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- creation of an information platform to make public the results of studying socio-economic and other consequences of tax reforms and analysis of the effects of transformations of tax systems;
- growth of scientific and theoretical knowledge in the fields of public finance and taxation as a science aimed at searching new constructive solutions in the taxation sphere;
- development of practical, economic and organizational measures for increasing the efficiency and justness of taxation and tax reforms;
- international cooperation of representatives of the scientific community, the public, the business sector and government agencies in the improving the tax system.

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- comprehensive analysis of the national and the international experience in reforming tax systems;
- development of measures to prevent tax evasion;
- support of the inter-disciplinary approach to studying taxation and tax reforms;
- cooperation of scholars of various sciences (economics, mathematics, sociology and psychology) with the aim of improving taxation and tax systems.

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### Budget Tax Revenues and Losses from External Labor Migration in Russia

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#### ABSTRACT

One of the reasons behind declining budget revenues can be external migration. This article aims to describe the methodology for estimation of tax losses and revenues from international labor migration for specific types of taxes. Changes in personal income tax revenues are estimated by using the data on the number of labor emigrants (immigrants) for specific occupations, nominal gross monthly wage of employees in this occupation in Russia, standard child tax deductions and the corresponding personal income tax rate for residents (non-residents). Changes in VAT and excise tax revenues caused by the current trends in labor migration are estimated in accordance with the structure of household consumption. The amount of tax revenues (and losses) is calculated as the product of the sum of VAT and excise tax payments made by one member of a household per year when buying goods, works and services on the territory of Russia, and the number of emigrants (or immigrants). The research uses the data provided by Rosstat, Federal Tax Service of Russia and the Analytical Centre under the Government of the Russian Federation for 2012–2017. The conclusion is made that international migration has a negative impact on the tax revenues of the country's consolidated state budget. Although, throughout the whole of the given period, the balance of additional revenues from VAT, excise taxes and the personal income tax (PIT) on earned income and budget losses from these taxes remained positive, in absolute terms, this balance decreased significantly. Trends in international labor migration affected the balance of tax losses and revenues. Therefore, the government's attempts to target international labor migration by reforming the tax legislation seem quite reasonable: the upcoming tax reforms will include the introduction of the concept 'centre of vital interests' as the second criterion of residence and equalization of the PIT rate for tax residents and non-residents. The proposed methodology can thus prove to be an effective tool for the Federal Tax Service of Russia to estimate the resulting changes in tax revenues as well as other changes related to labor migration processes.

#### KEYWORDS

tax losses, tax revenues, budgetary effect, international population migration, labor migration, consumer spending, immigration, emigration

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### Оценка налоговых поступлений и налоговых потерь бюджета Российской Федерации от внешней трудовой миграции

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#### АННОТАЦИЯ

Внешняя миграция населения может являться одной из причин сокращения бюджетных доходов. Целью статьи является разработка методики и оценка на-

логовых потерь и налоговых поступлений от международной трудовой миграции в разрезе отдельных налогов. Изменение поступлений налога на доходы физических лиц (НДФЛ) предложено оценивать исходя из численности трудовых эмигрантов (иммигрантов) определенной профессии, номинальной начисленной заработной платы работников этой профессии в РФ, стандартных налоговых вычетов на детей и соответствующей ставки НДФЛ для резидентов (нерезидентов). Изменения поступлений налога на добавленную стоимость (НДС) и акцизов, связанные с трудовой миграцией, определяются в соответствии со структурой потребления домашних хозяйств. Объем потерь (поступлений) косвенных налогов в консолидированный бюджет РФ предложено оценивать как произведение суммы НДС и акцизов, уплачиваемых в среднем одним членом домохозяйства в год при приобретении товаров, работ и услуг на территории РФ, на численность эмигрантов (иммигрантов). Для расчетов использованы данные Росстата, Федеральной налоговой службы России и Аналитического центра при Правительстве РФ за 2012–2017 гг. На основании проведенных расчетов сделан вывод о негативном влиянии международной миграции населения на налоговые доходы консолидированного бюджета РФ. На протяжении всех лет исследуемого периода сальдо дополнительных поступлений НДС, акцизов, НДФЛ с трудовых доходов и бюджетных потерь по данным налогам является положительным. Однако рассмотренный период положительное сальдо существенно сократилось в абсолютном выражении. Влияние на сальдо налоговых потерь и поступлений от международной трудовой миграции могут оказать изменения законодательства: введение «центра жизненных интересов» в качестве второго критерия резидентства, а также уравнивание ставки НДФЛ для налоговых резидентов и нерезидентов. Предложенные в статье методики могут быть применены в деятельности ФНС России для оценки изменения налоговых поступлений при изменении налогового законодательства, а также других изменений, касающихся трудовой миграции.

#### **КЛЮЧЕВЫЕ СЛОВА**

налоговые потери, налоговые поступления, бюджетный эффект, международная миграция населения, трудовая миграция, потребительские расходы населения, иммиграция, эмиграция

### **1. Introduction**

External migration, like any other social process, has a considerable impact on the economy of any country. Migration affects different spheres of economy such as production (GDP); labor (size of workforce); finance (monetary supply in circulation); budget (tax revenues of budgets); currency (foreign exchange reserves); and trade (exports and imports). This article deals with the effects that migration has on the state budget through tax revenues and tax losses. What this means is that emigrants stop paying taxes in their country of origin but have to pay them to the budget of the host country in accordance with its tax legislation because, when they arrive in this country, they get access to such public benefits as national defense, national security, law enforcement, environment, state systems of education and health care, free cultural and entertainment events. Emigrants also gain new

rights in the sphere of transfer payments: for example, they may be eligible to collect unemployment benefits, social security benefits and poverty relief.

The budgets of emigrants' countries of origin, on the contrary, suffer from the loss of tax payments that these people would have made if they had not emigrated. The amount of budget losses exceeds the costs of public services thus saved. In the host country, immigrants from wealthier states contribute more in taxes than the cost of the public services they consume. Immigration from poorer countries, on the contrary, has a significant negative impact on the budget of the host country, although, on the bright side, immigrants provide this country's economy with extra workforce. The positive effect is also generated through the direct sources of revenue from the profit tax paid by intermediary firms and the personal income tax sometimes charged on migrants'

remittance payments to their families and relatives back home.

The topic of external migration is of particular relevance for Russia due to the fall in the net migration gain this country has been facing since 2011: from 319.8 thousand people in 2011 to 124.9 thousand in 2018, that is, by 61% in the last seven years [1].

Such decline in the net migration gain signifies that the country has become less attractive for foreign citizens, which is to a great extent caused by the drop in the purchasing power of the average nominal monthly wage of workers in the Russian economy expressed in dollars. This situation results from the depreciation of the rouble against the dollar.

If this trend persists in the future, meeting the migration gain target of over 300 thousand people annually by 2025 would become problematic (this target is set by the Concept of State Migration Policy). Therefore, new approaches and new mechanisms would be required for external migration policy making.

The problem is exacerbated by the fact that Russia is now going through the new wave of brain drain. Since 2014, about 44 thousand highly qualified specialists have been leaving the country every year. One of the main reasons for emigration is the difficult economic situation in Russia due to Western financial sanctions.

Apart from that, a substantial category of emigrants comprises representatives of financial oligarchies, which links emigration with capital flight. The same category also includes successful creative professionals (singers, actors, etc) and sportsmen. In the last thirteen years, 20 thousand dollar millionaires and billionaires have left Russia. 6 thousand emigrated only in the last three years<sup>1</sup>.

In view of the above, this article aims to provide a quantitative estimation of the effects international migration has on the Russian state budget. This effect is measured as the balance of tax losses and tax revenues.

<sup>1</sup> Russia: Well-Off Citizens Emigrate from Russia on a Massive Scale. Russia today. Available at: <https://inosmi.ru/> [Accessed: 12.11.2019].

## 2. Literature review

There is a vast body of academic literature discussing the questions of international migration.

For the purpose of this research, we are going to focus on those studies that provide methodologies of quantitative estimation of economic and financial effects of external migration.

V. V. Maslennikov computed the losses suffered by the Russian economy due to its citizens' emigration to other countries by using the cost of the 'life' of one emigrant. His findings show that emigration from Russia has a negative effect on the Russian economy [2].

V. A. Iontsev and I. V. Ivakhnyuk analyzed the economic, institutional and legal effects of the ratification of the Agreements in the Sphere of Labor Migration [3].

V. A. Koretskaya-Garmash [4] estimated the tax revenues from work patents issued to labor migrants on the federal level and S. V. Ryazantsev did the same for the regional level [5]. These researchers came to a similar conclusion that labor migrants make a significant contribution to Russia's state budgets on all levels.

I. A. Aleshkovsky, A. A. Grebenyuk, and A. S. Maksimova [6] proposed a methodological approach based on the system of analytical indicators to estimate the impact of external labor migration on host countries' financial and budgetary sphere. Their methodology focuses on such key aspects as labor migrants' remittances home and mandatory payments made by foreign workers to the host country's budget.

The budgetary impact of labor migration is explored in a number of international studies.

D. Sriskandarajah, L. Cooley and H. Reed [7] have found that different groups of immigrants have different fiscal impact on the UK budget. For some groups, this impact is positive and quite substantial while for others, it is negative. The conclusion is made that the overall impact of external migration on the UK state budget has remained steadily positive.

S. P. Kerr and W. R. Kerr propose to consider the overall economic impact of immigration on the state budget as the



‘discounted difference between tax payments and income transfers received for an immigrant over the duration of his or her stay in the host country’ [8, p. 19].

I. Preston uses mathematical modelling to show that if the state policy encourages immigration in certain types of jobs for certain public services (health care, education, etc.), this leads to an increase in the unit cost of these public services for the country’s budget [9].

The estimated net fiscal impact of immigrants (with and without insurance contributions) on the host country’s budget system leads the OECD experts to the conclusion that ‘employment is the single most important determinant of migrants’ net fiscal contribution, particularly in countries with generous welfare states’ [10, p. 3]. Raising the rate of employment among immigrants to the level of that of the native-born would generate substantial fiscal gains for many OECD countries, in particular Belgium, France and Sweden, with the budget impact of more than 0.5% GDP [10].

