through expansionary economic policy will improve both the generation of its own scientific and technological development and, more importantly for the emergent markets, enhance the ability of economic agents to adopt foreign technology (reducing the time required for learning to use and further mass replicate by the formulas 10–13).

Using the model to choose the adjustment policy: fiscal and/or monetary tools

The government of the Territory *E* has two main tools of stimulation the innovative economic development of the population: fiscal and monetary policy, the impact of which we will analyse further.

Within the model, they function the following way.

Fiscal policy reduces the total tax rate[9] ($\tau\downarrow$):

– $\tau 1\downarrow$ — increasing enterprises' earnings — increasing intramural technology development costs;

– $\tau 2\downarrow$ — changing amounts of tax payments — changing government R&D financing.

[9] It this paper to determine the tax impact on economic processes we use the total tax rate indicator, introduced by the experts from PwC and World Bank Group (2015, p. 126), which describes the taxes and other mandatory contributions of the enterprise as a share of its profit.

There is no unambiguous prior answer on how the change in tax rate will affect the tax payments, whether they will increase or decrease. This is a specific question, which relates to the Laffer problematics (the tax base elasticity by the tax rate). The same applies to changes in the R&D government financing by the changes in tax revenues. Typically, for various reasons this dependence is absent, as far as additional revenues can, technically, be directed anywhere (within the law). Therefore, our simulation is based on a neutral hypothesis of unit elasticity:

– the x % increase in tax leads to a proportional x % increase in the tax base;

– the x % income change leads to a proportional x % change in each type of government expenditures, including x % change in R&D expenditures.

Monetary policy reduces mean interest rate ($k\downarrow$):

– $k1\downarrow$ — increasing enterprises' profit by interest savings — increasing intramural technology development costs — increasing tax payment amounts (for a given tax rate) — increasing government R&D financing;

– $k2\downarrow$ — increasing investment, financed by credits loans — increasing enterprises' profit — increasing intramural technology development costs — increasing tax payment amounts (for a given tax rate) — increasing government R&D financing;

– $k3\downarrow$ — increasing inflation — decreasing government R&D financing (real terms).

As the case of tax reduction, the interest rate reduction has an ambiguous impact on the volume of the government R&D financing, because, on the one hand, they may be increased due to revenue and thus the enterprise's tax payments growth and, on the other hand, they may be decreased in real terms due to the fact that the reduction of the official discount rate in the Territory E which determines the interest rates is related to the increasing inflation risks. Generally, it is a paraphrase of the aforementioned Laffer problematics, but only on the dependence of tax base on the interest rate. In this case, the sign and degree of this dependence are determined by the analysis of data for past periods.

Using this logic, further the simulation of the impact of τ and k on the coevolution of the economic and ecological populations in terms of long and short planning horizons (long and short behaviour) is carried out:

– B_1 is the fiscal and monetary regulations of the coevolution in terms of long term planning horizon;

– B_2 is the fiscal and monetary regulations of the coevolution in terms of short term planning horizon.

Experiment B_1 — fiscal and monetary regulations of the coevolution in terms of long term planning horizon

The calculations start with a social discount rate equal to zero. With such rate, the present value of its future revenue is equal to that of the present. This means that, following the population approach he performed calculations allow to take into account the long-term effects of the regulation of economic and ecological populations coevolution, and to serve the interests of future generations. At the same time, the planning horizons of economic entities coincide with the duration of calculation period (50 years).

Basing on these assumptions, the purpose of this experiment is to find those values of the variables (τ and k) at which the objective function (discounted production output) tends to the maximum under the following variables restrictions[10]:

[10] The following values of variables were used in calculation: (1) T_N = 0,01 (2) R&D spending — from 0,76 % GDP (Ukraine, average for 2005–2014) to 2,10 % GDP (The euro region, average for 2005–2014); source: The World Bank. World Development Indicators & Global Development Finance; (3) interest rates — from 17 % (Ukraine, average for 2005–2014) to 5 % (data on Italy for 2005–2014, recent data on other countries is unavailable, but before the financial crisis of 2008–2009, Germany and France had the same rates); source: The World Bank. World Development Indicators & Global Development Finance; (4) total tax rates — from 52,2 % of profit (Ukraine 2015) to 40,6 % of profit (the UN 2015, the rates for other years were similar); source: PwC, World Bank Group, Paying Taxes.

$$\begin{cases} \tau_{\min} < \tau < \tau_{\max} \\ k_{\min} < k < k_{\max} \\ \dfrac{\sum\limits_{i=1}^{N} \dfrac{\widehat{Q}_t^i}{(1+b)^t}}{\sum\limits_{i=1}^{N} \dfrac{\widehat{Q}_{t-1}^i}{(1+b)^{t-1}}} \geq T_N \end{cases}, \qquad (22)$$

$$\sum_{t=1}^{T} \sum_{i=1}^{N} \frac{\widehat{Q}_t^i}{(1+b)^t} \to \max, \qquad (23)$$

where b is the discounting rate; T_N — is minimal required compound annual growth rate of the production output.

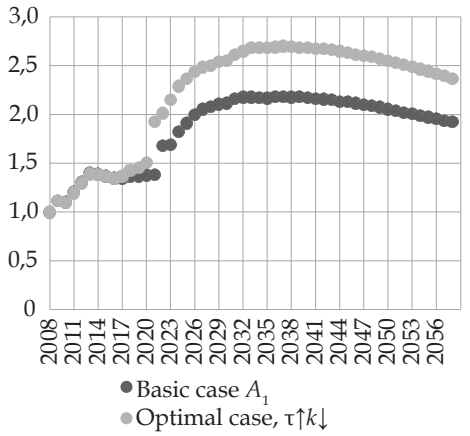

Figure 10. Experiment B_2. Comparative dynamics of production outputs (base index) in the Territory E under «long behaviour»

The results of the optimization calculations on the assumption of «long behaviour» showed that the policy, promoting the economical growth best (Fig. 10), is the cheap money policy, which gives the economic population the best investment access to savings, and high European taxation, which provides the government with the ability to consistently build and maintain a high level of R&D expenditures, thereby contributing into accelerating the development and localization of imported technologies. In fact, such conclusion may be considered expected. After all, in order to achieve high economic growth rates, catching up the advanced economies, it is necessary to gradually build up an innovation friendly institutional environment, which, along with other features, is characterized by cheap money and relatively high taxes, by which the advanced economies maintain their high development level of health care, education, science, culture, etc.

Experiment B_2 — fiscal and monetary regulations of the coevolution in terms of short term planning horizon

In this computational experiment the discounting rate is b = 0,3. With such discounting rate ≈ 80 % of the discounted cost results (Pareto distribution) fall on the first five years of accounting period, and ≈ 20 % only fall on all the other years. This means that, in practice, for the decision-makers, only the first 5 years of the activity do really matter. The planning horizon for economic entities of the given population is limited by the period, usually coinciding with the normal duration of the presidential term. Basically, it is a political (not economic) planning horizon, well reflecting current public life reality in Ukraine, where each central regime change causes a radical change in the strategic course of the state and the dominant rules of «the game». Therefore, nothing, happening beyond this horizon, is so important for making important decisions.

The results of the optimization calculations on the assumption of «short behaviour» showed that there are no optimal values of the variables τ and k exist. That is, any combination of monetary and fiscal policy τ↓k↓; τ↓k↑; τ↑k↓; τ↑k↑ does not provide the increase (compared to the base A_2) in minimum required annual economic growth ($T_N \geq 1$ %). Therefore, under such conditions, the potential of the state economic regulation is levelled off by the politically motivated business investment «myopia», which results, regardless of the government actions, in no hope for acceleration of the innovation economic growth in the Territory E.

However, this does not mean that the developed model has nothing to offer in the situation, well corresponding to the current institutional reality in Ukraine. In this context it is worth recalling that, in

this paper, we proceed not from the usual neo-classical presentation, but from the evolutionary (population) paradigm that links the achieved results to the activity of the entities, generating those results.

If the population of enterprises is viable, then there will be some results, and if the population of enterprises is gradually dying out, sooner or later, the results will disappear too. It follows that the neoclassical entity utility maximization is insufficient (even taking into account the usual constraints on resources, rationality, institutions, etc.). This is just the presupposition of the behaviour of a single entity (person) to model the population.

But in the long-term evolutionary context, the entity itself is not important, but the growing (at least relatively) population of entities is, which also gives the chance to survive to those who adhere to innovation (altruistic, cooperative) behaviour. After all, according to the theory of multilevel (group) selection, the frequency of altruists in a structured population is determined by two factors: the individual selection within subpopulations (groups), which is unfavourable for altruists-cooperators, and the group selection, which is cooperative subpopulations «friendly». Consequently: «Selfishness beats altruism within groups. Altruistic groups beat selfish groups» [16, p. 335].

The computational experiments showed that in terms of the short planning horizon of economic entities, the policy, that is most conducive to the growth of their population, involves a combination of cheap money and low taxes $\tau\downarrow k\downarrow$ (Fig. 11).

However, it is important to point out that such a policy can only be a first step in the long-term economic growth-focused national strategy. In the future, to ensure accelerated development of the Territory *E* through the windows of opportunities, which open for the localization of the European process technologies, it will be necessary to introduce the higher European taxes, only by gradually replacing the short political planning horizon with the long economic one. That is the raise in taxation should follow the formation of new institutional environment, based on the following: the stable rules of economic relations, long enough for the creation and commercialization of new technologies; the high costs of the rent-seeking behaviour and corruption; the government's ability to be a «technocratic» one and to direct the social revenue growth to the healthcare, education, R&D and not to their own needs, to serve the community at large, rather than the officials running the economy or rent-seeking businessmen.

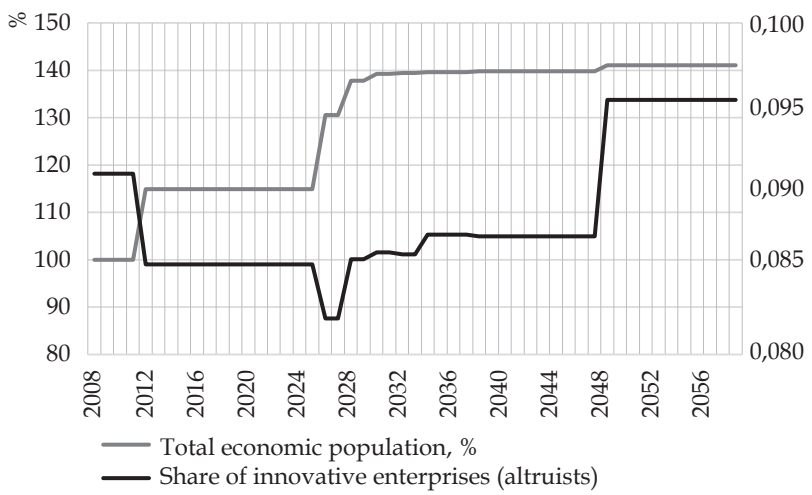

Figure 11. Experiment B_2. The dynamics and structure of the economic population of the Territory E under «short behaviour» with cheap money and low taxes

Conclusions

1. To overcome the consequences of the global financial and economic crisis and to shift to the sustainable economic growth, the developed nations mostly use the monetary policy tools. However, the achieved results, which are far from being great, put a more active use of the alternative fiscal policy tools on the agenda. The developing countries also face the challenge of such a choice, but it is even more difficult, because in the process of interaction with the developed economies, many of them entrenched in the global value chains as auxiliary units specialized in the production of raw materials and low processing degree products. And this, in its turn, imposes additional restrictions on the ability of the successfully solving the economic growth issues.

Therefore, in view of the indicated circumstances, to justify the choice of the best methods of economic processes regulation, which can change for the better the situation between interconnected and interdependent economies, this paper did not use the usual neoclassical methodology, but the evolutionary methodology based on the idea of studying the patterns of co-development (coevolution) of the differentiated economic and ecological populations, which function within the separate territories, under specific labour and natural resources, production technologies and environmental conditions, are lead by special institutions resulting from the «path dependence», etc.

2. It was suggested to present the development patterns of the economic and ecological populations, using the agent based and system dynamics modelling, which simulates the processes of their coevolution. In this model each population is characterized by its original structure of economic entities, defined by the relation of the egoistic enterprises (predisposed to conservative behaviour) to the altruistic enterprises (predisposed to innovation), as well as by specific population and demographic processes. Moreover, the population, specializing in the production of final products with low environmental costs, is characterized by high proportion of altruistic enterprises, when the population, which specializes in the production of intermediate products with high environmental costs, has a high proportion of egoistic enterprises.

It is important to mention that this model is not designed to describe the quantitative economic growth only, but to analyse its evolutionary processes in the form of changes in the initial structure of economic entities (egoistic and altruistic enterprises) which, in turn, determines the change of the population's dominant institutions.

3. The simulation of the coevolution processes of two differentiated economic and ecological populations, connected through GVCs in the production complex «Emerging market — Developed market» («*E* — *D*»), has shown that their spontaneous development can have hard negative impact on the entire system, which is determined by the fact, that the problems of the less developed territory through the supply chains, extend to the other members of the GVC, placed in the safe territory. To avoid such unfavourable developments, fraught with increasing global instability, the two types of regulatory tools — fiscal and monetary tools, which are used at the same time by the government in the Territory *E*, have been considered.

In particular, the following tools were considered:

– fiscal policy — the total tax rate reduction;

– monetary policy — the mean credit rate reduction.

Both tools influence (through different transmission mechanisms) the enterprises' profits, investments, taxes, amounts of government R&D funding and, eventually, the economic growth.

4. The results of the computational experiments have shown that the success of economic regulation fundamentally depends on the peculiarities of the initial state of the institutional management environment.

In the institutional environment with the «transparent» long behaviour and,

accordingly, a long economic planning horizon (at zero social discount rate), the best result in the form of average annual production growth rates of the emergent economies is provided by the cheap money policy (low credit interest rates) combined with the high European taxes. With such planning horizon, the taxation burden reduction is not as important, from the national standpoint, as the provision of high tax revenues, directed to the advanced development of the R&D sector.

In other words, in terms of initially backward innovation system, the enterprises' investment in the production modernization provide lower returns than government R&D investment, allowing the accelerated development and localization of advanced foreign technologies.

A different situation is observed in more realistic short behaviour and, accordingly, short (under 5 years) economic planning horizon (with politically motivated discount rate). In this case, any tax policy (neither low nor high taxes) together with any money (neither cheap nor expensive), to a certain extent loses its significance, as the initially backward innovative system does not allow to quickly get good results, and the long-term benefits of the potential economic growth are not taken into consideration.

5. However, the low taxes (except for the tax on negative externality) and cheap money are important for the gradual development of better innovation system, because, all other things being equal, they create better conditions for the altruistic enterprises, facilitating their investment activities and increasing the probability of meeting the innovative «black swan» [17], which can multiply increase their technical performance and economic efficiency. This will result in the improving economic population's structure by growing share of the economic entities adhering to innovation (altruistic, cooperative) behaviour, and in the increased population's viability. And that, finally, along with the favourable institutional environment of economic activity is essential for the sustainable economic and social development.

Anyway, in the context of the evolutionary economics and following the conducted computational experiments, the fiscal policy in terms of emergent markets retains its regulatory capacity, and therefore requires further reforms in the context of the «new reality» based on the global value chains. However, due to the relatively unbalanced economic populations' structures, the large-scale fast results should not be expected from such actions.

References

1. Stiglitz J., Rashid H. *What's Holding Back the World Economy?* Available at: https://www.project-syndicate.org/commentary/whats-holding-back-the-global-economy-by-joseph-e--stiglitz-and-hamid-rashid-2016-02.

2. Feldstein M. *The Case for Fiscal Stimulus*. Available at: https://www.project-syndicate.org/print/the-case-for-fiscal-stimulus.

3. Frankel J. *Rediscovering Fiscal Policy at the G7*. Available at: https://www.project-syndicate.org/commentary/focus-on-fiscal-policy-at-g7-by-jeffrey-frankel-2016-05.

4. Blanchard O., Leigh D. *Growth Forecast Errors and Fiscal Multipliers*. International Monetary Fund, Research Department, 2013. 42 p. Series IMF Working Paper WP/13/1. Available at: imf.org›external/pubs/ft/wp/2013/wp1301.pdf.

5. Ivanov A. *Krepkii rubl' i deshevye kredity. Naskol'ko deistvenny predlozheniya Sergeya Glaz'eva* [Strong ruble and cheap loans. How effective are the proposals of Sergei Glazyev]. Available at: http://svpressa.ru/economy/article/156619/. (In Russian).

6. Kuhndt M., Tessema F., Herrndorf M. Global value chain governance for resource efficiency building sustainable consumption and production bridges across the global sustainability divides. *Environmental Research, Engineering and Management*, 2008, vol. 3, no. 45, pp. 33–41.

7. Nelson R. R., Winter S. G. *An Evolutionary Theory of Economic Change*. Cambridge MA and London, Harvard University Press, 1982. 437 p.

8. Wiedmann T. A review of recent multi-region input-output models used for consumption-based emission and resource accounting. *Ecological Economics*, 2009, vol. 69, iss. 2, pp. 211–222.

9. Bergh J. C., Hofkes M. W. (eds). *Theory and Implementation of Economic Models for Sustainable Development*. Dordrecht, Kluwer Academic Publishers, 2010. 336 p.

10. Bosetti V., Gerlagh R., Schleicher S. P. (eds). *Modelling Sustainable Development: Transitions to a Sustainable Future*. Cheltenham, UK, Edward Elgar Publ., 2009. 259 p.

11. Gual M. A., Norgaard R. B. Bridging ecological and social systems coevolution: A review and proposal. *Ecological Economics*, 2010, vol. 69, iss. 4, pp. 707–717.

12. Kallis G., Norgaard R. B. Coevolutionary ecological economics. *Ecological Economics*, 2010, vol. 69, iss. 4, pp. 690–699.

13. Perez C. *Technological Revolutions and Financial Capital: The Dynamics of Bubbles and Golden Ages*. Cheltenham, UK and Northampton, MA, Edward Elgar Publishing, 2002. 198 p. (Russ. ed.: Perez C. *Tekhnologicheskie revolyutsii i finansovyi kapital. Dinamika puzyrei i periodov protsvetaniya*. Moscow, Delo Publ., 2011, 232 p.).

14. Becker M. C. (ed.). *Handbook of Organizational Routines*. Cheltenham, UK, Edward Elgar Publishing, 2008. 352 p.

15. Dement'ev V. Catching-up development through the theory of «long-wave» of technological dynamics: «windows of opportunity» aspect in the crisis. *Rossiiskii ekonomicheskii zhurnal = Russian Economic Journal*, 2009, no. 1–2, pp. 34–48. (In Russian).

16. Wilson D. S., Wilson E. O. Rethinking the theoretical foundation of sociobiology. *The Quarterly Review of Biology*, 2007, vol. 82, iss. 4, pp. 327–348.

17. Taleb N. N. *The Black Swan. The Impact of the Highly Improbable.* Random House, 2007. 400 p. (Russ. ed.: Taleb Nassim Nikolas. *Chernyi lebed'. Pod znakom nepredskazuemosti*. Moscow, KoLibri Publ., 2009. 528 p.).

Authors

Valentine P. Vishnevsky **—** Doctor of Economics, Professor, Deputy Director of the Institute of Industrial Economics of the National Academy of Science of Ukraine, Kiev, Ukraine (26 P. Mirnogo St., 01011, Kiev, Ukraine); e-mail: vvishn@mail.ru.

Alexey V. Polovyan **—** Doctor of Economics, Associate Professor, Director of the Institute of Economic Research, Donetsk, Ukraine (77 Universitetskaya St., 283048, Donetsk, Ukraine); e-mail polovyan@yandex.ru.

Информация об авторах

Вишневский Валентин Павлович **—** доктор экономических наук, профессор, заместитель директора по научной работе, Институт экономики промышленности НАН Украины, г. Киев, Украина (01011, г. Киев, ул. П. Мирного, 26); e-mail: vvishn@mail.ru.

Половян Алексей Владимирович **—** доктор экономических наук, доцент, директор Института экономических исследований, г. Донецк, Украина (283048, г. Донецк, ул. Университетская, 77); e-mail polovyan@yandex.ru.

УДК 308.832.23
DOI 10.15826/jtr.2016.2.3.026

Ekaterina N. Nevzorova
Baikal State University, Irkutsk, Russian Federation
Samo Bobek
University of Maribor, Maribor, Slovenija
Anna P. Kireenko
Baikal State University, Irkutsk, Russian Federation
Roman A. Sklyarov
Baikal State University, Irkutsk, Russian Federation

TAX EVASION: THE DISCOURSE AMONG GOVERNMENT, BUSINESS AND SCIENCE COMMUNITY BASED ON BIBLIOMETRIC ANALYSIS

ABSTRACT. This article analyzes the publications relating to the problem of tax evasion. This topic is attractive not only for the academic community, but also for public at whole. The article explores to what extent the scientific publications on tax evasion correspond to practical issues discussed among the stakeholders. We used the electronic database of e-Library as a source of scientific publications on the subject. The principal stakeholders directly dependent on the taxation are the taxpayers and public authorities. We used the electronic database of publications «Kommersant» publishing house and the «Rossiyskaya Gazeta» to reflect issues discussed among the stakeholders. We selected for analyze 301 publications for the period of 2013–2015. The study was conducted by comparing the publication activity by types and period of publications. In the first stage of the study we have done the qualitative content analysis by identification the common themes discussed in hole sample of publications. Then, a quantitative analysis was conducted by comparing the distribution of publications on a particular topic from each source. We used bibliometric analysis method for the quantitative and bibliographic mapping method to visualize the results of research. Calculations were performed using the software QDA Miner v.5.0 module WordStat v.7.1.7. As a result, studies have concluded that the most popular topics of interest for which no changes are: changes in legislation, legislation and increased enforcement. Using the results of the conducted study, we can identify the main similarities and differences between the monitored sources. We can see the special attention to the: Legislation changes, Law enforcement, Entrepreneurship. Marked reduction of interest can be noted regarding to the following topics: International aspects of taxation, Shadow economy, Ownership, property, investment. The growth of interest can be noted in relation to the following topics: Directorship, Article of the Tax Code, Short-lived companies, Arrears and fines. The study revealed a certain disparity between the topics discussed among academic community and stakeholders. The topics discussed in the majority of scientific texts (shadow economy, corruption, the firm one-day, social security contributions), a much rarer can be found in the publication of «Kommersant» and «Rossiyskaya Gazeta» which focuses mainly on matters of legislation. Analysis of the relationships in the texts according to the source and year of publication showed that research topics converge with issues considered by the public authorities. The business community more involved in discussion the legal issues, because the government notion works upon the impression about tax evasion of the business community and academia. Thus, bibliometric text analysis techniques can be used for research, preparation of literature reviews and thematic information retrieval.

KEYWORDS: tax evasion, bibliometrics, bibliometric analysis, bibliometric mapping, content analysis, scientific publications, electronic publications database.

FUNDING. This work was financially supported by the State Task № 26.1348.2014/K to fulfill research work as part of Project 1348 «Influence of shadow economy on the quality of life in Russia and Ukraine: a comparative analysis» (State registration number in FGASI CITaS: 114091140015).

Е. Н. Невзорова
Байкальский государственный университет, г. Иркутск, Россия
Само Бобек
Университет Марибора, Марибор, Словения
А. П. Киреенко
Байкальский государственный университет, г. Иркутск, Россия
Р. А. Скляров
Байкальский государственный университет, г. Иркутск, Россия

УКЛОНЕНИЕ ОТ УПЛАТЫ НАЛОГОВ: БИБЛИОМЕТРИЧЕСКИЙ АНАЛИЗ ТОЧЕК ЗРЕНИЯ ВЛАСТИ, БИЗНЕСА И НАУКИ

АННОТАЦИЯ. Статья посвящена анализу публикаций, касающихся проблемы уклонения от уплаты налогов. Эта тема привлекает пристальное внимание не только научного сообщества. В статье исследуется соответствие проблематики научных работ по уклонению от уплаты налогов практическим вопросам, обсуждаемым заинтересованными лицами. В качестве источника научных публикаций по данной тематике использовалась электронная база e-Library. В круг заинтересованных лиц, напрямую зависящих от правил налогообложения, входят бизнес-сообщество и государственные органы. Для них источниками информации по исследуемой теме являются электронная база публикаций издательского дома «Коммерсантъ» и «Российская газета». Для анализа отобрана 301 публикация за 2013–2015 гг. Изучение соответствия проблематики проводилось путем сравнения публикационной активности в разрезе видов публикаций. На первом этапе исследования был выполнен качественный контент-анализ посредством выявления общих тем, обсуждаемых в публикациях. Затем проводился количественный анализ через сравнение распределения публикаций по конкретной теме из каждого источника. Для количественного анализа и визуализации результатов использовались методы библиометрического анализа и картирования. Расчеты производились с помощью программного продукта QDA Miner v.5.0 модуль WordStat v.7.1.7. В результате исследования были сделаны выводы, что самыми популярными темами, интерес к которым не меняется, являются: изменение законодательства, законотворчество и усиление принуждения. Темы, к которым за рассматриваемый период снизился интерес, касаются международных аспектов налогообложения, теневой деятельности, собственности и инвестиций. Отмечено выраженное возрастание интереса сообщества к фирмам-однодневкам, руководству компаний, а также к вопросам штрафов и пени. Исследование позволило выявить определенное несоответствие тем, обсуждаемых бизнесом и властью, по сравнению с темами научных публикаций. Распространенные в научных публикациях темы (теневая экономика, коррупция, фирмы-однодневки, взносы на социальное страхование), гораздо реже встречаются на ресурсах издательского дома «Коммерсантъ» и в «Российской газете», сосредотачивающих основное внимание на вопросах законотворчества и обсуждения изменений в законодательстве. Анализ взаимосвязей в текстах в соответствии с источниками и годом публикации показал, что темы научных исследований сближаются с проблемами, рассматриваемыми властью, а бизнес-сообщество в большей степени вовлекается обсуждение правовой проблематики, т. е. точка зрения власти во многом определяет обсуждение темы уклонения от налогов бизнес-сообществом, и научными кругами. Таким образом, библиометрические методы анализа текстов могут применяться для проведения научных исследований, составления обзоров литературы и тематического поиска информации.