M. F. Hansen, M. L. Schultz-Nielsen and T. Tranæs analyzed the budget effect from immigration to Denmark and found that immigrants from wealthier countries have a positive fiscal impact while immigrants from poorer countries have a significant negative effect due to a ‘weak labour market performance and early retirement in combination with the universal Danish welfare schemes’ [11, p. 31].

F. D. Blau and Ch. Mackie found that a large share of dependent children and senior immigrants in the total number of immigrants leads to an increase in spending and a reduction in the tax revenues of budgets of US states. As for the general effect of immigration, the immigrant generated revenue exceeds the total costs of immigration to the state budget [12].

P. Orrenius showed that the fiscal influence of immigrants on the US state budget is actually much less negative than that of the host population. Taxes paid by immigrants cover 93% of the public benefits they consume while the tax payments made by native residents cover only 77% [13].

d’Artis Kancs and P. Lecca found that, despite the fact that integration of refugees (for example, social benefits, language training, and education) generates considerable costs for the state budget, in the medium- and long-term perspective, socio-economic and fiscal benefits of this support could significantly outweigh its costs. The more investment is made into the integration of refugees after their arrival, the more net benefits such investment will bring [14].

A large number of Russian studies discuss the problem of budget losses due to illegal labor migration. D.V. Savelenko makes a long-term forecast concerning personal income tax losses and insurance contributions in relation to illegal labor migration [15]. N. P. Neklyudova and E. A. Ilinbaeva calculated tax losses of the budget of Sverdlovsk region [16]. E. B. Yakovleva, N. P. Kuznetsova and O. A. Drozdov estimated the amount of real and potential losses of the Russian state budget due to the illegal use of migrant labor [17].

In our previous research, we developed and applied a methodology for estimating tax losses of regional budgets due to illegal labor migration to Russia by calculating the potential amount of payments to be collected and the actual amount of payments of the personal income tax on earned income of foreign citizens. Our findings showed that illegal labor migration, while making a great contribution to Russia’s GDP, at the same time has a considerable detrimental effect on the Russian state budget. The situation is exacerbated by the negative trend in the losses from the personal income tax: by 2017 there was an almost 60% increase in losses in comparison with 2016 [18].

This question is also widely discussed in international literature.

T. Palivos [19] studies the impact of illegal immigration on the host country’s well-being. J. Machado considers the economic effect from amnesty and deportation of illegal migrants [20]. S. A. Camarota estimates the overall impact of illegal labor migration on the US federal budget [21] while P. R. Orszag, on budgets of individual US states and local budgets [22].

M. O'Brien considers the budget expenditures caused by illegal migration by calculating the fiscal burden per migrant in the State of Texas [23].

N. Obiokoye focuses on the reasons for tax non-compliance among undocumented migrants in the US, which causes considerable tax losses for the state budget. He argues that the root of the problem is the unfairness of the tax laws and policies towards immigrants in America resulting in unequal treatment of this group of people, even though they are in similar economic conditions as other US citizens. In other words, it is the tax laws themselves that force undocumented migrants to dodge taxes [24].

Despite the abundance of studies in this sphere, there are certain research gaps that need to be addressed: when dealing with the effects of migration, most studies focus on immigration as the main factor that determines tax revenues and tax losses, while other aspects remain all but ignored.

The majority of authors associate the negative budget effects either with illegal labor migration or with the public spending on immigrants, exceeding the amount of taxes they pay, but not with the process of emigration itself.

Thus, there is a perceived gap in contemporary research, which can be filled through comparative analysis of tax losses and tax revenues and through estimation of the total budget impact of two opposite processes – emigration and immigration – for different types of taxes.

In our view, tax losses result not only from shortfalls in tax collection due to illegal labor immigration or the costs of immigrant support (e.g. the high costs of the public service provision), but from permanent emigration.

### 3. Research methodology

We used the data of the Federal State Statistics Service (Rosstat), Federal Tax Service of Russia and Analytical Centre under the Government of the Russian Federation.

We have chosen indirect taxes and the personal income tax (PIT) because these

taxes, first, contribute the most to federal and regional budget revenues and, second, constitute a burden for physical persons – migrants.

#### 3.1. Methodology for estimation of PIT revenues and losses

We suppose that changes in budgetary losses and revenues from PIT on earned income caused by international migration trends can be calculated as the sum of the products of the number of labor emigrants (immigrants) in a certain occupation and the nominal monthly wage of employees in this profession in Russia and the rate of PIT on earned income for residents (non-residents).

We apply formula (1) to estimate tax losses of the state budget:

$$\zeta = \sum_0^1 \mu(0,1M + 0,56(M - 1400) + 0,28(M - 1400) + 0,06(M - 3000))12\sigma, \quad (1)$$

where  $\mu$  is the number of labor emigrants from Russia, with current or last occupation  $\nu$ ;  $M$ , the average nominal gross monthly wage of employees in occupation  $\nu$ ;  $\sigma$ , the rate of PIT on earned income for Russian residents (13%).

Our calculations take into account standard child tax deductions. According to the statistical reports of the Federal Tax Service, 10% of taxpayers do not claim child tax deductions; 56% claim tax deductions for the first child; 28%, for the second child; and 6%, for the third child<sup>2</sup>.

We estimated PIT revenues of the federal budget in relation to labor immigration by using the statistical reports of the Federal Tax Service.

PIT revenues are calculated by applying formula (2):

$$\varepsilon = (E_{30} - \mu\varepsilon)\sigma_{30} - \chi_{30} + (E_{13} - \mu\varepsilon)\sigma - \chi_{13}, \quad (2)$$

where  $E_{30}$  is the income of foreign citizens and stateless persons earned on the territory of Russia or from sources in Russia taxed at the rate of 30%;  $E_{13}$ , the income of foreign citizens and stateless persons

<sup>2</sup> Federal Tax Service of the Russian Federation. Moscow; 2005–2019. Available at: <http://www.nalog.ru> [Accessed: 12.11.2019].

earned on the territory of Russia or from sources in Russia taxed at the rate of 13%;  $\mu\varepsilon$ , non-taxable income;  $\sigma_{30}$ , PIT rate of 30%;  $\sigma_{13}$ , PIT rate of 13%;  $\chi_{30}$ ,  $\chi_{13}$ , PIT debt, calculated as the difference between the assessed PIT amount and the amount obtained by the budget, for each tax rate.

### 3.2. Methodology for estimation of indirect tax losses and revenues

One of the key characteristics of indirect taxation is the tax shifting effect, described by English philosopher John Locke in his 1691 pamphlet: in his view, merchants and intermediaries shifted the tax burden through indirect taxes to laborers (consumers), who were unable to bear it because they received fixed pay for their work [25].

For a quantitative estimation of the indirect tax revenues and losses related to international migration, we considered only physical persons as subjects of fiscal relationships and used consumption expenditures as the main indicator.

The second hypothesis of our study is as follows: the amount of budgetary losses (revenues) from indirect taxes in relation to international migration in the current year equals the amount of VAT and excise taxes, which emigrants (immigrants) could theoretically pay on goods, works and services in the current year in Russia.

VAT losses are calculated by using the methodology for estimating 'migration of indirect taxes' [26, p. 80]:

$$\zeta = \mu_1 \cdot VATH, \quad (3)$$

where  $\mu_1$  is the number of emigrants;  $VATH$ , the amount of VAT paid on goods, works and services on average by one member of a household per year.

VAT revenue can be calculated the following way:

$$\varepsilon = \mu_2 \cdot VATH, \quad (4)$$

where  $\mu_2$  is the number of immigrants.

A similar scheme can be applied to calculate the excise tax losses and revenues.

In order to compute the yearly amount of per capita VAT payments and payments of excise taxes (ETH), we used the structure of consumer expenditures. This

structure includes 544 items and is used to calculate the consumer price index.

$$VATH = \sum_0^i \tau_i / 100 \delta \cdot 12 \sigma_{VATH}, \quad (5)$$

where  $\tau_i$  is the share of goods, works and services of type  $i$  in the general consumption expenditures list;  $\delta$ , the average monthly consumption expenditures per one member of a household;  $\sigma_{VATH}$ , estimated VAT on goods, works and services of type  $i$  (18%, 10% or 0%).

$$ETH = \sum_0^i \frac{\tau_i / 100 \delta \cdot 12}{\kappa} \sigma_{ETH}, \quad (6)$$

where  $\kappa$  is the consumer price for excisable goods of type  $i$ ;  $\sigma_{ETH}$ , the excise tax rate for excisable goods of type  $i$ .

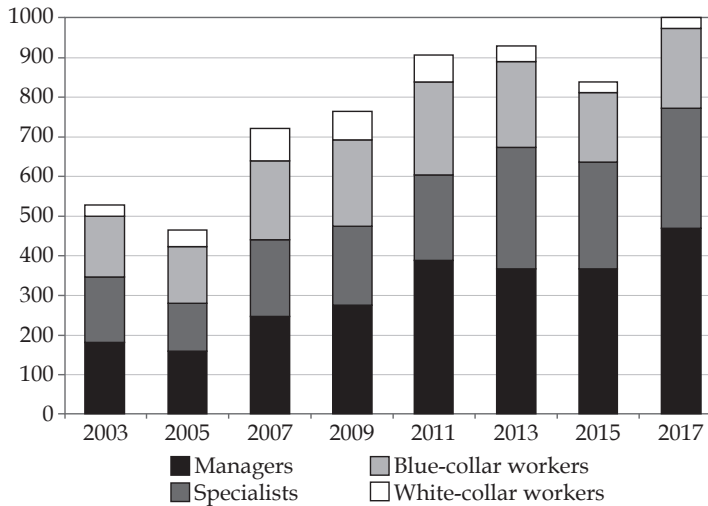
To calculate the amount of excise taxes paid on average by one member of a household per year, we divided the total sum of expenditures on a certain excisable product a year by the consumer price for this product. Thus, we obtained the product quantity purchased by one member of a household per year or the taxable base. We need, however, to take into consideration the differences in measurement units (convert litres into tons, for example, in the case of car petrol and use the number of cigarettes instead of the number of packs in the case of tobacco products). Moreover, the assessment of excise taxes on strong alcoholic beverages should take into account the percentage of ethanol these beverages contain. To assess excise taxes on cars it is necessary to consider the overall horsepower of all cars by using the average engine power per car (100 hours powers).