КЛЮЧЕВЫЕ СЛОВА. Уклонение от уплаты налогов, библиометрия, библиометрический анализ, библиографическое картирование, контент-анализ, научные публикации, электронная база публикаций.

ФИНАНСИРОВАНИЕ. Статья подготовлена при финансовой поддержке государственного задания № 26.1348.2014/К на выполнение работ в сфере научной деятельности в рамках базовой части проекта № 1348 «Влияние теневого сектора экономики на качество жизни населения в России и Украине: сравнительный анализ» (номер госрегистрации в ФГАНУ ЦИТиС 114091140015).

Introduction

Setting research questions. The problem of tax evasion is extremely urgent, because it is one of the largest by the breadth and complexity of manifestation. Tax evasion has a destructive impact not only on the scope of taxation, but in general –on all spheres of society, economy and state. At the same time, considerable scopes of tax evasion are explained by the tolerant attitude of society to such offenses. So we decided to find out just how important is the topic of tax evasion from the state, business and science point of view.

Which aspects of tax evasion are the most popular at the moment? How different from each other are the topics in scientific and journalistic literature on issues related to tax evasion? What are the issues and how often they are discussed on the pages of various publications? What topics which are actively discussed by the press have not yet found their scientific understanding? Elucidation of these issues is also necessary to select the scientific priorities and forecasting of future research.

To answer these questions, we decided to analyze several sources of information which reflect different points of view on relevant aspects of tax evasion. Scientific publications contained in the library system «eLibrary» reflect the views of the scientific community, publications in periodicals, articles in «Rossiyskaya Gazeta» which in our opinion expresses government point of view on the problem of tax evasion and the publications of the «Kommersant» publishing house, which can be considered as reflecting the views of business community.

The methodological basis of this research consisted in the special researching techniques of documentary information flows: for the qualitative research we used the content analysis method and for the quantitative research — we used bibliometric analysis method and bibliographic mapping method as an important objective of the research was to visualize its results. Visualization of analysis results in the form of «maps» will present the problem of tax evasion in a variety of problems related to this phenomenon by using a combination of figures and graphs.

Literature review. Special researching methods of documentary information flows bibliometrics, informetrics, scientometrics, vebmetrics, cybermetrics, documentrics, mediametrics are actively used for selecting research priorities and forecasting the future research. The essence of these methods is in counting, combining, interpretation, comparison of certain elements of information flow, acting on each other in the process of developing scientific field.

As the first works in this field foreign researchers often points to the work of F. Cole. and N. Ealesin (1917) [1], in which they carried out a statistical analysis of literature on comparative anatomy. O. Voverene [2], followed by science historian S. V. Altshuller [3] says that the name of the Russian scholar P. Walden is unfair forgotten, and in 1911 he was the first who used the method of citation analysis to study the contribution of scientists in individual countries in the development of chemistry [4], and thus, should be recognized as the founder of this method, the most commonly used at present time in evaluating the scientific performance. The first attempts of quantitative study of Russian literature flows were made by A. Storch and F. Adelung [5]. They analyzed their own index, which reflects the literature of 1801–1806 gg. according to various parameters. In 1895, the term «Bibliographic Statistics» [6] was introduced for similar works.

In 1969 V. V. Nalimov and Z. M. Mulchenko introduced the term «scientometrics» [7], which later became widespread. It relates to the field of science, science studies, structure, dynamics of scientific activity, the interaction between science and other spheres of material and spiritual life of society, which means, it explores processes and phenomena of scientific activities in the broader context. In 1979, in articles of German authors L. Blackert and S. Siegel [8] and O. Nacke new term «informetrics» was firstly introduced, and it was originally defined as a set of mathematical methods for the study about objects of informational science, the description and analysis of their properties, as well as the

laws in order to optimize these objects when making decisions.

Quantitative research of documentation flow was initially called «statistical bibliography». Then the term «bibliometrics» was introduced, which, according to E. Garfield [9], was first mentioned in the works of P. Otle (1934) and A. Pritchard (1969) [10]. A. Pritchard in his famous article in 1969 defined the bibliometrics as «the application of mathematical and statistical methods in relation to books and other communication media».

The subject of content analysis, or analysis of the content is the content of text arrays and communicative correspondence products. In the national research in tradition content analysis is defined as the quantitative analysis of texts and text arrays for subsequent meaningful interpretation of identified numerical laws[1]. The term content analysis was first used in the late XIX — early XX centuries by American journalists Matthew B., A. Tenney, D. Spiid, D. Uipkins [6; 11].

In modern Russian literature, devoted to the study of texts on economics, bibliometric studies are rare. We may noted the concept of system-innovation bibliometric analysis and mapping of economic literature (SIBAMEL). The Department of Economics of the National Research University — Novosibirsk State University and the Institute of Economics and Industrial Engineering of the Siberian Branch of the Russian Academy of Sciences created and developed this concept SIBAMEL [12].The authors elaborated special techniques and software for the SIBAMEL [13].

The research was based primarily on the analysis of non Russian, and foreign economic literature. The first studies were carried out on the basis of the electronic bibliography EconLit. In the future, the authors began to use data from journal articles JEL issues; Social Science Research Network electronic library (www.ssrn.com); electronic bibliography EconLit. From the Russian sources the flows of new books in all sciences, which went on State Public Scientific Technical Library were analyzed. Among the subject areas to which the authors paid particular attention to we can highlight: the financial economy [14]; regional economy [15]; health economics; agricultural economics [16]; environmental economics; energy economy; government regulation [17]; entrepreneurship; accounting; marketing; innovation and others.

A detailed analysis of data about the use of bibliometric methods in the Russian scientific literature cited in the study of I. Yu. Popova, let him made a conclusion that bibliometrics in the overwhelming majority of Russian studies is used for comparative evaluation of research performance of countries, organizations, publications, and sometimes individual scientific fields and very few studies in which the focus is on the identification of new areas of research, especially at the intersections of different subject areas [18].

Tax evasion is precisely located at the intersection of domains, at the crossroads of economic, legal and even political trials.

Methodology

Bibliometric mapping. Pritchard (1969) [10] explained bibliometrics as «the application of mathematical and statistical methods to books and other media of communication». Later, Hawkins (2001) [19] defined bibliometrics as «the quantitative analysis of the bibliographic features of a body of literature». Within a bibliometric analysis, mainly books, monographs, reports, theses, and papers in serials and periodicals are analyzed; however papers which are published in journals seem to be the most suitable studies for bibliometric research (Glänzel (2003) [20]). For analyzing research literature production (to identify patterns in the literature) bibliometric analysis uses quantitative methods (De Bellis (2009) [21]). Moreover, Garfield (2006) [22] is convinced that with bibliometric analysis, we can also examine the history and structure of a field, the flow of information into a field, the growth of the literature, the patterns of collaboration amongst scientists, the impact of journals, and the long-term citation impact of a work.

Bibliometric mapping is used with the purpose to visually represent scien-

[1] Content analysis / Wikipedia. URL: http://ru.wikipedia.org/wiki/ (18.10.2016).

tific publications based on bibliographic data. With bibliometric mapping we can produce different bibliometric maps which provide an overview of the structure of the scientific publications in a specific research field. One of the most popular ways to use bibliometric mapping is to identify specific research areas within a selected science field, with the purpose of getting a view of the size of the field and relevant subfields, and how they relate to each other (van Eck (2011) [23]). In this way, we can understand the broader aspects of the particular research field (Börner, et al. (2012) [24], (2012) [25]). Visualization of Similarities (VOS) is the new mapping technique, which has been used to create bibliometric maps in various studies (van Eck and Waltman (2007) [26]; van Eck et al. (2010) [27]; Waaijer et al. (2011) [28]). The VOS mapping technique has been implemented in the computer program called VOS viewer (Leiden University, Netherlands) (van Eck and Waltman (2013) [29]). The VOS viewer software has visualization capabilities, therefore bibliometric maps can be displayed in various different ways and consequently emphasize on different aspects of a map. Additionally, VOS viewer allows using different colors to indicate clusters of objects. Moreover, the VOS viewer software also merges terms that may be closely related to term clusters denoted by the same cluster color (van Eck (2011) [23]). According to van Eck, the proximity of the terms can be interpreted as an indication of their relatedness. VOS viewer Version 1.6.0 additionally enables the creation of maps in which terms are colored according to the year of the term's appearance in the scientific literature.

Data set and its analysis. Issues, which attract attention not only of academic community, but also of public at whole, are topics in the field of social sciences. One of such debated topics is taxes, and issues related to tax payment, including tax evasion. In connection with this, the research question of this paper is the following: to what extent the problems of academic articles on this subject correspond to the practical issues which are discussed by stakeholders?

Among the stakeholders we include a circle of subjects who directly depend on the established rules of taxation: taxpayers and public authorities. This article studies issues of correspondence by means of comparison, using the data on publication activities by types of publications, both at the level of qualitative and quantitative analysis. Qualitative analysis here is the identification of common topics discussed in the academic and non-academic publications. Quantitative analysis here is a comparison between the percentage of academic and non-academic publications, which discuss a particular topic, at the total number of publications of this type.

In this research we carry out a comparison of the discourse by the business community, government agencies, and academia. For this purpose, we identify content and frequency of the main topics discussed in the texts from three sources: PH Kommersant (business discourse), Rossiyskaya Gazeta (the discourse of authorities), and eLibrary (discourse of the scientific community). Period of study is 2013–2015.

As an object of the research we selected all the texts in the considered period which contained keywords «evasion, payment, taxes» (including the possibility of changing keywords according to the rules of Russian language). Text characteristics are presented in table 1.

For the analysis of texts we used the program *QDA Miner v.5.0* with module

Table 1

Sample structure by the source and date of publication

Source	Absolute values				%			
	2013	2014	2015	Total, all years	2013	2014	2015	Total, all years
eLibrary	13	16	19	48	11	15	24	16
Kommersant	50	40	30	120	44	37	38	40
Rossiyskaya Gazeta (RG)	51	52	30	133	45	48	38	44
Total all sources	114	108	79	301	100	100	100	100

WordStat v.7.1.7 which has been developed by Provalis Research (Montreal).

In this study we use an approach that combines elements of quantitative and qualitative analysis of texts, partly we follow the methodology described by A. Oleynik [30].

In order to bring the text to a uniform manner, at the preliminary stage of our investigation the initial information has been processed, thus the analysis used only texts, headers, and headers of graphics from the text; i.e. such attributes as date of publication, the author of the publication, graphic objects (tables, figures and diagrams) have been removed.

In the first phase of the research we compiled the dictionary of categories, which included words, which occurred in 10 % and more texts. Words that are most frequently used, but have the least significance (for example, they, do, is) were exclude from the content analysis. Also keywords for search («evasion*», «*payment*», «tax*») were excluded from the content analysis (where the * replaces any character, and designation «---» refers for word forms). The dictionary includes 133 categories. Characteristics of the texts and the dictionary are given in table 2.

The second stage was implemented by extraction of the text's topics. Extraction of topics was carried out by applying the method of factor analysis. Module WordStat allows using following units for the extraction of topics: document (i.e., all the texts used in the analysis); paragraph; sentence.

For the analysis it can be taken as variables: words or set phrases, or categories defined by researcher.

Factors (latent variables) are recoverable topics which are identified basing on the values of the variables (frequency of variables usage) in the unit of analysis.

Module *WordStat* can extract topics in two possible ways:

– without usage of the dictionary categories (thereby words are extracted in such forms as they are used in the texts; as well set phrases can be extracted);

– with usage of dictionary categories (which are defined by researcher).

Table 2

Characteristics of the texts and the categorization dictionary

Index	Indicator
Collection statistics	
Total number of cases	301
Total number of paragraphs	5 682
Total number of sentences	15 549
Total number of words (token)	276 996
Total number of word forms (type)	28 516
Type/Token Ratio	0,103
Total words excluded	102 249
Percentage of words excluded, %	36,9
Words per sentence	17,8
Words per paragraph	48,7
Words per non-empty case	920
Dictionary coverage, %	
Percentage of all words	16,6
with excluded words	53,5
Percentage of words not excluded	26,3
Percentage of sentences	80,5
Percentage of paragraphs	85,2
Percentage of cases	100,0

According to the rules of implementing factor analysis, the obligatory condition is the following quantitative restriction: the number of observations should not be less doubled number of variables. In our research the number of analyzed texts is equal to 301; that's why the number of variables (number of words / categories) should be less than 150. Thus the problem of extracting topics is linked with possibility of lemmatization for the language used in the texts. Such option is absent for the Russian language in this version of WordStat, so the ability of inflexion is achieved by specifying the categories manually. Due to these limitations, topics extracted with the option «without usage of the dictionary categories» are used in our content analysis not for directly quantitative analysis of texts, but as a reference that is taken into account when filling dictionary categories.