Our methodology is based on the assumption that the structure of consumption among immigrants and emigrants is the same. We are aware of the fact that this assumption may seem debatable because it does not take into account the differences in consumer preferences and different levels of consumption among emigrants and immigrants.

## 4. Results

### 4.1. Estimation of PIT losses and revenues

Figure 1 illustrates the dynamics and structure of PIT losses in relation to labor



**Figure 1. Dynamics and structure of PIT losses in relation to labor emigration in 2003–2017, by occupation of emigrants, mln rbs**

Source: Calculated by the author by using the data from: *Labor and Employment in Russia. 2017: Statistical Yearbook*. Moscow: Rosstat; 2017. 261 p.

emigration in 2003–2017 for different occupations of emigrants.

In the given period, the tax losses of the Russian federal budget almost doubled. This can be explained by the annual increase in the number of labor emigrants from Russia – in the last fifteen years this figure has grown by about 30%. Since 2014, general emigration from Russia has risen by 22.5% in comparison with 2013<sup>3</sup>. An upsurge in labor emigration was observed in 2008 and 2010. An increase in tax losses since 2011 is related to the growth in the nominal gross monthly wage of those categories of professionals who are more prone to emigrate: managers and highly qualified specialists. Importantly, the growth in the number of emigrants to non-CIS countries, which started in 2014, is a continuing trend. Thus, there is likelihood that PIT losses will continue growing in the nearest future.

Table 1 shows our calculations of PIT revenues related to labor migration in 2012–2017.

The data show a decline in the revenues from PIT on earned income in 2015 resulting from the drastic fall in the number of labor migrants in the same year (by

42.3%)<sup>4</sup> caused by the rouble devaluation and new laws. At the beginning of 2015, work permits for labor migrants from CIS countries were replaced by work patents. In order to obtain such patents, migrants were obliged to provide a full set of documents.

The downward trend in migration to Russia, which started in 2015, still continues. It encompassed not migrants from remote countries but also those from Central Asia. This process is caused by the shrinking labor market and it is unlikely that in the nearest future there will be a rise in PIT revenues from migrants' earned incomes.

In this respect, it is interesting to look at the balance of the PIT losses and revenues in relation to population migration and at the share of this balance in the total tax revenue of the Russian state consolidated budget (see Table 2).

It should be noted that, throughout the whole given period, the balance was positive, which means that labor migra-

<sup>4</sup> Final Report on Migration, Outcomes and the Main Areas of Activity of the Federal Migration Service in 2015. General Administration for Migration Issues of the Ministry of Internal Affairs of Russia. Available at: [https://xn--b1a-b2a0a.xn--b1aew.xn--p1ai/upload/site1/document\\_file/doklad.pdf](https://xn--b1a-b2a0a.xn--b1aew.xn--p1ai/upload/site1/document_file/doklad.pdf) [Accessed: 12.11.2019].

<sup>3</sup> Rosstat data.

Table 1

**PIT revenues of the consolidated budget of Russia in relation to labor migration in 2012–2017, mln rbs**

Indicators	2012	2013	2014	2015	2016	2017
Income of foreign citizens and stateless persons on the territory of Russia and from sources in Russia, taxed at the rate:	401,886.51	406,772.20	375,754.80	331,917.69	353,286.52	371,754.30
15%	4 287.52	3 927.09	4 991.93	11,701.61	13,582.67	20,658.86
30%, including:	49,668.91	48,397.62	43,941.77	34,656.99	28,915.87	27,642.29
30% (earned income)	14,241.56	6 698.68	22,587.75	30,142.44	27,893.68	26,421.67
30% (unearned income)	35,427.35	41,698.94	21,354.02	4 514.55	1 022.19	1 220.62
13%	341,676.50	347,349.06	317,618.61	255,515.99	284,358.31	276,653.16
at other rates (stipulated by international agreements)	6 253.59	7 098.43	9 202.49	30,043.10	26,429.68	46,799.99
Tax base at the rate:	291,523.13	313,612.72	308,427.89	270,731.73	292,989.02	310,885.29
15%	4 283.22	3 921.78	4 981.38	10,316.33	13,557.40	20,638.77
30%, including:	43,915.33	42,639.64	38,644.10	26,420.11	21,271.94	18 027,94
30% (earned income)	12 735.45	5 969,55	19 708,49	22 985,49	20 421,06	17,126.55
30% (unearned income)	31,179.89	36,670.09	18,935.61	3 434.61	850.88	901.40
13%	237,219.53	259,985.68	256,007.28	205,209.60	232,146.18	227,675.07
at other rates (stipulated by international agreements)	6 105.05	7 065.62	8 795.14	28,785.70	26,013.50	44,543.51
PIT charged at the rates:	45,359.36	48,019.49	46,745.32	39,797.66	42,053.10	43,729.63
15%	612.16	585.29	743.44	1 525.40	1 999.29	3 086.65
30%, including:	13,081.41	12,705.09	11,527.84	7 794.41	6 343.44	5 354.88
30% (earned income)	3 793.61	1 778.71	5 879.20	6 781.13	6 089.71	5 087,14
30% (unearned income)	9 287.80	10,926.37	5 648.64	1 013.27	253.74	267.74
13%	30,838.54	33,798.14	33,280.95	26,677.25	30,179.00	29,597.76
at other rates (stipulated by international agreements)	827.25	930.98	1 193,10	3 800,61	3 531,37	5 690,34
Budget revenues from the PIT at the rate:	44,450.14	46,552.78	44,404.73	38,428.22	41,106.01	42,698.36
15%	571.98	562.95	706.99	1 401.89	1 976.09	3 038.33
30%, including:	11,628.24	12,705.09	10,626.54	7 758.99	6 397.61	5 081.46
30% (earned income)	3 372.19	1 778.71	5 419.54	6 750.32	6 141.71	4 827.38
30% (unearned income)	8 256.05	10,926.37	5 207.01	1 008.67	255.90	254.07
13%	31,476.25	32,380.49	31,944.51	25,780.07	29,284.20	28,995.07
at other tax rates (stipulated by international agreements)	773.67	904.25	1 126.69	3 487.27	3 448.11	5 583.5
Revenues from the PIT on earned income	34,848.44	34,159.26	37,364.05	32,530.39	35,425.91	33,822.46

Table 2

**Changes in the share of the balance of PIT losses and revenues in relation to population migration in the total revenue of the Russian state consolidated budget in 2013–2017**

Indicators	2013	2015	2017
PIT losses, mln rbs	928.86	834.56	999.40
PIT revenues, mln rbs	34,159.21	32,530.39	33,822.46
Balance (additional tax revenues), mln rbs	33,230.35	31,695.83	32,823.05
Total tax revenues, mln rbs	9,982,028.31	9,644,378.09	11,177,264.26
Share of the balance in the total tax revenue, %	0.33	0.33	0.29

tion provides additional tax revenues to the budget. A sharp reduction in the balance by 2015 was caused by the drop in the net migration gain in Russia and by the falling wage level across the country.

An increase in this indicator by 2017 was not, however, caused by migration but largely stemmed from the enhanced quality of tax administration, resulting in higher tax collection rates, and the rising wage level.

An alarming trend observed between 2013–2017 was the decline in the balance in absolute terms by 407.3 million roubles as well as the shrinkage of the share of the balance in tax revenues – from 0.33% to 0.29%.

#### 4.2. Estimation of budgetary revenues and losses from VAT and excise taxes

In order to estimate revenues and losses from indirect taxes, we calculated the sum of VAT and excise taxes paid on average by one member of a household per year by using the prices for excisable goods in 2012–2017. Table 3 shows our calculations of excise taxes in 2017.

To save space, we are not going to discuss in detail the computation procedure but will proceed straight to the results.

Figure 2 illustrates the dynamics of VAT losses and revenues in relation to international migration in 2012–2017.

Table 3  
Average amount of excise taxes paid by one member of a household per year as a percentage of product price in 2017

Consumer expenditures, by product type	Consumer expenditures		Consumer price for a product, unit/rbs*	Product quantity taxable base)	Excise rate	Excise taxes paid on average by one member of a household per year, rbs
	%**	rbs per person***				
Car petrol A-76 (AI-80), l	0.029	60.45	35.22	0.0012	13,100	16.08
Car petrol AI-92 (AI-93, etc), l	2.013	4196.28	37.95	0.0813	13,100	1064.70
Car petrol AI-95 and petrol of higher octane rating, l	1.31	2730.82	41.01	0.0499	13,100	654.25
Fortified grape wine, alcohol level 20%, l	0.37	771.30	541.79	1.42	18	25.63
Table grape wine (dry, semi-dry, semi-sweet), alcohol level 14% and 8% sugar, l	0.918	1913.66	394.15	4.86	18	87.39
Russian-made sparkling wine, l	0.178	371.06	320.63	1.16	36	41.66
Diesel fuel, l	0.2	416.92	40.24	0.0089	6800	60.58
Russian-made ordinary cognac, l	0.58	1209.06	1303.04	0.37	523	194.11
New imported car, unit	1.273	2653.69	1,166,061.23	0.23	43	9.79
Foreign imported second-hand car, unit	1.537	3204.02	561,778.58	0.57	43	24.52
Foreign-branded car assembled in Russia, unit	1.652	3443.75	780,158.86	0.44	43	18.98
New Russian-made car, unit	0.724	1509.24	475,413.29	0.32	43	13.65
Beer of international brands, l	0.201	419.00	226.81	1.85	21	38.79
Russian beer, l	1.069	2228.43	110.22	20.22	21	424.58
Russian unfiltered cigarettes, pack	0.5	1042.30	80.46	0.26	3685	954.73
Filtered cigarettes of international brands, pack	0.391	815.08	115.89	0.14	3685	518.35
Russian filtered cigarettes, pack	0.785	1636.40	80.46	0.41	3685	1498.92
<i>Total</i>	100	208,448.78	X	X	X	5646.70

\* Prices in Russia. 2018: Statistical Yearbook. Moscow: Rosstat; 2018. 142 p.