Owing to the fact that we identify the dominant topics of publications in all texts selected for analysis, so we extract topics at the document level (not at the level of smaller segments of the text, such as paragraphs or sentences).

WordStat offers the following options: to extract 3 topics, or 8, or 13, or 18, or 23, or 28 (we did not consider here options with more numbers of topics). Trying to get the maximum number of topics which contain meaningful idea, we chose option «23 topics». Thus, 23 topics have been extracted using the document as the unit of analysis, the total percentage of variance explained — 48,6 %. The last of the topics is expressed by a single word — category named «AUTHORIT*». Criterion for determining the number of factors is Kaiser criteria (to drop all components with eigenvalues under 1.0).

Thus, the result of extraction (the listed topics) reflects joint occurrence of words in all analyzed documents, where «joint occurrence» means within one document. Studying the keyword list is of interest in terms of understanding issues which are being most frequently discussed in the context of tax evasion in the Russian sources.

The next step was carried out as a qualitative analysis of the extracted keywords to identify the meaning of each extracted topic. It was found that extracted topics 2 «CRIM*; FELON*» and 7 «SLEDKOM; LTD» are linked by a joint meaning, «Law enforcement». Similarly, topics 14 «DECLAR*; VAT» and 15 «COST*» are connected by the joint keyword «VAT». Topics 21 «PARTNER*; COMMER*» and 22 «BUSINESS*» are also linked by a joint meaning «Business management, entrepreneurial activity». Topic 23 «AUTHORIT*» was excluded from further analysis because it was formulated in one word, that is, the context of its use was not specified. These subjects were grouped according to joint meaning, so the 19 topics are analyzed further.

The final coding were carried out in the following way: the code was been assigned to the minimal segment of text. To do this, it has been made extraction of stable statements from entire list of keywords.

In order to assess the agreement of coding used the kappa coefficient of Cohen, which is a statistical measure of agreement between coders (in this case — the agreement between the different approaches to coding).

Cohen's kappa measures the agreement between two raters both classify N items into C mutually exclusive categories.

The equation for κ is:

$$k = \frac{p_o - p_e}{1 - p_e} = 1 - \frac{1 - p_o}{1 - p_e},$$

where p_o is the relative observed agreement between raters; and p_e is the hypothetical probability of chance agreement, which uses the observed data to calculate the probabilities what each observer randomly says each category.

If the raters are in complete agreement then $k = 1$.

If there is no agreement between the raters other than one, that would be expected by chance (as given by p_e), $k \leq 0$.

There isn't clear-cut agreement on what constitutes high or low levels of agreement based on Cohen's kappa, common, but not always so useful set of criteria is: less than 0 % no agreement, 0–20 % poor, 20–40 % fair, 40–60 % moderate, 60–80 % good, 80% or higher very good.

According to the information received, $p_o = 75$ %, $p_e = 44$ %, thus, $k = 55$ % (moderate level of agreement).

Results

Qualitative analysis. Using the results of the conducted content analysis, we can identify the main similarities and differences between the monitored sources.

The first source RG is an official publication — state documents come into force after publishing in it. At the same time, it also contains news, reports and interviews of government officials, as well as competent comments on documents. Speaking of tax evasion, RG reveals itself, trying to highlight the diversity of the problem from all possible angles. Anti-offhores economics and making of various laws contributing to this are very relevant topics for the RG. Very important topic, which is often illuminated in the RG is the punishment for tax evasion.

The second source is the Publishing House Kommersant. By category of

news, reports and articles, it is similar to the RG, but has one major difference in the form of a more in-depth view in the business sphere on taxation, as well as international tax evasion. Also, this source provides materials on measures to counter tax evasion in the business. For Kommersant journalists the Russian and the international tax control is very topical theme. Especially when it comes to «break the bank» sums.

The third source which was analyzed is the electronic library (eLibrary). Materials from this source mostly have scientific nature, abundant number of scientific terms, charts and economic indicators. Scientists publish their works in this source mainly emphasize its focus on such topics as tax control, tax system, tax competition and the shadow economy. For example, one of the authors writes about unfair tax competition as a factor contributing to tax evasion. He analyzes the impact of interstate tax competition on financial flows in the world and identifies main negative effects of tax competition. He specifies that a high level of tax burden leads to the shadow economy, and encourages taxpayers to move their business in the most favorable from a tax point of view jurisdiction. He lights problem of poorly developed international cooperation in the fight against tax crimes and offenses.

Content analysis revealed a number of publications which were most often considered by the media and by scientific community.

Most often, in connection with the tax evasion, the topic of changes in tax legislation is considered. In this context, the most common suggestions are to strengthen the responsibility for the illegal tax optimization. For this purpose, for example, the Tax and Criminal Codes changes are proposed to clarify the concept of unjustified tax benefit and to toughen the penalties for its receipt, including the confiscation of property.

Also the company's proposals to harmonize their tax optimization schemes with the Federal Tax Service (FTS) are described. It is assumed that each year before the December 1, organization must assert processes with agency for the preparation of fiscal benefits for the next year.

This issue also includes a discussion of draft laws and legislative activities related to tax evasion. For example, a discussion about anti-offshores package of laws that have been prepared and submitted to the State Duma by the Federation Council members, headed by the Chamber Chairman Valentina Matvienko. The starting point in the creation of anti-offshore measures was a report from the Accounting Chamber, which reported that the customs office fixed the foreign trade operations with low-tax zones in the amount of $ 329 billion. Using offshore companies more than 40 % of foreign trade turnover of the country was carried, over the past two decades from 800 billion to $ 1 trillion were derived from Russia to offshores. This became the reason for the development of measures which would reduce the outflow of capital from the country and prevent the erosion of the tax base.

Another frequently discussed topic is the work of law enforcement and judicial authorities in preventing tax evasion. Media clearly describes the conduct of search and seizure of documents in the framework of tax evasion. The interest of the press to the operational activities of law enforcement agencies in the fight against tax evasion is quite understandable. Such events always look very impressive. For example, searches in a criminal proceeding on the fact of tax evasion, amounting to more than 380 million rubles in National Reserve Bank. In order to identify persons involved in the evasion of taxes, main office of the bank in Moscow and buildings of affiliated companies were searched, all documentation of the bank's activities was withdrawn. A separate section of this issue is devoted to the action of the Investigative Committee of Russia. For example, the description of the criminal proceeding against the CEO of the Galich distillery «KOSTROMAHLEBPROM» on suspicion of tax offenses amounting to

over 56 million rubles. Press reported at the same time that all assets were derived virtually from the enterprise, goods are not in stock, so the Investigative Committee of Russia initiated two criminal proceedings under articles «evasion of taxes and duties with the organization on a large scale» and «concealment of money» to the director of the company, by means of which the collection of taxes should be done.

However, when the brightest stages consisting of searches and arrests ends, interest in the investigation of such proceedings in the press is lost due to the extremely low percentage of criminal liability for tax evasion. Information about actual punishment of specific individuals is never highlighted neither by the media nor by the law enforcement agencies.

An interesting section of this topic is the discussion on the actions of experts and expertise in relation to tax proceedings. The source of information for law enforcement agencies may be represented by all banks that are engaged in cashing funds, audit companies which accumulate data on violations and customer documents. Often the source of information on fraud are owners or employees of the company. In the situation of a corporate conflict they go to law enforcement agencies, and talk about crimes in the organization. Also, companies often respond to a request of law enforcement agencies for documents, and not always even analyze the validity of the requirements to provide documents.

The third popular topic is the topic about international taxation, offshore, and optimization of tax payments. A striking example is the article about the Russian offshore companies in Seychelles. After the escape of Russian business from the British Virgin Islands, as well as Belize, Seychelles has become one of the most popular jurisdictions for the registration of so-called non-transparent shareholders. These are companies that are «opaque» shareholders of other companies in jurisdictions such as Cyprus. It is a practice, when, instead of individuals shareholders indicate Seychelles companies.

In addition, Seychelles is one of the «favorite» jurisdictions of private consultants and financiers providing consulting services outside the territory of Russia. These companies are often used for property registration. For example, a mansion in the center of Moscow may be registered as an offshore company. If the Seychelles really begin the exchange of tax information with Russia in 2017, the domestic interested individuals will either have to go back to Russia, or to search for other «convenient» jurisdiction, which Russian Finance Ministry does not consider as an offshore.

We can note the issue of the shadow economy and fighting shadow activity as a fairly common problem. For media there persist questions like: why we do not like to pay by checks, and salary is put into envelopes. The materials devoted to this topic have scientific research with statistics and research methodology. For example, the publication of the report about sociological monitors of RANEPA (Russian Presidential Academy of National Economy and Public Administration). The results of the survey of 1,600 respondents conducted in 20 regions of the Russian Federation show that currently every ninth respondent (11,9 %) is occupied only in the shadow labor market. State authorities do not know about his work and earnings. In general, the proportion of the working population, which uses shadow employment schemes — 41 %. That's about 30 million economically active citizens of Russia.

The theme of evasion of social (insurance) premiums is not less important. In the framework of the topic the huge debts to non-budgetary funds are being discussed. Insurance premiums after the abolition of single social tax in 2010 were excluded from the scope of criminal legal regulation. For debts to non-budgetary funds the employer would face only administrative fines, depending on the amount of arrears. In 2012–2014, Russian insurers hadn't paid to the pension fund more than 100 billion rubles. Nearly two billion rubles — the amount of arrears for the same period through the Social Insurance Fund.

The stricter legislation will not be effective while the current rate of insurance premiums exist, experts believe. While the size of the standard payment to FSS, FIU and HIF would be about 30 per cent of the wage bill, entrepreneurs do not give up the «gray» wages. Even employers who pay the «white» salary and are faced with economic difficulties, can not always find the money for payroll taxes.

Banks actions are also one of the most frequently discussed topics. Articles on banking topics discuss banks' participation in the activities of offshore companies and ephemeral firms and issues about bank employees who sell information about their customers.

The topic of tax incentives is also very popular. In this regard, we consider two opposing points of view. Business point of view is led to expanding the list of benefits and increasing their size. And the point of view of the State was announced recently, by the Head of the Ministry of Finance Anton Siluanov. According to the Ministry of Finance, it is necessary not only to talk about granting new benefits, but also to abolish the existing privileges, which are not used for stimulating economy and are ineffective. For this an interagency working group of the Accounts Chamber of the Ministry of Finance, the Federal Tax Service, Federal Customs Service, Ministry of Economic Development, the RSPP and «SUPPORT of Russia» is formed for the analysis of the effectiveness of tax breaks. Efficiency benefits will be evaluated through the analysis of economic indicators based on the methodology, which is now developed by the Ministry of Economic Development. Benefits of having a social orientation (such as benefits for the Heroes of Russia or organizations that employ disabled), removed behind the scope of this analysis.

For all other benefits so-called «benefits passport» would be created. It allows you to assess their economic feasibility. Federal and regional benefits would be analyzed.

Practice has shown that tax incentives are also used for tax evasion. Firstly, the overwhelming majority of organizations which have tax incentives use them to hide profits from commercial transactions, which often do not comply with their regulations and subject to preferences, type of activity. Secondly, officials of preferential organizations use the funds and property of these organizations for their own gain. Thirdly, organizations with benefits are used by other companies in the schemes of minimizing tax evasion.

Another often discussed topic is the topic of struggle with ephemeral firms. Publications on the given issue reflects the tendency to tighten the fight with any means of tax evasion. Therefore, many entrepreneurs now have to rethink their way of doing business, to close the companies, in which is impossible to remedy the situation and to move to a new, more secure way of doing business. There is a definite relation between the theme of ephemeral firms and the problem of VAT declaration. For example, fraudulent VAT refund schemes are carried out, usually with the help of ephemeral firms. However, the system of analysis of declarations introduced in 2015 in conjunction with data books of purchases and sales of books, as well as a comparison of the data of buyers and sellers significantly limits the potential for abusing.

Quantity analysis

Coding Frequencies. Statistics of topics mentioned in the text is given in the table 3. It should be noted that the number of words relating to each code is depends on designated coding rules (is it search for a particular word or phrase, is it search for a particular word or phrase, is encoded segment sentence or paragraph).

We can see the special attention to the topics discussed in more than ¾ of texts (following list is descending by decreasing of coding frequency), see. table 3:

– 19 Entrepreneurship, business management, profit.

– 01 Legislation changes.

– 02 Law enforcement.

– 16 Registration, employment and income.

– 04 Directorship.

– 08 Banking information.

Table 3

Frequencies of the topics

Code	Given for the topic	Quantity of codes	Share of codes in total quantity, %	Quantity of Cases, were this code occurs	Share of cases, were this code occurs in total quantity, %	Quantity of coded words	Share of coded words in the topic in total quantity of words, %
01	Legislation changes	3047	15,1	274	91,0	155000	54,2
02	Law enforcement	2805	13,9	268	89,0	131799	46,1
03	International aspects of taxation	1808	9,0	204	67,8	88069	30,8
04	Directorship	1439	7,1	245	81,4	78980	27,6
05	Shadow economy	475	2,4	141	46,8	21843	7,6
06	Lawmaking	416	2,1	124	41,2	18896	6,6
07	Social security contributions	774	3,8	129	42,9	40889	14,3
08	Banking information	1624	8,0	245	81,4	82982	29,0
09	Monitoring	728	3,6	156	51,8	33687	11,8
10	Tax allowance	260	1,3	82	27,2	12698	4,4
11	Article of the Tax Code	507	2,5	102	33,9	16835	5,9
12	Short-lived companies	100	0,5	51	16,9	5010	1,8
13	Value-added tax	424	2,1	113	37,5	19678	6,9
14	Expert examination	241	1,2	124	41,2	10021	3,5
15	Ownership, property, assets, capital, investment	814	4,0	183	60,8	42810	15,0
16	Registration, employment and income	1630	8,1	258	85,7	84825	29,7
17	Corruption	84	0,4	45	15,0	3859	1,4
18	Arrears and fines	315	1,6	120	39,9	15859	5,5
19	Entrepreneurship, business management, profit	2693	13,3	283	94,0	130476	45,7

Next, we can note some trends: the dynamics of frequencies for certain topics. Dynamics of topic frequencies (for certain topics) is presented at the Fig. 1–2. One can mark out a range of topics, which became less interesting for the years analyzed, or on the contrary, other became more interesting for community. Topics which frequency has no clear trend are the following: Legislation changes, Law enforcement, Lawmaking, Social security contributions, Banking information, Monitoring, Tax allowance, Value-added tax, Registration, Employment and Income, Corruption, Entrepreneurship, Business management, Profit.

Marked reduction of interest can be noted regarding to the following topics (Fig. 1): International aspects of taxation, Shadow economy, Expert examination, Ownership, property, assets, capital, investment.

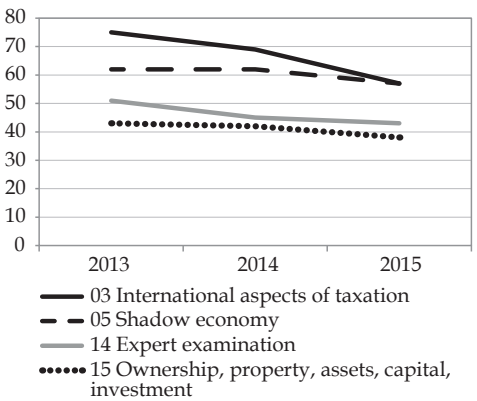

Figure 1. Dynamics of topic frequences (topics which became less interesting)

The interest to the topic «03 International aspects of taxation» decreased after 2013 largely due to the new political course of the Russian Federation taken after the reunification of the Crimea with Russia. The topic «15 Ownership, prop-

erty, assets, capital, investment» has also been linked with international interaction in the field of taxation.

The growth of interest can be noted in relation to the following topics (Fig. 2): Directorship, Article of the Tax Code, Short-lived companies, Arrears and fines.

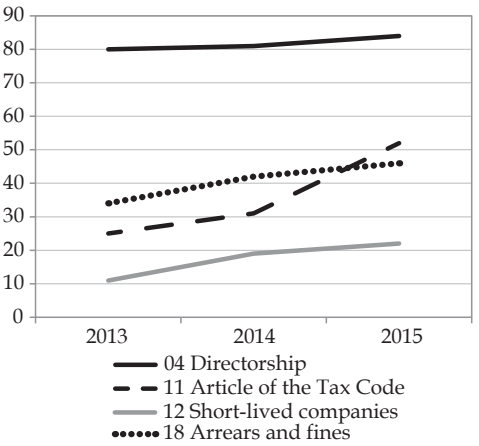

Figure 2. Dynamics of topic frequences (topics which became more interesting)

A notable increase on frequency of the codes «11 Article of the Tax Code», «12 Short-lived companies», «18 Arrears and fines» is associated with the tightening of law enforcement practices in this field.

Codes Co-occurrences. In order to analyze codes' co-occurrences, we use information about the proximity or the co-occurrence of codes within documents to investigate probable relationships among them and similarities among cases. This information allows implementing cluster analysis.

We implemented cauterization of the codes by usage of the data on similarity matrix. The result is presented in the form of a dendrogram (here encoded segments can overlap each other) (Fig. 3). The vertical axis is made up of the codes, and the horizontal axis represents the clusters formed at each step of the clustering procedure.

All proximity values calculated on all included items (codes) are represented by the concept map (2D) (Fig. 4). These maps allow detecting meaningful dimensions that may explain observed similarities between items. Each sphere depicts a code; the distances between pairs of spheres indicate how likely these codes tend to appear together. Size of the sphere represents number of times this code has been used (count). On the figure can be seen that the topics having joint issues for discussion, it is 01, «Legislation changes» and 02 «Law enforcement»; 04 «Directorship» and 19 «Entrepreneurship, business management, profit»; 03 «International aspects of taxation» and 08 «Banking information».

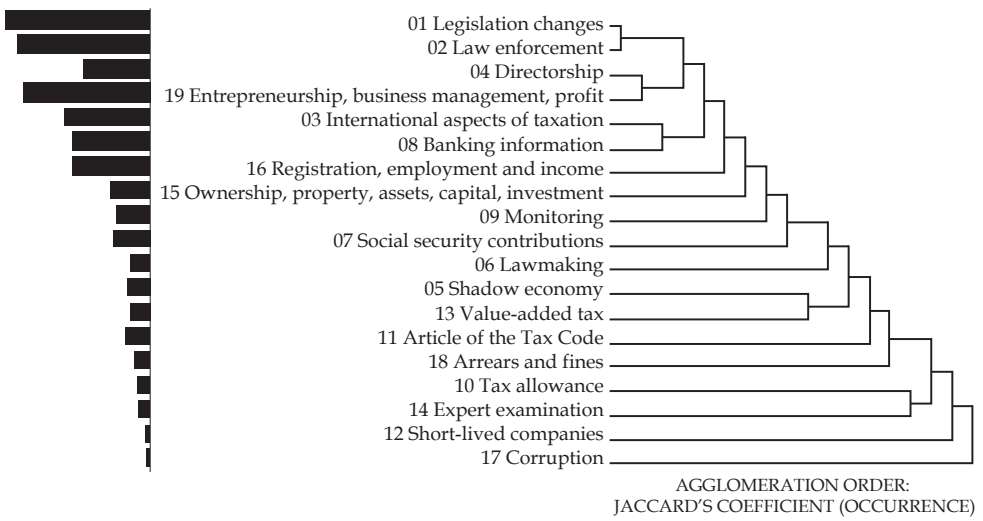

Figure 3. Dendrogram by codes

Coding by Variables. Analysis according to variables allows investigating the relationship between codes assigned to cases defined by values of a variable. We analyze each variable (SOURSE, YEAR) and for combination of these variables such measure as Code Occurrence — the number of cases where this code appears at least one time. The most representative results are shown in the following table 4.

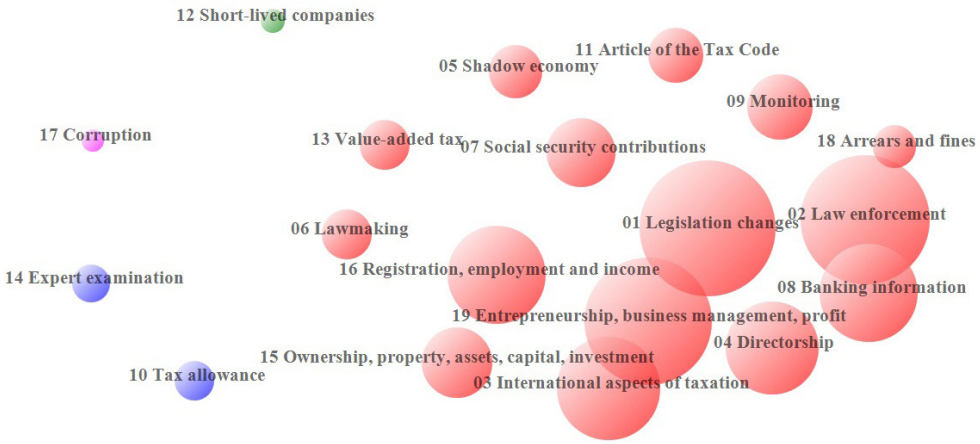

Figure 4. 2D Concept Map

Table 4

Code occurrence

Code	Given for the topic	All years		All sources			RG			Kommersant			ELIB		
		ELIB	Kommersant	RG	2013	2014	2015	2013	2014	2015	2013	2014	2015	2013	2014	2015
1	Legislation changes															
2	Law enforcement															
3	International aspects of taxation															
4	Directorship															
5	Shadow economy															
6	Lawmaking															
7	Social security contributions															
8	Banking information															
9	Monitoring															
10	Tax allowance															
11	Article of the Tax Code															
12	Short-lived companies															
13	Value-added tax															
14	Expert examination															
15	Ownership, property, assets, capital, investment															
16	Registration, employment and income															
17	Corruption															
18	Arrears and fines															

Note Minimum value (0 %) Average value (50 %) Maximum value (100 %)

Codes «06 Lawmaking» and «14 Expert examination» have notably higher frequency at the source «Kommersant PH» and «Rossiyskaya Gazeta», and we believe that it is due to the target audience specifics of these sources.

At the same time topics «05 Shadow economy», «07 Social security contributions», «12 Short-lived companies», «16 Corruption» get more coverage in academic articles as compared with other resources; this can not be associated solely with the language features of academic texts. We believe that the reasons are the following. Compared to academic publishers, source RG has less freedom of publications concerning these topics. Simultaneously, source Kommersant needs of lessening the negative attitude of readers regarding these topics, what is achieved by «reticence» of data on these unabiding phenomena.

Heatmap represents relations between code frequencies and variables. Codes occuring frequently have bright color, whereas if the code is not used often, its cell has a dark color (Fig. 5).

For heatmap plot clustering analysis are performed on the cross tabulation tables.

The similarity index (computed for two codes and used for clustering) measures the similarity of their distribution by variables (e.g., «01 Legislation changes» and «02 Law enforcement» for Elib).

Analogous, two variables will be considered near to each other if the distributions of codes in those two groups are similar.

The correspondence analysis graphically represents the relation between assigned codes and subgroups of an independent variable (it is based on usage of the frequency data). The results are presented by a three-dimensional map (Fig. 6).

Our correspondence analysis is implemented by dividing the sample in compliance with combined variables (each of them are combination of two initial vari-