\*\* Unified Interdepartmental Statistical Information System (EMISS). Moscow; 1999–2018. Available at: <https://fedstat.ru/> [Accessed: 12.11.2019].

\*\*\* Social Standing and Quality of Life of the Russian Population. 2017: Statistical Yearbook. Moscow: Rosstat; 2017. 332 p.

First, the amount of VAT revenues exceeds that of losses. Second, VAT losses demonstrate a pronounced upward trend, which is directly connected to the increase in the number of emigrants, taking their assets with them. Third, the dynamics of VAT revenues is unstable: they peaked in 2014, which can be explained by the increase in average consumer spending per capita until 2014, that is, until the time when consumer preferences started to be affected by the economic recession.

Figure 3 illustrates the dynamics of excise tax losses and revenues in relation to international migration in 2012–2017.

Excise tax losses demonstrate a clear upward trend. As for the revenues, in 2014 and 2015, they fell considerably. This can be explained by the recession, when people cut their spending on certain categories of goods, in particular those that do not belong to consumer staples.

Figure 4 shows the balance of losses and revenues from VAT and excise taxes in 2012–2017.

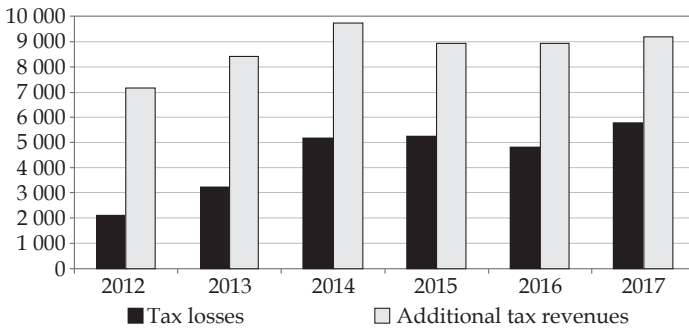


Figure 2. Changes in VAT losses and revenues in relation to international migration in 2012–2017, mln rbs

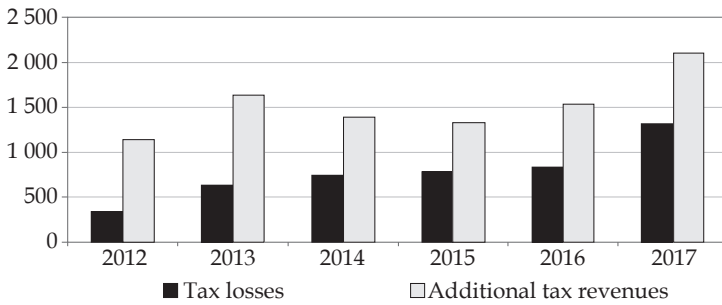


Figure 3. Changes in excise tax losses and revenues in relation to international migration in 2012–2017, mln rbs

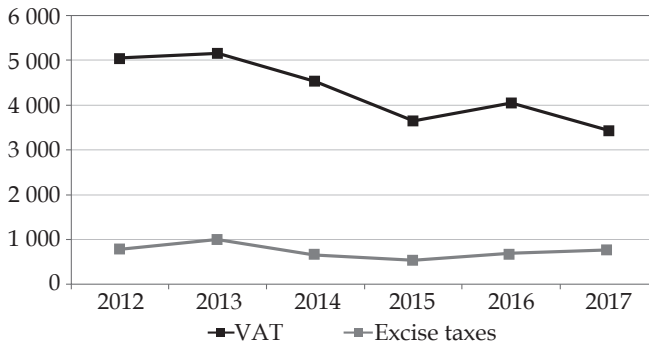


Figure 4. Balance of losses and revenues from VAT/excise taxes in 2012–2017, mln rbs

For Russia, the positive balance in the case of VAT and excise taxes is beneficial because it provides extra opportunities to replenish the state budget out of the pockets of foreign citizens.

This difference, however, is growing smaller every year because emigration exceeds immigration. The absolute difference between VAT revenues and losses in relation to international migration has decreased by 1,619 million roubles, for excise taxes – by 19 million.

### 5. Discussion

Statistical reports of the Federal Tax Service do not provide data on VAT paid abroad. The only indicator included in the reports that characterizes VAT losses is the ‘sum of VAT from operations performed outside of the Russian Federation’<sup>5</sup>. The data on this indicator in the given period are quite impressive. As for VAT paid outside of Russia, the reports do not specify the sums paid by foreign organizations in Russia or by withholding agents. This figure remains ‘hidden’ in other indicators. We have to solve a similar problem when dealing with the PIT: the statistical reports provide no information about the sums of the PIT paid by Russian residents abroad and subject to foreign tax credit.

To assess the efficiency of indirect tax administration we need to estimate the potential amount of these taxes to be collected annually. We should also take into consideration the potential amounts of taxes to be paid by Russian citizens, foreign citizens and stateless citizens. The VAT and excise tax revenues in the current year cannot be below this level, otherwise we are dealing with corporate tax dodging, for instance, companies concealing their income.

Thus, the proposed methodology can be used by the Federal Tax Service of Russia for administration of revenues from the PIT and indirect taxes and for reporting (‘On the Tax Base and Structure of Charges for VAT and Excise Taxes’ and

‘On Declaration of Income by Physical Persons’).

This methodology can be further improved to take into account the VAT reclaimed through the tax-free shopping (TFS) system to foreign travelers in Russia and to Russian residents traveling abroad. This is necessary to estimate the potential tax losses of the state budget since the TFS system stimulates physical persons and legal entities to buy goods on which VAT is charged abroad.

### 6. Conclusion

The pronounced negative trend in the sphere of net migration gain which started in 2014 makes the task of estimating tax losses in connection with the increased outflow of migrants from Russia particularly relevant.

Our research focused only on those taxes that constitute the tax burden on physical persons, such as the personal income tax and indirect taxes. There is no official information on the PIT paid by Russian residents abroad, which makes them entitled to a foreign tax credit. However, information on the revenues from the PIT paid by non-residents of Russia can be deduced from the official data. The situation with indirect taxes is quite the opposite: the data about the VAT paid by Russian resident companies outside of Russia are available but there are no data about the VAT payments made by non-residents.

Our analysis has led us to the following conclusions. Despite the fact that traditionally migration had a positive influence on budgetary revenues (through PIT and indirect taxes), since 2014, the situation has been reversed and the impact of migration on the country’s consolidated budget has become negative. Overall, between 2011 to 2017, the absolute difference between VAT revenues and losses in relation to international migration fell by 1,619 million roubles, for excise taxes – by 19 million.

What causes most concern is the fact that the difference between the revenues and losses from the PIT on earned income dropped by 407.3 million roubles. The share of this difference in the total tax rev-

<sup>5</sup> Federal Tax Service of the Russian Federation. Moscow, 2005–2019. Available at: <http://www.nalog.ru> [Accessed: 12.11.2019].



enue of the Russian state budget has also shrunk – from 0.33% to 0.29%. The above-described trend can stem from the declining external labor migration balance.

This problem can be partially tackled through the tax reforms which are planned to be implemented in the nearest future. These reforms will include the two key areas. First, there will be a change in the criterion for fiscal residence of physical persons – the duration of uninterrupted stay in the country will be reduced from 183 days to 90 days, according to the ‘Key Areas of the Budget, Fiscal and Customs Tariff Policy in 2020–2022’<sup>6</sup>. It should be noted that the new duration of stay will be applied on a voluntary basis. In this case, highly qualified foreign specialists spend-

ing most of their time in other countries and coming to Russia for a brief stay may find it interesting to acquire Russian tax residence, since this country offers competitive PIT rates. This measure is expected to enhance budgetary tax revenues.

Moreover, a new criterion will be introduced – ‘centre of vital interests’, which will affect foreign assets of physical persons. Foreign legal entities owned by a physical person will be automatically recognized as ‘controlled foreign companies’ (CFC), which will increase the total fiscal burden imposed on them and enhance tax revenues.

Second, PIT rates will be equalized for tax residents and non-residents at the level of 13%. This step is expected to create a positive effect by discouraging well-off Russians from prolonging the duration of their stay abroad. The possible negative effect of this measure is that the lower tax rate will lead to a certain decline in the tax revenues of regional budgets.

<sup>6</sup> Key Areas of the Budget, Fiscal and Customs Tariff Policy in 2020 and for the Planning Period of 2012 and 2022 (Approved by the Ministry of Finance of Russia). Available at: [http://www.consultant.ru/document/cons\\_doc\\_LAW\\_334706/](http://www.consultant.ru/document/cons_doc_LAW_334706/) [Accessed: 12.11.2019].

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### Inconsistencies of small business fiscal stimulation in Ukraine

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#### ABSTRACT

The article discusses the effects of fiscal instruments used to stimulate the development of small business in Ukraine and the hypothesis that the inconsistencies inherent in these instruments prevent them from achieving the desired outcomes. To test this hypothesis, the authors estimated the percentage of small businesses covered by the simplified tax scheme and analyzed such fiscal instruments as the simplified tax scheme, various types of debt financing and taxation of debt financing. The authors used the data on the amount and dynamics of repayable financial assistance to estimate the scale of the phenomenon of corporate split-ups. The latter might be caused by the interest of large and medium-sized companies in accessing small business tax preferences. To calculate the amount of repayable financial assistance the authors propose to adjust the indicator of other current liabilities for the following indicators: other current accounts payable; interest incomes of resident banks; interest incomes of non-resident banks from their lending transactions in Ukraine; commission incomes of resident banks; and the total amount of corporate bonds. The analysis relies on the data of the State Statistics Service of Ukraine on activity of companies and the data of the National Bank of Ukraine on the country's banking system in 2012–2017. The results of the analysis have confirmed the initial hypothesis about the contradictory effects of fiscal instruments:

1) In the given period, from 22% to 38% of small businesses did not have access to the benefits of the simplified tax system due to the inadequacy of the criteria for defining the size of business.