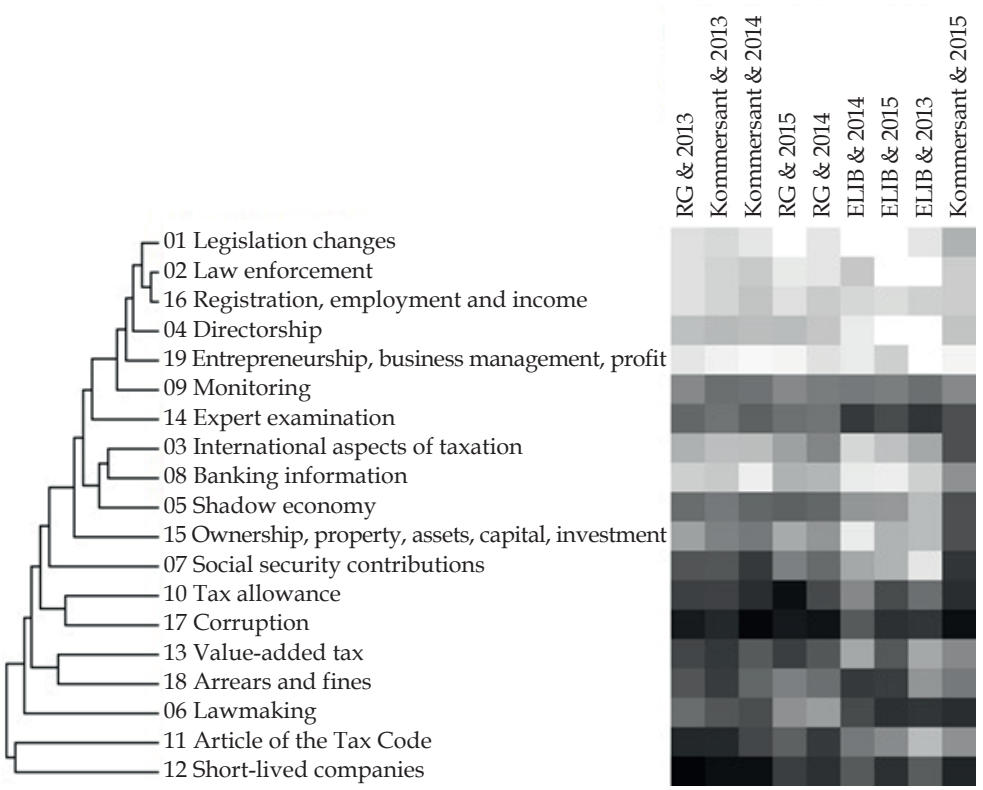

Figure 5. Heatmap

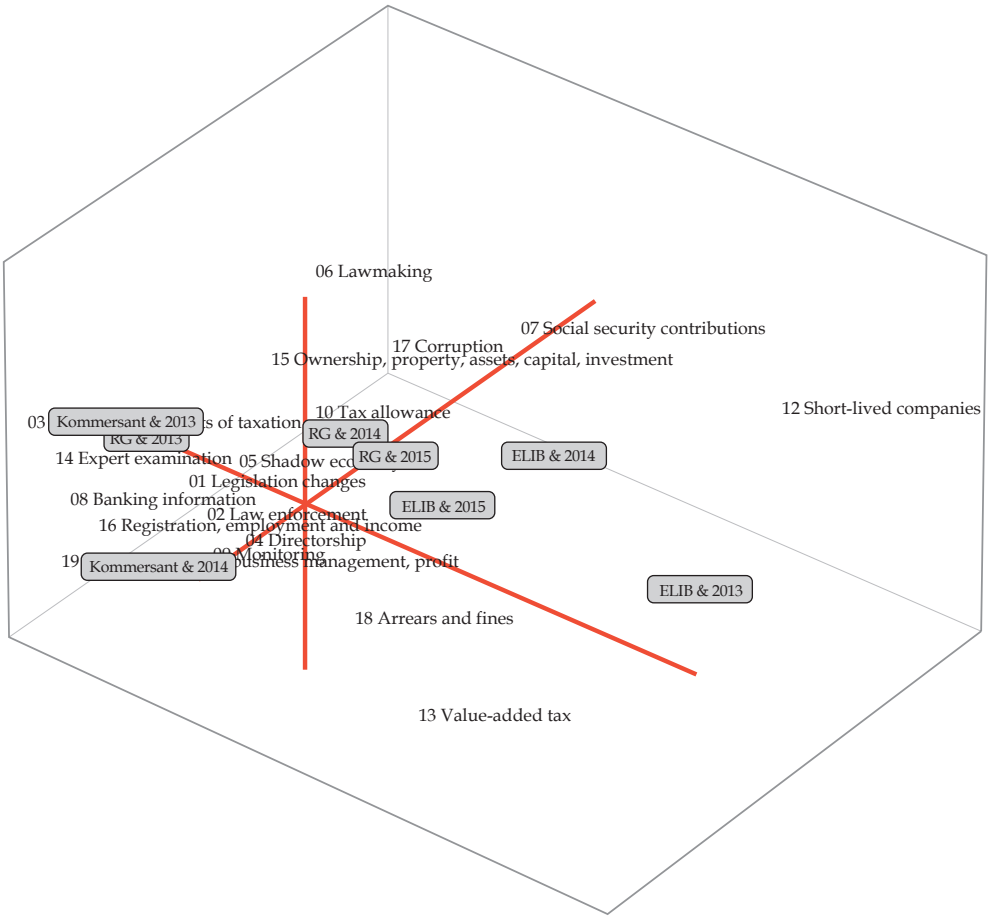

Figure 6. Correspondence map

ables: SOURSE and YEAR), here are denoted as «cohort»[2].

Here data are depicted according to the following information:

1. Similarity of the code distribution among certain cohort to the total distribution of all codes within cohorts.

2. Similarity of the code distribution between cohorts.

3. Similarity of the codes.

Relationship among codes is following:

1. The more similar the distribution of a code among cohorts is to the total distribution of all codes within cohorts, the closer it will be to the origin. Codes which are depicted far from point of origin have singular distributions (such as code «12 Short-lived companies» in our analysis).

2. If two codes have similar distributions among cohorts, their points in the correspondence analysis plot will be close together (such as codes «01 Legislation changes» and «02 Law enforcement»).

Relationship among cohorts:

1. The more distribution of a code for a cohort is, compared with the distribution of these codes for the entire sample; the farther this cohort will be from the point of origin (such as RG in comparison with Elib).

2. If two cohorts have similar distribution of a code, they will be depicted near each other (such as RG&2014 and RG&2015).

[2] Cohort — agenerationalgroup as defined in demographics,statistics, or marketresearch (http://www.thefreedictionary.com/cohort)

Relationship between codes and cohorts:

1. The distance between codes and cohorts has no meaning for interpretation.

2. The angle between this code point and a cohort's point from the origin is meaningful:

–an acute angle indicates that the two characteristics are correlated (such as «04 Directorship» and «16 Registration, employment and income»);

– an obtuse angle indicates that the two characteristics are negatively correlated (such as «17 Corruption» and «18 Arrears and fines»).

Analysing the correspondence map, it can be noticed that source RG moves around the origin of coordinates, source Elib moves towards the center, and source Kommersant leaves out to the periphery during considered years, and we can give the following interpretation for this: academic topics become closer to issues considered by the authorities; and the language of business community is considering more legal issues («13 Value-added tax», «18 Arrears and fines», «11 Articles of the Tax Code»).

Results and discussion

That result of correspondence analysis has research significance. As a result, studies have concluded that the most popular topics of interest for which no changes are: changes in legislation, legislation and increased enforcement. Using the results of the conducted study, we can identify the main similarities and differences between the monitored sources. We can see the special attention to the: Legislation changes, Law enforcement, Entrepreneurship. Marked reduction of interest can be noted regarding to the following topics: International aspects of taxation, Shadow economy, Ownership, property, investment. The growth of interest can be noted in relation to the following topics: Directorship, Article of the Tax Code, Short-lived companies, Arrears and fines. The study revealed a certain disparity between the topics discussed among academic community and stakeholders. At the beginning of our study we represented characteristics of our sample; its general structure is as follows: 44 % of cases are the texts of source RG, 40 % — «Kommersant», and 16 % — Elibrary. We would assumed that the discourse of the source RG and «Kommersant» will have approximately equal influence on the results of the correspondence analysis, and both of these sources will be approximately equidistant from the origin of coordinates. However, the actual results show that the origin of coordinates is surrounded by graphical representations of a source RG for different years, i.e. discourse of all analyzed sources largely coincides with the source RG discourse for 2014 and 2015. At the same time, the discussion topics at the source «Kommersant» is not typical for all texts. Thus the analysis of compliance indicate that power is largely rhetoric is the dominant theme in the description of tax evasion and business circles and the scientific community. At the same time, the discussion topics at the source «Kommersant» is not typical for all texts. Thus the correspondence analysis indicates that rhetoric of authority is largely the dominant in description of tax evasion, both for business community and for academic circles.

References

1. Cole F. J., Eales N. B. The history of comparative anatomy. Part 1. A statistical analysis of the literature. *ScienceProgress*, 1917, vol. 11, no. 10, pp. 1229–1234.

2. Voverene O. Bibliometrics: a structural part of computer science methodologies. *Nauchno-Tekhnicheskaya Informatsiya. Seriya 1, Organizatsiya i metodika informatsionnoi raboty* [Scientific and Technical Information. Series 1, Organization and methods of informational work]. Moscow, Russian Institute for Scientific and Technical Information (VINITI RAS) Publ., 1985, no. 7, pp. 1–5. (In Russian).

3. Al'tshuller S. V. Valden P. I. Researching links language. *Priroda = Nature*, 1969, no. 8, p. 119. (In Russian).

4. Val'den P. I. The development of chemistry in Russia. *Dnevnik Vtorogo mendeleevskogo s"ezda po obshchei i prikladnoi khimii i fizike. Saint Petersburg, 21–28 dekabrya 1911 g.* [The Diary of

Second Mendeleev Congress on General and Applied Chemistry and Physics. Saint Petersburg, December 21–28, 1911].Saint Petersburg, 2011, no. 1, pp. 124–141. (In Russian).

5. Shtorkh A., Adelung F. *Sistematicheskoe obozrenie literatury v Rossii (1801–1806 gg.)* [A systematic review of Russian literature (1801–1806)]. Saint Petersburg, 1810. Pr. 1. 352 p.

6. Pen'kova O. V., Tyutyunnik V. M. *Bibliometriya — istoriya razvitiya i stanovleniya* [Bibliometrics — the history of development and formation]. Available at: http://informetrics.ru/articles/sn.php?id=55. (In Russian).

7. Nalimov V. V., Mul'chenko Z. M. *Naukometriya: izuchenie razvitiya nauki kak informatsionnogo protsessa* [Scientometrics: the study of science development as an informational process]. Moscow, Nauka Publ., 1969. 192 p.

8. Blackert L., Siegel S. Ist in ger wissenschaftlichen information Platz für die Informetrie? *Wissenschaftliche Zeitschrift der Technischen Hochschule*, 1979, bd. 25, hf. 6, ss. 187–199.

9. Garfield E. The intended consequences of Robert K. Merton. *Scientometrics*, 2004, vol. 60, no. 1, pp. 51–61.

10. Pritchard A. Statistical bibliography or bibliometrics? *Journal of Documentation*, 1969, vol. 24, pp. 348–349.

11. Mirskii E. M. Scientometrics. In Stepin V. S. (ed.). *Novaya filosofskaya entsiklopediya* [New Encyclopedia of Philosophy]. 2nd ed. Moscow, Mysl' Publ., 2010.

12. Lychagin M. V., Lychagin A. M., Shevtsov A. S., Bekareva S. V.; Suslov V. I. (ed.). *Analiz struktury nauchnykh publikatsii po ekonomike* [Analysis of Structure of Scientific Publications on Economics]. Novosibirsk, Institute of Economics and Industrial Engineering of the Siberian Branch of the Russian Academy of Sciences Publ., 2004. 192 p.

13. Lychagin M. V., Lychagin A. M., Shevtsov A. S.; Suslov V. I. (ed.). *Atlas publikatsii po ekonomike na osnove EconLit. 1992–2005* [Atlas of Publications in Economics on the EconLit basis. 1995–2005]. Novosibirsk, Siberian Branch of the Russian Academy of Sciences Publ., 2007. 400 p.

14. Lychagin M. V., Skott-Kvinn B., Suslov V. I. et al. *Finansovye innovatsii: zarubezhnyi opyt* [Financial innovations: foreign experience]. Novosibirsk, Nauka, Siberian Branch of the Russian Academy of Sciences Publ., 1997. 160 p.

15. Lychagin M. V., Suslov V. I., Lychagin A. M. New in regional studies published in English. *Region: Ekonomika I Sotsiologiya = Region: Economics and Sociology*, 2008, no. 3, pp. 241–254. (In Russian).

16. Lychagin M. V., Lychagin A. M. Agricultural economics: new in english scientific literature. *Sibirskii vestnik sel'skokhozyaistvennoi nauki = Siberian Herald of Agricultural Science*, 2009, no. 1, pp. 96–103. (In Russian).

17. Lychagin M. V., Lychagin A. M. Directions of researches in the field «government policy and regulation» in english language academic literature. *Vestnik Novosibirskogo gosudarstvennogo universiteta. Seriya Sotsial'no-ekonomicheskie nauki = Vestnik Novosibirsk State University. Series: Social and Economics Sciences*, 2009, vol. 9, iss. 2, pp. 104–117. (InRussian).

18. Popov I. Yu. Information support of innovation research projects of the university. *Vestnik Novosibirskogo gosudarstvennogo universiteta. Seriya Sotsial'no-ekonomicheskie nauki = Vestnik Novosibirsk State University. Series: Social and Economics Sciences*, 2015, vol. 15, no. 2, pp. 87–97. (In Russian).

19. HawkinsD. T. Bibliometrics of electronic journals in information science. *Information Research*, 2001, vol. 7, no. 1. Available at: http://www.informationr.net/ir/7-1/paper120.html.

20. Glänzel W. *Bibliometrics as a Research Field: A Course on Theory and Application of Bibliometric Indicators*. Course Handouts, 2003. 120 p. Available at: https://www.researchgate.net/profile/Wolfgang_Glaenzel/publication/242406991_Bibliometrics_as_a_research_field_A_course_on_theory_and_application_of_bibliometric_indicators/links/0a85e536694a2980f9000000.pdf.

21. De Bellis N. *Bibliometrics and Citation Analysis: from the Science Citation Index to Cybermetrics*. Lanham, Scarecrow Press, 2009.450 p.

22. Garfield E. The history and meaning of the journal impact factor. *Journal of the American Medical Association,* 2006, vol. 295, no. 1, pp. 90–93.

23. Eck N. J. van. *Methodological Advances in Bibliometric Mapping of Science. Doct. Diss.* Erasmus University Rotterdam, 2011. № EPS-2011-247-LIS.

24. Börner K., Boyack K. W., Milojević S., Morris S. An introduction to modeling science: Basic model types, key definitions, and a general framework for the comparison of process models. In Scharnhorst A., Börner K., & van den Besselaar P. (eds). Models of Science Dynamics, Encounters Between Complexity Theory and Information Sciences. Berlin, Springer, 2012, pp. 3–22.

25. Börner K., Klavans R., Patek M., Zoss A. M., Biberstine J. R., Light R. P., Larivière V., Boyack K. W. Design and update of a classification system: The UCSD map of science. *PloS one,* 2012, vol. 7, no. 7, pp. 1–10. DOI: 10.1371/journal.pone.0039464.

26. Eck N. J. van, Waltman L. VOS: a new method for visualizing similarities between objects. *Advances in Data Analysis*. Springer Berlin Heidelberg, 2007, pp. 299–306.

27. Eck N. J. van, Waltman L., Dekker R., Berg J. van den. A comparison of two techniques for bibliometric mapping: Multidimensional scaling and VOS. *Journal of the American Society for Information Science and Technology*, 2010, vol. 61, no. 12, pp. 2405–2416.

28. Waaijer C. J. F., Bochove C. A. van, Eck N. J van. On the map: Nature and Science editorials. *Scientometrics*, 2010, vol. 86, no. 1, pp. 99–112.

29. Eck N. J. van, Waltman L. *VOSviewer manual*. UniveristeitLeiden. 2013.

30. Oleinik A. N. Triangulation in content analysis: a case of in-depth interviews with members of the Russian elite. *Vestnik obshchestvennogo mneniya. Dannye. Analiz. Diskussii = The Russian Public Opinion Herald Data. Analysis. Discussions*, 2008, vol. 95, no. 3, pp. 62–75. (In Russian).

Authors

Ekaterina N. Nevzorova — PhD in Economics, Associate Professor, Baikal State University, Irkutsk, Russia (11 Lenin St., 664003, Irkutsk, Russia); e-mail: nevzorova_kat@mail.ru.

Samo Bobek — PhD in Economics, Professor, Head of Department of E-Business, Faculty of Economics and Business University of Maribor, Maribor, Slovenia, (Razlagova 14, 2000 Maribor, Slovenia); e-mail: samo.bobek@um.si.

Anna P. Kireenko — Doctor of Economics, Professor, Head of the Department of Taxation and Customs, Baikal State University, Irkutsk, Russia (11 Lenin St., 664003, Irkutsk, Russia); e-mail: KireenkoAP@bgu.ru.

Roman A. Sklyarov — PhD Student, Department of Taxation and Customs, Baikal State University, , Irkutsk, Russia (11 Lenin St., 664003, Irkutsk, Russia); e-mail: free9sonjas@gmail.com.

Информация об авторах

Невзорова Екатерина Николаевна — кандидат экономических наук, доцент, Байкальский государственный университет, г. Иркутск, Россия (664003, г. Иркутск, ул. Ленина, 11); nevzorova_kat@mail.ru.

Бобек Само — доктор экономических наук, профессор, заведующий кафедрой электронного бизнеса, факультет экономики и бизнеса университета Марибор, г. Марибор, Словения (2000, Словения, г. Марибор, ул. Разлагова, 14); e-mail: samo.bobek@um.si.

Киреенко Анна Павловна — доктор экономических наук, профессор, заведующая кафедрой. Байкальский государственный университет, г. Иркутск, Россия (664003, г. Иркутск, ул. Ленина, 11); e-mail: kireenko-ap@isea.ru.

Скляров Роман Андреевич — аспирант, кафедра налогов и таможенного дела, Байкальский государственный университет, г. Иркутск, Россия (664003, г. Иркутск, ул. Ленина, 11); e-mail: free9sonjas@gmail.com.

Требования к статьям, публикуемым в журнале «Journal of tax reform»

Требования к структуре и содержанию статьи

1. Статья, представляемая для публикации, должна обладать новизной, быть самостоятельным, завершенным, характеризующимся внутренним единством исследованием актуальной проблемы, связанной с налоговыми реформами на международном и национальном уровнях.

2. Текст статьи следует структурно разбивать на разделы с заголовками, отражающие:

- актуальность темы исследования;
- степень изученности и проработанности проблемы;
- предлагаемые методы, подходы и их оригинальность;
- анализ полученных результатов;
- основные выводы, обобщающие полученные научные результаты, а также обозначающие направления дальнейших исследований по проблеме.

3. Статья должна содержать иллюстративный материал, демонстрирующий результаты исследований.

Правила оформления статьи

1. Текст статьи набирается в текстовом редакторе Microsoft Word и сохраняются в формате .docx.

2. При наборе необходимо учитывать следующее:

- формат листа — А4;
- шрифт — Times New Roman; размер основного текста — 14 пт., вспомогательного (аннотация, ключевые слова, таблицы, рисунки, литература) — 12 пт.;
- межстрочный интервал — одинарный;
- форматирование — по ширине;
- абзацный отступ — 1,25 см;
- поля — 20 мм со всех сторон;
- нумерация — внизу страницы.

3. Объем статьи не менее 18–25 страниц.

4. Статья должна содержать следующие элементы, оформленные в соответствии с требованиями журнала (см. образец оформления статьи):

- индекс УДК;
- заглавие статьи на русском и английском языках;
- информацию об авторе (ах) на русском и английском языках;
- аннотацию на русском и английском языках;
- 5–10 ключевых слов на русском и английском языках;
- список использованной литературы;
- ссылки на литературу, оформленные согласно списку литературы в квадратных скобках.

5. Все элементы, перечисленные в п. 4, указываются сначала на языке оригинала текста статьи, затем на вспомогательном языке (в статьях на русском языке — сначала на русском, а затем на английском языке; в статьях на английском языке — сначала на английском, а затем на русском языке).

Рекомендации по подготовке аннотации статьи

Аннотация является источником информации о содержании статьи и изложенных в ней результатах исследований.

1. Аннотация выполняет следующие функции:

- дает возможность установить основное содержание статьи, определить его релевантность и решить, следует ли обращаться к полному тексту статьи;

• предоставляет информацию о статье и устраняет необходимость чтения полного текста статьи в случае, если статья представляет для читателя второстепенный интерес;

• используется в информационных, в том числе автоматизированных, системах для поиска необходимых статей и информации.

2. Аннотация к статье должна быть:

• информативной (не содержать общих слов);

• оригинальной;

• содержательной (отражать основное содержание статьи и результаты исследований);

• структурированной (следовать логике описания результатов в статье);

• компактной (укладываться в **объем от 200 до 250 слов**).

3. Аннотация включает следующие аспекты содержания статьи:

• предмет, цель исследования (указываются в том случае, если они не ясны из заглавия статьи);

• метод или методологию проведения работы (целесообразно описывать в том случае, если они отличаются новизной или представляют интерес с точки зрения данной работы. В рефератах статей, описывающих экспериментальные работы, указывают источники данных и характер их обработки);

• результаты работы (описываются предельно точно и информативно. Приводятся основные теоретические и экспериментальные результаты, фактические данные, обнаруженные взаимосвязи и закономерности. При этом отдается предпочтение новым результатам и данным долгосрочного значения, важным открытиям, выводам, которые опровергают существующие теории, а также данным, которые, по мнению автора, имеют практическое значение);

• область применения результатов;

• выводы (могут сопровождаться рекомендациями, оценками, предложениями, гипотезами, описанными в статье).

4. В тексте аннотации следует употреблять синтаксические конструкции, свойственные языку научных и технических документов, избегать сложных грамматических конструкций. Текст должен отличаться четкостью формулировок и содержать только значимую информацию. Сведения, содержащиеся в заглавии статьи, не должны повторяться в тексте аннотации. В ней следует применять значимые слова из текста статьи.

Рекомендации по выбору ключевых слов

1. Ключевые слова выражают основное смысловое содержание статьи, служат ориентиром для читателя и используются для поиска статей в электронных базах, поэтому должны отражать дисциплину (область науки, в рамках которой написана статья), тему, цель и объект исследования.

2. В качестве ключевых слов могут использоваться как одиночные слова, так и словосочетания в единственном числе и именительном падеже. Количество слов внутри ключевой фразы (словосочетания) может быть не более трех.

3. Основные принципы подбора ключевых слов:

• применяйте базовые термины вместе с более сложными (бухгалтерский учет основных средств, бухгалтерский учет, основные средства); повторы и синонимы (грузовые перевозки — транспортная логистика, организация перевозок — логистика);

• не используйте слишком сложные слова (словосочетания, в которых приводится больше трех слов, чаще всего можно разбить на несколько ключевых слов (обработка и анализ данных — обработка данных, анализ данных)); слова в кавычках (ОАО «Иркутскэнерго» — Иркутскэнерго); слова с запятыми (факторы, определяющие качество — факторы качества, определение качества);

• каждое ключевое слово — это самостоятельный элемент. Ключевые слова должны иметь собственное значение (человеческий капитал, его оценка — человеческий капитал, оценка человеческого капитала).

Рекомендации по оформлению ссылок на использованную литературу

1. Список использованной литературы оформляется в соответствии с ГОСТ 7.1-2003. Библиографическая запись. Библиографическое описание. Общие требования и правила составления и помещается в конце статьи. Нумерация в списке литературы осуществляется по мере цитирования. При повторном цитировании источника ему присваивается номер первоначального цитирования.

2. Ссылки на использованную литературу приводятся в тексте в квадратных скобках с указанием в них номера источника по Списку использованной литературы и страницы цитируемого фрагмента, напр.: [5, с. 115].

3. В оригинальной научной статье необходимо упоминание не менее 20–30 источников, имеющих автора, в научном обзоре — 50–80, в том числе не менее 50 % источников на иностранном языке. Редакционная коллегия рекомендует цитировать статьи из журналов, которые индексируются в международных базах данных (Scopus, Web of Science).

4. Электронные ресурсы, в которых не указан автор материала, статистические сборники, нормативно-правовые акты размещаются в постраничных сносках и в список использованной литературы не выносятся.

5. Самоцитирование автора допускается не более 20 % от количества источников в списке. Самоцитирование журнала (ссылки на статьи из данного журнала) не рекомендуется!!!

Пример оформления библиографических записей

1. Статьи в журналах:

Орлова Е. Н. Мобильность налогоплательщиков — домохозяйств и их налоговой базы и ее влияние на налоговый потенциал / Е. Н. Орлова // Известия Иркутской государственной экономической академии. — 2012. — № 1 (81). — С. 23–27.

Романовская Ю. А. Проблемы межрегиональной миграции налогоплательщиков и уклонения от уплаты налогов / Ю. А. Романовская // Baikal Research Journal. — 2015. — Т. 6, № 4. — DOI : 10.17150/2411-6262.2015.6(4).4.

Jensen O. W. Transfer Pricing and output decisions: the dynamic interaction / O. W. Jensen // Decision Sciences. — 1986. — Vol. 17. — P. 428–436.

Grubert H. Taxes, tariffs and transfer pricing in multinational corporation decision making / H. Grubert, J. Mutti // Review of Economics and Statistics. — 1991. — № 33. — P. 285–293.

2. Статьи из сборников научных трудов и материалов конференции:

Быков С. С. Противодействие уклонению от уплаты налогов: функция, принцип и вектор развития системы российского налогового права / С. С. Быков // Влияние финансово-правовых и иных публично-правовых институтов на инновационное развитие России : материалы Всерос. науч.-практ. конф., г. Иркутск, 20–21 сент. 2013 г. / отв. ред. : Н. В. Васильева, С. В. Праскова. — Иркутск : Ин-т законодательства и правовой информации им. М. М. Сперанского, 2014. — С. 58–87.

3. Монографии, учебники, учебные пособия:

Варналий З. С. Экономическая безопасность Украины: проблемы и приоритеты крепления / З. С. Варналий, Д. Д. Буркальцева, А. С. Саенко. — Киев : Знание Украины, 2011. — 299 с.

Уклонение от уплаты налогов. Проблемы и решения: монография / под ред. И. А. Майбурова, А. П. Киреенко, Ю. Б. Иванова. — М. : Юнити-Дана, 2013. — 383 с.

Демин А. В. Налоговое право России : учеб. пособие / А. В. Демин. — М. : Юрлитинформ, 2006. — 424 с.

Geist B. Sociologicky slovnik / B. Geist. — Praha : Victoria Publishing, 1992. — 322 p.

McCarten William J. International Transfer Pricing and Taxation. Tax Policy Handbook. Tax Policy Division / William J. McCarten ; FAD IMF. — Washington, D.C., 1995. — 221 p.

4. Диссертации, авторефераты диссертаций:

Киреенко А. П. Трансформация налоговой системы в условиях усиления взаимодействия с предпринимательской средой: теория и практика : дис. … д-ра экон. наук : 08.00.10 / А. П. Киреенко. — Иркутск, 2005. — 329 с.

Карахотин С. Н. Оценка влияния налоговых издержек на стоимость капитала и инвестиционную привлекательность организации : автореф. дис. … канд. экон. наук : 08.00.05 / С. Н. Карахотин. — СПб., 2006. — 17 с.

5. Электронные ресурсы, в которых указан автор материала:

Асанкин Р. ФНС впервые дотянулась до бенефициаров офшоров в Голландии [Электронный ресурс] / Р. Асанкин, А. Штыкина. — Режим доступа : http://top.rbc.ru/business/19/12/2014/549302429a79476f5cfde7b3 (дата обращения: 14.02.2015).

Merz M. Taxation of the digital economy (China's Digital Transformation) [Electronic resource] / M. Merz. — Mode of access : https://michaelamerz.files.wordpress.com/2014/08/140825_taxation-of-the-digital-economy.pdf (data of access: 28.05.2015).