2) The taxation norms discriminated against small businesses seeking to use specific instruments of debt financing: instead of stimulating the development of start-ups, these fiscal instruments encouraged large and medium-sized companies to split into smaller units.

3) What distinguishes Ukraine from other countries is the wide use of repayable financial assistance by small businesses to attract funds. Calculations have shown that the share of repayable financial assistance among other available instruments of debt financing in the given period exceeded 28%.

Thus, the findings indicate that further improvements of small business taxation are necessary.

#### KEYWORDS

fiscal instruments, simplified tax system, debt financing, repayable financial assistance, small business

JEL H25, H30

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### Противоречия фискального стимулирования малого бизнеса в Украине

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#### АННОТАЦИЯ

В статье проверяется утверждение о том, что использование отдельных фискальных инструментов по отношению к малому бизнесу в Украине носит противоречивый характер и не способствует его развитию. Для проверки выдвинутой

гипотезы исследовалась степень охвата субъектов малого предпринимательства особым (льготным) режимом налогообложения, фискальные инструменты стимулирования малого бизнеса (упрощенная система налогообложения, различные формы долгового финансирования и порядок их налогообложения), процесс искусственного дробления компаний для использования налоговых льгот и преимуществ малого бизнеса. Предложена методика оценки масштабов искусственного дробления компаний косвенным методом, на основе данных об объёмах и динамике возвратной финансовой помощи. Для оценки масштабов возвратной финансовой помощи предложено корректировать показатель прочих текущих обязательств, отраженный в балансе национальной экономики, на следующие показатели: прочая текущая кредиторская задолженность; процентные доходы банков-резидентов; процентные доходы банков – не резидентов по кредитным операциям в Украине; комиссионные доходы банков-резидентов; объем выпущенных корпоративных облигаций. Базой исследования послужили данные Государственной службы статистики Украины о деятельности субъектов хозяйствования и данные Национального банка Украины о показателях банковской системы Украины за 2012–2017 гг. Результаты исследования подтвердили предположение о существовании противоречий фискальных инструментов стимулирования малого бизнеса в Украине:

1) От 22 до 38% субъектов малого бизнеса в рассмотренный период не могли использовать преимущества упрощенной системы налогообложения для своего развития вследствие несовершенства критериев отнесения субъектов предпринимательства к малым.

2) Дискриминационные нормы налогового законодательства, действующие в случае использования субъектами малого предпринимательства разных (отдельных) инструментов долгового финансирования, привели к стимулированию процесса дробления больших и средних предприятий вместо стимулирования развития стартапов.

3) Возвратная финансовая помощь широко используется как специфический инструмент привлечения дополнительных финансовых ресурсов в малом бизнесе. Расчет по предложенной методике показал, что ее удельный вес в структуре всех инструментов текущего долгового финансирования в экономике Украины на конец периода исследования превысил 28%.

Сделан вывод о том, что совершенствование налогообложения субъектов малого предпринимательства в Украине является чрезвычайно важным направлением налоговой политики государства.

#### КЛЮЧЕВЫЕ СЛОВА

фискальные инструменты, упрощенная система налогообложения, долговое финансирование, возвратная финансовая помощь, малый бизнес

### 1. Introduction

The simplified tax system (STS) introduced in 1999 is the main fiscal instrument used in Ukraine to boost small business. Even though the system has been operating for twenty years now, so far it has not brought the desired effect. Unlike developed countries, the share of small business in the GDP of Ukraine is less than 25% and as for employment, in the last decade small businesses accounted for only 32–36% of jobs. Interestingly enough, the share of small business in the national economy is estimated by the statistical authorities as 99%<sup>1</sup>.

The simplified tax system was adjusted numerous times, which included changes of the unified tax rate, the tax charge procedure, the types of taxes replaced by the unified tax, and the eligibility criteria. In the recent decade, the state policy was largely aimed towards improving the quality of administrative services to small private entrepreneurs while the task of eliminating the contradictions inherent in the tax legislation was all but ignored.

As is commonly known, for the realization of their economic potential, small enterprises depend on the available sources of funding, which includes debt financing. In other words, a key factor of success in business is to obtain sufficient financial

<sup>1</sup> Activity of Economic Entities 2017: Statistical Yearbook. 2018. Available at: [https://ukrstat.org/uk/druk/publicat/kat\\_u/publ9\\_u.htm](https://ukrstat.org/uk/druk/publicat/kat_u/publ9_u.htm)

resources. One of the main barriers to the development of entrepreneurship in Ukraine is considered to be the insufficient access to bank loans. Even though we cannot but acknowledge the significance of this argument, it should, however, be noted that unlike developed economies, in Ukraine the current accounts payable and repayable financial assistance make up a prominent share among other sources of external funding. We believe that the specific patterns of small businesses' debt financing in Ukraine are to a great extent determined by the inconsistencies of the corresponding tax norms while the existing fiscal instruments are inadequate and often contradictory, unable to provide sufficient stimulation for the development of small business in Ukraine. To test this hypothesis, we are going to consider the following questions:

1. To what extent do small businesses have access to tax preferences provided by the STS? In our view, the majority of small enterprises are not covered by this system.

2. What are the fiscal implications of debt financing instruments being used by small businesses? We suppose that the specific structure of debt financing instruments results directly or indirectly from the existing tax norms.

3. Is it possible for large businesses to abuse the STS? In our view, the STS encourages medium-sized and large companies to split up into smaller units in order to reduce the tax burden, which is potentially bad for the country's economy.

The article is structured as follows. The introduction is followed by a literature review in the second section. The third section describes the research methodology. The fourth section compares the criteria for defining the size of business in government accounting and in tax legislation of Ukraine and shows how these criteria affect companies' eligibility for the STS. The fifth section analyzes the fiscal implications of small businesses' use of debt financing instruments. The sixth section explores the problem of corporate split-ups aimed at using small business tax preferences. The final section discusses the research results.

## 2. Literature review

Small business taxation has attracted much scholarly attention, in particular the question of special (preferential) tax treatment and its role in this sector of economy. For instance, C. Evans [1] has shown that the overall tax burden on small businesses is much heavier than on large companies. Therefore, special (preferential) tax regimes are necessary to provide sufficient support for small businesses.

A vast amount of research literature focuses on the differences between the European tax systems and on various cases of contradictions and inconsistencies of taxation. K. V. Pashev uses the case of Bulgaria [2] to show that the tax burden of compulsory social contributions on small businesses is disproportionately heavy and, therefore, has a discriminatory character. Moreover, he reveals the negative elements of tax administration discriminating against small business. G. Smatrakalev [3] contends that it is necessary to reconsider the small business tax policy in the context of the EU expansion and demonstrates the need for unification of approaches in the tax sphere within the EU.

The introduction of a special (preferential) tax scheme makes it crucial to specify the criteria for defining the size of a business. There is no universally accepted definition of 'small business' in the world practice [4; 5]. The criteria of a small business depend on the tax regulation norms applied in this or that country. In the majority of countries these criteria include the number of employees, income, and assets size [6, p. 127–136]. In the USA, being a 'small business' means that a firm employs less than 500 people and 80% of small businesses are self-employed persons [7]. In the EU, these criteria are determined by the European Commission<sup>2</sup>: an enterprise is considered small or medium-sized if it employs 250 workers or less, its turnover does not exceed 50 million euro, and its balance sheet total is less than

<sup>2</sup> Commission Recommendation of 6 May 2003 concerning the definition of micro, small and medium-sized enterprises. Available at: <https://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2003:124:0036:0041:EN:PDF>

43 million euro. Moreover, no more than 25% of its shares can be owned by another enterprise. The latter criterion is criticized by H.-E. Hauser [8, p. 58] on the grounds that the majority of European registers do not contain information about the connections between enterprises, which means that some legal entities belonging to other legal entities or controlled by them will qualify for small and medium-sized enterprises according to the criteria of European statistics provided that the staff of these companies are no more than 250 people.

H.-J. Wolter and H.-E. Hauser [9] found that there was a 5% difference between the share of small and medium-sized enterprises (SMEs) when identified according to the qualitative criterion and to the quantitative criterion.

B. Günterberg and G. Kayser [10] criticize the European Commission's parameters of a small business. In their view, the upper limit of 250 employees has a discriminatory character. They also believe that a company's assets is not an optimal indicator since it can increase for the reasons unrelated to the size of the enterprise.

Sufficient funding is essential for small businesses' integration into the market environment. This fact has been confirmed by a number of studies based on the analysis of empirical data (L. D. Wamba, L. Hikkerova, J.-M. Sahut, E. Braune [11] and A. Ključnikov, J. Belás, L. Kozubíková, P. Paseková [12]). These studies have introduced the term 'financial gap', which is used to denote a problem frequently faced by small businesses – the failure of a small enterprise to meet its financial obligations and mobilize additional internal or external funds when the need arises.

The role of the company's capital structure as the factor in its choice of sources of funding was discussed by S. Kumar and P. Rao [13], A. Ono, I. Uesugi [14] and W. Zhou [15], who came to the conclusion that the main external source of funding for small enterprises both in developed and developing economies is the bank loan. At the same time there are factors that impede small businesses from accessing loans such as small businesses' lack of transparency, lack of sufficient business

collateral [16; 17], a large amount of the already existing debt obligations [12]; and inefficient or inadequate management of borrowed funds [18]. After the global financial crisis, banks started setting higher interest rates for small businesses in comparison with large ones, which exacerbated the problem [19; 20].