Предоставление сведений об авторе (ах) статьи

1. В статье в информации об авторах на русском и английском языках указываются следующие данные:

- фамилию, имя, отчество (полностью);
- ученую степень, ученое звание (полностью);
- занимаемую должность;
- рабочее подразделение (кафедра, факультет, институт и др.);
- место работы в соответствии с официальным названием организации;
- почтовый индекс организации — места работы (с указанием почтового индекса);
- адрес электронной почты (e-mail);
- ORCID (Open Researcher and Contributor ID) — уникальный идентификатор ученого, связывающий его исследовательскую деятельность и помогающий идентифицировать ссылки на его научные публикации в международных базах данных (Scopus, Web of Science) (если имеется).

2. Дополнительно указывается информация, которая служит для связи с автором и в журнале не публикуется:

- почтовый адрес для переписки (с указанием индекса);
- телефоны (рабочий, мобильный);
- SPIN-код — персональный идентификационный код автора в Science Index (если имеется).

3. Фамилия и имя на английском языке указываются автором в соответствии с их написанием в ORCID или ранее опубликованным в зарубежных изданиях, входящих в международные базы данных (Scopus, Web of Science), либо указанным в заграничном паспорте.

Образец оформления статей

УДК 351.71:004

Л. А. Матвейчук
Национальная академия государственного управления при Президенте Украины, г. Киев, Украина

ДИНАМИКА РАЗВИТИЯ НАЛОГОВОЙ СИСТЕМЫ И НАЛОГОВОГО АДМИНИСТРИРОВАНИЯ В РОССИЙСКОЙ ФЕДЕРАЦИИ

АННОТАЦИЯ. В условиях глобализации национальных экономик использование информационно-коммуникационных технологий в государственном менеджменте является одним из наиболее важных элементов эффективного государственного управления, механизмом реализации которого выступает электронное правительство. В настоящее время требуется углубленный анализ сущностных характеристик электронного правительства и входящего в него электронного государственного управления налогообложением (электронного налогообложения) и его прикладных аспектов на основе опыта информационно-развитых стран — поэтому данное исследование является весьма актуальным. В статье проводится анализ развития электронного правительства стран мира на основе наиболее авторитетных международных оценок: технологической зрелости государств в сфере электронного правительства по индексу развития электронного правительства и готовности стран к сетевому будущему по индексу сетевой готовности. Проанализированы данные показатели по странам мира, а также государств на постсоветском пространстве. Отмечена высокая позиция Эстонии в мировом рейтинге и первое место в международном рейтинге по развитию технологии электронного правительства среди бывших республик Советского Союза. Исследовано современное состояние электронного государственного управления налогообложением Эстонии, раскрыта его практическая значимость, обоснованы преимущества использования информационных и коммуникационных технологий в налоговой сфере. Акцентировано, что построение в Эстонии одной из лучших прогрессивных моделей электронного правительства Европы удалось благодаря государственной поддержке и выделению развития информационно-коммуникационных технологий в разряд первоочередных задач правительства и общества. Учитывая существование информационного и телекоммуникационного разрыва между государствами, очевидна необходимость исследования сильных сторон в сфере электронного налогообложения для обоснования налоговой политики и стратегии развития стран.

КЛЮЧЕВЫЕ СЛОВА. Электронное правительство; индекс сетевой готовности; электронное налогообложение; информационно-коммуникационные технологии; налогово-таможенный департамент; налоговые услуги.

Liudmyla A. Matveychuk
National Academy for Public Administration under the President of Ukraine, Kiev, Ukraine

INTRODUCTION OF E-MANAGEMENT INTO PRACTICE OF TAX ADMINISTRATION

ABSTRACT. In the context of globalization of national economies the use of information and communication technologies in the state management is one of the key elements of effective state management, where the e-government acts as an implementation mechanism. At present, there is a need of an in-depth analysis of the essential characteristics of the e-government including its electronic state taxation administration (e-taxation)and its applied aspects on the basis of the informationally developed countries' experiences, therefore this study is rather topical. The article analyzes development of the e-government worldwide based on the most authoritative international estimations: technological maturity of the states in the area of the e-government according to the E-Government Development Index and readiness of the states for the networked future in regard of the Networked Readiness Index. It gives an analysis of these

indicators throughout the countries of the world, as well as the countries in the post-Soviet space. Estonia's top position in the world rating and its 1st place in the international rating in e-government technology development among the former states of the Soviet Union has been highlighted. The current state of the e-state management of tax administration in Estonia has been investigated, its practical significance has been revealed, and the benefits of using information and communication technologies in the area of taxation have been substantiated. Attention is drawn to the fact that construction of one of the best models of advanced e-government in Europe took pace in no other country but Estonia due to the government support and inclusion of the ICT developments in the category of the government and society's top priorities. Given the existing information and communication gap between different states, there is a clear need for research of the e-taxation advantages to justify specific tax policies and national development strategies.

KEYWORDS. e-government; Networked Readiness Index; e-taxation; information and communication technologies; tax and customs department; tax services.

Текст статьи. Текст статьи[1]. Текст статьи. Текст статьи. Текст статьи. Текст статьи. «Текст статьи. Текст статьи. Текст статьи. Текст статьи» [1, с. 115]. Текст статьи. Текст статьи. Текст статьи. Текст статьи. Текст статьи. Текст статьи. Текст статьи. Текст статьи. Текст статьи. Текст статьи. Текст статьи. Текст статьи. Текст статьи. Текст статьи. Текст статьи [2].

Текст статьи. Текст статьи. Текст статьи. Текст статьи. «Текст статьи. Текст статьи. Текст статьи. Текст статьи» [3, p. 13]. Текст статьи. Текст статьи. Текст статьи. Текст статьи. Текст статьи. Текст статьи [2]. Текст статьи. Текст статьи. Текст статьи. Текст статьи. Текст статьи. Текст статьи. Текст статьи. Текст статьи. Текст статьи. Текст статьи. Текст статьи. Текст статьи. Текст статьи. Текст статьи. Текст статьи. Текст статьи [4].

Список использованной литературы

1. Электронное налогообложение: сущность и перспективы применения / П. В. Мельник, А. Н. Новицкий, А. А. Долгий [и др.] ; под общ. ред. П. В. Мельника. — Ирпень: НУ ГНС Украины, 2010. — 332 с.

2. Викторова Н. Г. Онлайн-сервисы в налогообложении / Н. Г. Викторова // Налоговая политика и практика. — 2011. — № 5 (1). — С. 19–24.

3. Post J.E. Managing Extended Enterprise / J.E. Post, L. E. Preston, S. Sachs // The New Stakeholder View California Management Review. — 2002. — Vol. 45, № 1. — P. 6–26.

4. Тихомиров В. П. Мир на пути к Smart Education: новые возможности для развития [Электронный ресурс] / В. П. Тихомиров. — Режим доступа : http://www.slideshare.net/PROelearning/smart-education-7535648 (дата обращения: 14.02.2015).

Информация об авторе

Матвейчук Людмила Александровна — кандидат экономических наук, докторант, Национальная академия государственного управления при Президенте Украины (03057, Украина, г. Киев, ул. Эжена Потье, 20); e-mail: sla.kpnv@gmail.ru.

Author

Matvejciuk, Liudmyla A. — PhD in Economics, Doctoral Student, National Academy for Public Administration under the President of Ukraine (20 Ezhena Pottier st., 03057, Kiev, Ukraine); e-mail: sla.kpnu@gmail.com.

[1] The Global Information Technology Report 2012 // World Economic Forum 2012. URL : http://www3.weforum.org/docs/Global_IT_Report_2012.pdf.

Publication requirements for articles submitted to «Journal of Tax Reform»

The requirements for the structure and content of the article

1. The article submitted for publication must contain novelty, must be an independent, complete and internally united research work on a current issue, related to tax reform at international and national levels.

2. The article should be structurally divided into sections with headings, reflecting:

- relevance of the research;
- background of a problem;
- proposed research methods and their originality;
- analysis of the study findings;
- main conclusions, the results of the research and further discussion of them, or the problem solution.

3. The article should contain illustration material, showing the results of the research.

Format requirements

1. The manuscript files in Microsoft Word format should be converted to .docx. files

2. Technical format of the article has to comply with the following requirements:

- the page size — A4;
- font — Times New Roman; main text — 14-point, supplementary text (abstract, keywords, tables, figures, references) — 12-point;
- line spacing — 1,0;
- fit to the width;
- indent — 1,25;
- margins — 2.0 cm on all sides;
- page numbers - at the bottom of the page;

3. Article should be 18–25 pages.

4. The article has to contain the following components drawn up in accordance with the journal's requirements (see the sample):

- UDC code;
- title of the article in Russian and English:
- information about the author given both in Russian and English;
- abstract in Russian and English;
- 5–10 key words in Russian and English;
- the list of references;
- the article should have reference notes given in square brackets provided according to the references.

5. All the elements listed in Sec. 4, indicated first in original language of the article, then in the subsidiary language (articles in Russian - first in Russian and then in English, and in articles in the English- first in English, and then in Russian).

Guidelines for Abstract writing

An Abstract is a source of information on your paper's content and findings.

1. An Abstract has the following functions:

- allows readers to identify the basic concept of your paper as well as its relevance and decide if the full text paper is of interest to them;
- provides information on your paper and makes it unnecessary to read its full text version if it is of secondary interest to a reader;
- is used in information (including computerized) search systems to find papers and information.

2. An Abstract should be:

- informative (no general words);

- original;
- relevant (reflects your paper's key content and research findings);
- structured (follows the logics of results' presentation in the paper);
- concise **(between 200 and 250 words**).

3. An Abstract should contain the following content aspects:

- the statement of the object and purpose of your study;
- research methods/methodology;
- results observed;
- the sphere of results application;
- conclusions drawn from your study.
- the object, topic and purpose of the research (if they are not clear from the title of the paper);
- the research methods/methodology if they are original or of interest for this particular research. For papers concerned with experimental work describe your data sources and data process technique;
- the results of research should be described as precisely and informatively as possible. Include your key theoretical and experimental results, factual information, revealed interconnections and patterns. Give special priority to new results and long-term impact data, important discoveries and verified findings that contradict previous theories as well as data that you think have practical value.
- the sphere for implementation the results of the research;
- conclusions could be associated with recommendations, estimations, suggestions, hypotheses described in the paper.

4. Use the language typical of research and technical documents to compile your abstract and avoid complex grammatical constructions. Information contained in the title should not be repeated in the abstract. The abstract should be concise and clearl and reflect only the main information of the original paper. The text of the abstract should include key words of the paper

Guidelines for Keywords

1. Keywords encapsulate the principal topics of the paper. These keywords will be used for indexing purposes as a guide to search the articles in electronic databases, therefore, they should reflect area of science in which the article was written, the subject, the purpose and object of research

2. The keywords can be used as single words and phrases. Key phrase (phrases) should contain no more than three words.

3. Basic principles for keyword selection:

- avoid general and plural terms and multiple concepts (avoid, for example, «and», «of»).
- be sparing with abbreviations: only abbreviations firmly established in the field may be eligible. These keywords will be used for indexing purposes.
- each keyword should have its separate meaning.

Guidelines for Reference

1. Authors should use the following reference format: GOST 7.1-2003. The bibliographic description. General requirements and rules. References reside below the text body. The list of references should be arranged in the order of the appearance the citations in the text. In case of repeated citation the number is the same.

2. To associate the list of references with the text of the article, you should include a reference as a number (running number of the source from the list) and also the page number in square brackets: [5, c. 115].

3. In the original scientific paper must be not less than 20–30 references, in the scientific review — 50–80 references. The Editorial Board recommends to cite papers indexing in international databases (Scopus, Web of Science).

4. The electronic sources without an author, statistic and regulation materials should not be included in the list of reference, but preferably set as a footnotes at the end of the page.

5. Author's self-citations should not exceed 20 % of the number of sources in the list of references.

Information about the author (s)

1. The information about the authors in Russian and English indicates the following data:

- surname, first name, middle name (in full);
- academic degree, academic title (in full);
- position;
- operating unit (department, chair, institute etc.).
- affiliation (the official name of the organization);
- organization address (including postcode);
- author's e-mail;
- ORCID (Open Researcher and Contributor ID) (if available).

2. Information for communication with the author (not published in the journal):

- post address for correspondence (with post index);
- phone numbers (office, mobile);
- SPIN-code — personal identification author's number in the Science Index (if available).

3. Full name in English is indicated in accordance with its writing at ORCID or previous publication in foreign journals included in international databases (Scopus, Web of Science), or as it is indicated in a foreign passport.

Редактор М. С. Григорьева
Дизайн и верстка Т. А. Лоскутова

Подписано в печать 01.12.16. Формат 70х100 1/16. Бумага писчая. Печать плоская. Усл. печ. л. 5,8.
Тираж 500 экз. Заказ

Отпечатано в типографии Издательско-полиграфического центра УрФУ.
620000, г. Екатеринбург, ул. Тургенева, 4.
Тел. +7(343) 350-56-64, 350-90-13. Факс +7(343)358-93-06.
E-mail: press.info@uffu.ru

Распространяется бесплатно