Small businesses need alternatives to bank loans, such as accounts payable and commercial loans (B. Coulibaly, H. Sapriza, A. Zlate [21], S. Centineo [22] and R. Bastos, J. Pindado [23]). According to these authors, during the financial crises in Europe, commercial loans were used to cover about 50% of the costs of purchases of raw materials and goods. A. Demirgüç-Kunt and V. Maksimovic [24] have shown that commercial loans rank second in terms of external funding sources used by small businesses both in developed and developing countries.

It should be noted that the relationship between bank and commercial loans in external financing practices also attracts considerable scholarly attention. T. Lin and J. Chou believe that in the time of financial crisis commercial loans act as substitutions for bank loans and that this process is accompanied by a decline in the amount of lending [25]. It is essential to maintain a sensible balance between bank and commercial loans in the structure of small business financing (Demirgüç-Kunt, V. Maksimovic [26], A. Rahman, Z. Rozsa, M. Cepel [27]).

The majority of European countries seek to improve SMEs' access to funding by providing them with additional sources of capital and introducing new incentives for start-up development. This is usually done in the form of grants (non-repayable). The study of V.M. Mihai [28] seems particularly relevant in this respect: she showed the positive effect of external non-repayable grants on the development of small business in Romania. However, other studies conducted in EU countries (for instance, Poland) have revealed the problem of poor management of the funds obtained by businesses through government subsidies [29].

A. Basu, S.C. Parker [30], T. Bates [31], A. Bădulescu [32], A. Terungwa [33],

W. A. Abbasi, Z. Wang, D. A. Abbasi [34], A. M. Abdulsaleh, A. C. Worthington [35] demonstrate that in some countries, small businesses use only their own capital (family savings and money borrowed from relatives) while sources of external funding are used only in cases of emergency.

K. Onji [36] has proven that a reduction in tax burden through the STS may act as a stimulus for large and medium-sized countries to split into smaller units and thus get access to tax preferences. Thus, medium-sized and large enterprises are highly sensitive to the introduction of special tax schemes for small enterprises. When corporate split-ups start happening on a massive scale, it does not always lead to significant budget losses [36]. For instance, the introduction of a simplified tax regime for small enterprises in Japan triggered corporate split-ups and, consequently, in 1988–1991 the annual growth in the number of businesses was 10.7–12.7% while VAT losses were only 0.5%.

The issues we highlighted above generated vigorous debates among scholars and consensus has not yet been achieved in research literature.

### 3. Methodology

It should be noted that when businesses split in order to benefit from tax preferences and incentives, this process is usually hidden and is not reflected in the statistics. It can be detected only through indirect evidence, such as the data on the amount of repayable financial assistance and its dynamics.

From the perspective of tax legislation, repayable financial assistance consists of the funds the taxpayer receives under the agreement stipulating that this assistance is interest-free but needs to be repaid<sup>3</sup>. The lender has no commercial interest in granting the borrower a repayable financial assistance. Therefore, it is usually offered only to firms integrated into the lender's economic activity, in other words, the receivers of such assistance are normally the

businesses which emerged as a result of a split of a larger business.

National statistical and tax authorities of Ukraine do not keep record of the amounts of repayable financial assistance, which makes it difficult to estimate the scale of this phenomenon. For this purpose, we developed our own methodology based on the application of the following formula:

$$R_{fa} = CL_o - 0,2 \cdot CP_o - II_{rb} - II_{non-rb} - CI_b - B, \quad (1)$$

where  $R_{fa}$  is repayable financial assistance;  $CL_o$  are other current liabilities;  $CP_o$  is other current debt payable;  $II_{rb}$  are the interest incomes of resident banks;  $II_{non-rb}$  are the interest incomes of non-resident banks from their lending transactions in Ukraine;  $CI_b$  are the commission incomes of resident banks;  $B$  is the total amount of corporate bonds.

The use of the proposed formula to calculate the amount of repayable financial assistance is justified by the following considerations.

In the official statistical data, short-term repayable financial assistance is included in item 'Other current liabilities' together with other elements ( $CL_o$ ). Long-term repayable financial assistance is not considered feasible as it involves fiscal implications. Therefore, this kind of funding should be predominantly short-term.

To find the sum of repayable financial assistance we need to subtract the rest of the elements from 'Other current liabilities'. The difficulty lies in the fact that they are not specified separately by the State Statistics Service. Therefore, we had to use other official data sources.

Applying the proposed formula, we subtracted the sum of prepayment VAT – 20% (VAT rate in Ukraine) of 'Other accounts payable' from 'Other current liabilities' ( $CP_o$ ). Item 'Other accounts payable', apart from the prepaid amounts received from customers, which is the basis for computing prepayment VAT, contains the sums of current accounts payable in settlements with founders, participants and in internal settlements. As a result of such calculations, the sum of prepayment VAT will be slightly higher while the required

<sup>3</sup> Tax Code of Ukraine of 02.12.2010 No. 2755-VI, item 14.1.257. Available at: <http://zakon2.rada.gov.ua/laws/show/2755-17>



sum of repayable financial assistance will be slightly on the low side.

The interest incomes of banks ( $I_{rb}$ ) were calculated by using the reports of the National Bank of Ukraine. On the national scale, this indicator corresponds to the interest incomes of the Ukrainian banking system. The insignificant deviation (less than 4%) in the current liabilities of businesses in the form of short-term loan repayments in the consolidated national statistics (541109.3 million hryvnias in 2017<sup>4</sup>) and the amount of outstanding debt (561328.193 million hryvnias in 2017<sup>5</sup>), according to the data of the National Bank of Ukraine, shows that our decision to use interest incomes of Ukrainian banks as the amount of interest accrued on business loans was quite justified. These calculations do not take into account the fact that a part of banks' interest incomes come from personal loans. Since the amount of bank lending to individuals in Ukraine is declining, the influence of this factor is insignificant.

Item 'Other current liabilities' also includes short-duration bonds issued by companies ( $B$ ); their current liabilities to banks for cash desk services, fiduciary transactions, securities transactions, and currency market transactions ( $CI_b$ ); their settlements with employees and with special-purpose state funds.

According to the official data of the National Commission on Securities and Stock Market of Ukraine<sup>6</sup>, the majority of corporate bonds in the non-financial sector are short-duration bonds. Therefore, we subtracted the amount of bonds issued by Ukrainian businesses ( $B$ ) from the sum of their other current liabilities.

Current liabilities of businesses to banks for cash desk services, fiduciary transactions, securities transactions and currency market transactions form com-

mission incomes of banks ( $CI_b$ ). Therefore, we subtracted the commission incomes of Ukrainian banks (the data were taken from the reports of the National Bank of Ukraine) from the sum of other current liabilities of businesses.

In the absence of the necessary information, we cannot identify the exact sums for items 'Settlements with employees' and 'Settlements with special-purpose state funds'. These sums account for a negligible share in 'Other current liabilities' (1–2%). Therefore, we omitted them from our calculations of repayable financial assistance, which resulted in a slightly higher sum.

The proposed method, nevertheless, enables us to make a more or less accurate estimation of the amount of repayable financial assistance. Our hypothesis can be tested by comparing the growth rates of the amounts of repayable financial assistance with the growth rates of the number of small businesses.

The novelty of this method lies in the fact that this way we can connect the rates and scale of small business development in Ukraine with the debt of small businesses, in which the key role is played by repayable financial assistance. This approach will enable us to bring to light the inconsistencies in fiscal instruments used in Ukraine to stimulate small business and the specific patterns of debt financing in Ukraine.

#### 4. Small businesses' access to the STS

It should be noted that in Ukraine, the criteria a company has to meet to qualify as a 'small business' are different for public accounting and for taxation purposes, which is why in 2014–2017 from 15% to 35% of private entrepreneurs and 51–57% of small legal entities were not eligible for the benefits of the STS (Figure 1).

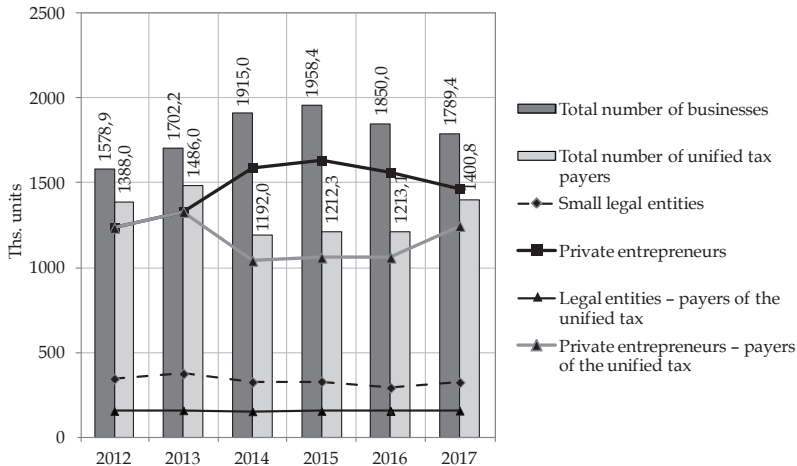
While formally, the share of small enterprises in the total number of businesses in the country is 99%, the actual share of those able to use the STS is much smaller: in the recent years it has been within the range of 62–78%.

Moreover, for companies with a high expenses to income ratio, the use of the

<sup>4</sup> Activity of Economic Entities 2017: Statistical Yearbook. 2018. Available at: [https://ukrstat.org/uk/druk/publicat/kat\\_u/publ9\\_u.htm](https://ukrstat.org/uk/druk/publicat/kat_u/publ9_u.htm)

<sup>5</sup> Indicators of the Bank System of Ukraine. Available at: [https://bank.gov.ua/control/uk/publish/category?cat\\_id=74208](https://bank.gov.ua/control/uk/publish/category?cat_id=74208)

<sup>6</sup> National Commission on Securities and Stock Market. Available at: <http://www.ssmc.gov.ua/activities/annual>



**Figure 1. Dynamics of the number of small businesses and unified tax payers in Ukraine in 2012–2017**

Based on the official data provided by the Press-Service of the State Fiscal Service of Ukraine: Press-Service of the State Fiscal Service of Ukraine. 17.10.2017. Available at: <http://sfs.gov.ua/media-tsentr/novini/313393.html>; Ministry of Finance of Ukraine: Report on monitoring the efficiency of the Decree of the Ministry of Finance of Ukraine 'On Approval of Unified Tax Forms'. Regulatory acts efficiency monitoring reports. Available at: <https://www.minfin.gov.ua/news/view/zvoity-pro-vidstezhennia-rezultatyvnosti-rehuliatorynykh-aktio?category=zakonodavstvo&subcategory=reguljatorna-aktivnist>

STS becomes infeasible. In the case of the STS, the amount of tax payable does not depend on the expenses, which creates a heavier tax burden than in the case of the general tax system, where taxation base is calculated by subtracting expenses from the total income. Thus, a turnover tax included into the unified tax could be productive as a way of supporting only economically viable businesses.

### 5. Fiscal effects of debt financing instruments

Accounts payable are the most widely spread instrument of debt financing in the practices of Ukrainian enterprises.

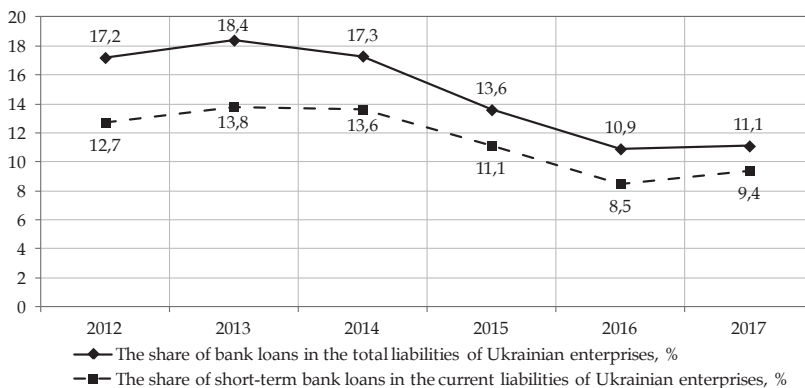
Accounts payable, considered by the State Statistics Service together with commercial loans, are popular because they are less costly and are not subject to taxation. The annual rates of growth in debt financing are quite high in Ukraine due to the increased use of accounts payable financing and are likely to continue increasing. This figure rose from 14.8% in 2014 to 18.1% in 2016 but in 2017 it fell to 13%<sup>7</sup>.

<sup>7</sup> Activity of Economic Entities 2017: Statistical Yearbook. 2018. Available at: [https://ukrstat.org/uk/druk/publicat/kat\\_u/publ9\\_u.htm](https://ukrstat.org/uk/druk/publicat/kat_u/publ9_u.htm)

In the last ten years, the share of bank loans has been shrinking in the share of borrowed funds of Ukrainian enterprises (see Figure 2). This figure dropped from 23.2% in 2008 to 11.1% in 2017. The same can be said about the share of short-term bank loans in the current liabilities of companies, which fell from 12.7% in 2012 to 9.4% in 2017. This means that short-term bank loans are losing their popularity.

Ukrainian legislation states the need to provide support for small enterprises and aspiring entrepreneurs<sup>8</sup>. Nevertheless, if we look at the actual practices of the Tax Code implementation, especially those related to debt financing and small businesses, we will see that these practices often go against the basic principles of state policy.

<sup>8</sup> Decree of the Cabinet of Ministers of Ukraine 'On Approval of the Concept of the State Program of Development of Small and Medium-Sized Entrepreneurship for 2014–2024' of 28 August 2013 No. 641. Available at: <http://zakon5.rada.gov.ua/laws/show/641-2013-p#n9>; Law of Ukraine 'On the State Program of Development of Small and Medium-Sized Entrepreneurship for 2014–2024' of 22.03.2012 No. 4618-VI Available at: <http://zakon5.rada.gov.ua/laws/show/4618-17/paran3#n3>



**Figure 2. Dynamics of the share of bank loans in the total liabilities of enterprises in Ukraine in 2012–2017, %**

Based on the official data of the State Statistics Service of Ukraine. Activity of Economic Entities 2017: Statistical Yearbook. 2018. Available at: [https://ukrstat.org/uk/druk/publicat/kat\\_u/publ9\\_u.htm](https://ukrstat.org/uk/druk/publicat/kat_u/publ9_u.htm); National Bank of Ukraine; Monetary and Financial Statistics of the National Bank of Ukraine. Available at: [https://bank.gov.ua/control/uk/publish/article?art\\_id=27843415](https://bank.gov.ua/control/uk/publish/article?art_id=27843415)

As an illustration, let us consider the situation when the interest on loan (similar to other debt-related expenditures) is considered as a financial expense and, therefore, reduces the company's tax liability. This, however, is not the case for private entrepreneurs in the general tax scheme. The interest they have to pay on loan is not considered a tax deductible expense. Such situation is not conducive to the development of small business in Ukraine and means that tax laws discriminate against small business.

As we have already pointed out, repayable financial assistance is widely used by Ukrainian enterprises – a trend that is particularly characteristic of Ukraine and distinguishes it from world practices.

Ukrainian legislation<sup>9</sup> prohibits a company from acquiring a financial loan (interest credit) from another legal entity, if the latter does not have a status of a financial institution, which turns repayable financial assistance into a form of hidden lending. Thus, it seems reasonable to suppose that there is a formal or informal relationship between the donor company and

the recipient company, which, in all likelihood, used to be parts of a larger company before the split-up.

We applied Formula 1 to calculate the amounts of short-term repayable financial assistance. The results of our calculations are shown in Table 1.

Our calculations have shown that the practice of using repayable financial assistance is becoming more widely spread in Ukraine (Figure 3).

We can see that since 2015, there has been a substantial increase in the amount of current liabilities of Ukrainian enterprises, which to a certain extent can be explained by the amendments to the Tax Code. According to the amendments of 01.01.2015, imputed interest on loan is exempt from tax. The abolition of the tax norms which decreased the net profits of recipients of repayable financial assistance led to a dramatic increase in the growth rates of such assistance (87% in 2015 and 119% in 2016) and to an increase in its share among other debt financing instruments.

One of the contradictory features of the fiscal instruments is that if a small business has been using repayable financial assistance for a period longer than 12 months, it will have to pay an income tax charged on the whole principle amount of the repayable financial assis-

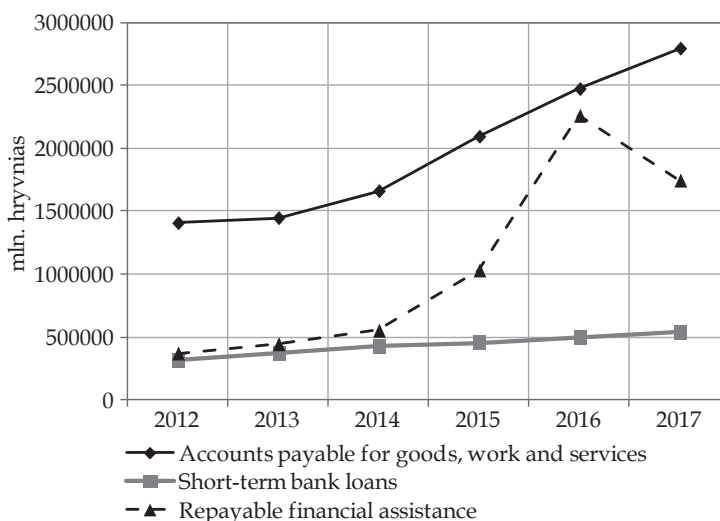
<sup>9</sup> Law of Ukraine 'On Financial Services and State Regulations of the Market of Financial Services' of 12.07.2001 r. No. 2664-III, article 4. Available at: <http://zakon3.rada.gov.ua/laws/show/2664-14>

Table 1

**Annual average current liabilities of businesses and repayable financial assistance  
in Ukraine in 2012–2017, in million hryvnias**

Indicators	2012	2013	2014	2015	2016	2017
<i>Current liabilities of small businesses</i>						
Short-term bank loans	316987.3	371760.5	428243.2	455709.4	496947.2	541109.3
Current debt payable, including	1461862.2	1505505.7	1733245	2196263.4	2587426.8	2928507.6
Accounts payable for goods, work or services	1027434.3	1109062.0	1165577.1	1405536.3	1592478.6	1880710.5
other current debt payable ( $CP_o$ )	379070	337505.6	495007.4	688549	879988.1	912704.7
Other current liabilities ( $CL_o$ )	692235.8	764994.9	914944.3	1400987.5	2665847.2	2154379.5
<i>Estimated amounts of financial assistance</i>						
Ukrainian banks' interest incomes ( $II_{rb}$ )	119278.016	132341.32	154096.53	140644.7	138958.88	126907.65
Ukrainian banks' commission incomes ( $CI_b$ )	20048.483	23104.461	26038.755	25433.797	31433.65	37146.066
Non-resident banks' interest incomes ( $II_{non-rb}$ )	53800	53800	53800	53800	53800	53800
Corporate bonds ( $B$ )	51390	42470	29010	11420	5520	8350
repayable financial assistance ( $R_{\mu}$ )	371905.301	445778	552997.54	1031979.2	2260137	1745634.8
Annual growth rate of repayable financial assistance, %	-	19.9	24.1	86.6	119.0	-22.8
Share of repayable financial assistance in the total amount of current liabilities, %	53.7	58.3	60.4	73.7	84.8	81

Source: The table is compiled by using the data of 'Activity of Economic Entities 2017': Statistical Yearbook. 2018. Available at: [https://ukrstat.org/uk/druk/publicat/kat\\_u/publ9\\_u.htm](https://ukrstat.org/uk/druk/publicat/kat_u/publ9_u.htm); Indicators of the Bank System of Ukraine. Available at: [https://bank.gov.ua/control/uk/publish/category?cat\\_id=74208](https://bank.gov.ua/control/uk/publish/category?cat_id=74208); National Commission on Securities and Stock Market. Available at: <http://www.ssmc.gov.ua/activities/annual>; [37]



**Figure 3. Usage of debt financing instruments by Ukrainian businesses in 2012–2017**

Based on the official data of the State Statistics Service of Ukraine: Activity of Economic Entities 2017: Statistical Yearbook. Kyiv, 2018. Available at: [https://ukrstat.org/uk/druk/publicat/kat\\_u/publ9\\_u.htm](https://ukrstat.org/uk/druk/publicat/kat_u/publ9_u.htm)

Table 2

## Sources of funding for small enterprises in Ukraine in 2012–2017, %

Sources of funding	Year						Structural change 2017/2012, %
	2012	2013	2014	2015	2016	2017	
Owned capital	34.0	29.5	20.4	18.0	7.2	10.2	-23,8
External funding	66.0	70.5	79.6	82.0	92.7	89.6	23.6
including:							
long-term liabilities	16.6	18.4	20.8	19.6	14.5	20.4	3.8
current liabilities, including	49.4	52.0	58.8	62.4	78.2	69.2	18.8
short-term bank loans	5.7	6.9	9.2	7.3	3.2	5.9	0.2
accounts payable	18.4	20.6	22.9	22.7	18.2	24.1	5.7
other current liabilities	23.3	23.9	26.1	31.8	56.4	38.6	15.3
Liabilities associated with fixed assets and disposal groups	-	-	-	-	0.1	0.2	-
<i>Total</i>	100	100	100	100	100	100	-

tance. The general tax system does not provide for such liabilities in the case of large and medium-sized enterprises. Having to pay this ‘tax on loan’ limits small enterprises’ potential in terms of net profit accumulation.

The patterns of debt financing in Ukraine differ significantly from those of other countries and we suppose that these patterns are largely shaped by the existing tax norms. The main recipients of repayable financial assistance are SMEs while large companies, consequently, play the role of donors. As for the structure of other current liabilities, the official statistical data for 2017 show that large companies (donors), account for 18%; SMEs (recipients), for 82% (small, 49% and medium-sized, 33%). If we look at the capital structure (it is important as a source of funds borrowed from the donor), we will see a completely opposite picture: 69% of the total own capital belongs to donors, and 31%, to recipients (small businesses, 11%; medium-sized businesses, 20%). Such capital structure is quite stable and the prevalence of borrowed funds over owners’ funds means that SMEs are faced with constrained budgets and donors help them solve this problem. Large enterprises (donors) hold the potential for debt financing. If we take into account the fact that the majority of other current liabilities (repayable financial assistance accounted for 74–84% in 2015) belongs

to SMEs (82–89.3% in the same period<sup>10</sup>), there are high chances that such structure of debt financing instruments in national economy (Table 2) is characteristic of the debt financing structure of small business.

### 6. The problem of corporate split-ups

If the use of repayable financial assistance as a debt financing instrument grows in scale and scope, it may point to the corresponding growth in the number of split-ups among large and medium-sized companies, seeking to access the benefits of the STS for optimization of their tax payments. Here resides another contradiction in the way fiscal instruments are used to support small business in Ukraine: the STS is expected to create certain fiscal preferences to stimulate start-ups rather than incite medium-sized and large businesses to split.

The structure of Ukrainian economy has a number of specific features, which make it quite different from the majority of other economies. Among other things, it is characterized by an extremely high concentration of capitals and businesses.

<sup>10</sup> The amount of loan interest paid by Ukrainian companies to foreign banks in 2016. Since there is no official data on the loan interest paid by Ukrainian companies to foreign banks in the given period, let us assume that the annual average ranged within the amount of loan interest paid by Ukrainian companies to foreign banks in 2016; [37]

For instance, in 2015, 200 large Ukrainian companies sold goods worth of 2 trillion hryvnias – 36% of total national sales. The share of small enterprises (as we already said, they account for 99% of all Ukrainian enterprises) was less than 16% [38]. The development of small business in Ukraine also has a number of distinctive features in comparison with European countries. For instance, the majority of small firms originated not as successful start-ups, as it normally happens in developed countries, but emerged as a result of privatization and the ensuing restructurization of large state enterprises. Medium-sized enterprises in Ukraine are mostly joint-stock companies with ambiguous ownership structures [39, p. 56], which makes them more prone to splitting up into smaller corporate units.

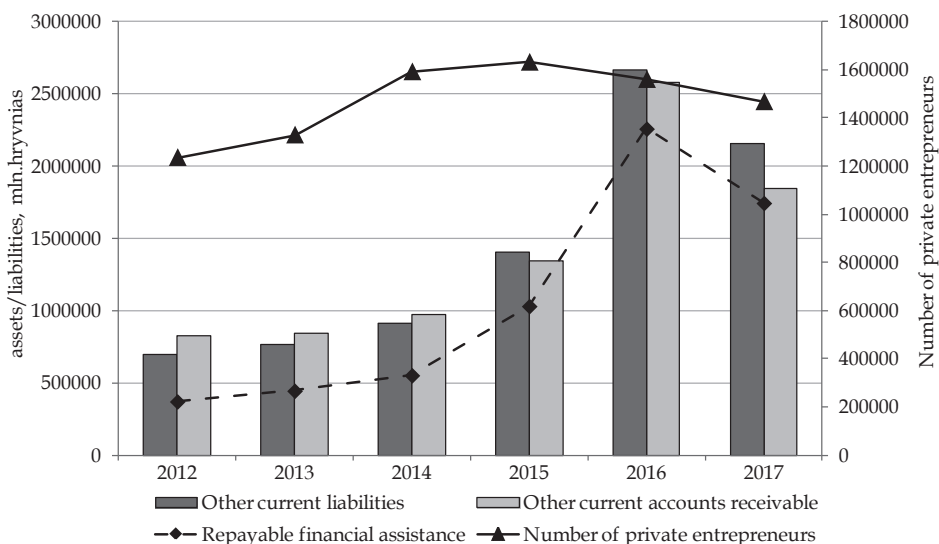
Some Ukrainian businesses are unwilling to take risks and deal with the general taxation system, which makes fiscal management more complicated and tax liabilities, overwhelming and unpredictable. Therefore, they choose to limit their growth and split into several smaller firms.

In case of a split-up of a large enterprise into small units or a small company splitting off a larger one, there is a great

likelihood that repayable financial assistance will be used. It does not mean, however, that only businesses can provide such assistance to each other, it may well be offered by physical persons to legal entities, by enterprises to their employees, by founding parties to companies, and so on. Nevertheless, the coincidence of trends (see Figure 4) clearly demonstrates the popularity of repayable financial assistance among Ukrainian businesses.

In 2012–2016, there was a nationwide increase in the indicators in item ‘Other current liabilities’ for recipient businesses and in item ‘Other current accounts receivable’ for donor companies, which agrees with another trend – an increase in repayable financial assistance, which we discussed above. In the given period, there was an increase in the number of private entrepreneurs using repayable financial assistance.

In order to take into account the turnover and estimate the eligibility of companies for small business benefits, since 2016, the second and third groups of unified tax payers have been obliged to use cash registers (except for those selling goods in markets or via mobile retail facilities). Since 1 January 2017, private entre-



**Figure 4. Items including repayable financial assistance and the number of private entrepreneurs in Ukraine in 2012–2017**

Based on the official data provided by the State Statistics Service of Ukraine: Activity of Economic Entities 2017: Statistical Yearbook. 2018. Available at: [https://ukrstat.org/uk/druk/publicat/kat\\_u/publ9\\_u.htm](https://ukrstat.org/uk/druk/publicat/kat_u/publ9_u.htm)

preneurs of the second and third groups have been obliged to pay the unified social contribution at a minimal rate even if they are not engaged in any entrepreneurial activity and do not have any income. As a result, in 2016 and 2017, there was a dramatic fall in the number of small business entrepreneurs and in the amount of repayable financial assistance (Figure 4).

A parallel increase in the amount of repayable financial assistance for donor companies as well as for recipient businesses (as it is shown by the official statistical data) means that most of such assistance serves as an instrument of lending between businesses. The discussion of this problem falls beyond the scope of this paper and we recommend further research into the formal and informal relationships between the parties involved in repayable financial assistance. It should be noted, however, that there is a variety of such relationships: for instance, the donor business may be simultaneously the founder of the recipient business or the founder of the donor business may be at the same time the founder of the recipient business.

Since a considerable number of small businesses in Ukraine resort to repayable financial assistance, it can signify that corporate split-ups aimed at reducing the tax burden with the help of the STS is a large scale phenomenon in Ukraine.

We subscribe to the view of our Ukrainian colleagues [40; 41], who believe that the most economically efficient way of detecting and deterring abuse of the STS and eliminating the inconsistencies in the fiscal instruments applied in this sphere is selective regulation (adjustments) rather than the liquidation of the whole system. For our research most relevant are the cases of large and medium-sized companies which split up in pursuit of the following purposes: to gain extra profit by using private entrepreneurs and to use private entrepreneurs instead of employing staff. The fact that repayable financial assistance is a widely spread practice in Ukrainian economy means that a significant part of large and medium-sized enterprises split into smaller units not only for the sake of tax optimization

but also to gain an extra source of funding with the help of this instrument.

## **7. Results discussion and conclusions**

Our analysis has confirmed the initial hypothesis about the contradictory effects of the fiscal instruments used to stimulate the development of small business in Ukraine.

First, the criteria for defining the size of a business are inadequate, which means that in the recent years from 22 to 38% of small businesses failed to access the STS.

Second, these norms discriminate against small businesses limiting their access to specific instruments of debt financing. As for debt financing, Ukrainian tax legislation does not provide equal opportunities for all categories of business. Small firms which do not qualify for the STS have to pay a corporate income tax on the funds they borrow while small firms covered by the STS pay this tax for using long-term repayable financial assistance. In Ukrainian economy, small businesses cannot benefit from the whole range of debt financing tools, unlike their counterparts in developed countries.

Third, instead of stimulating start-ups, the system in fact encourages large and medium-sized companies to split up. We have shown that while repayable financial assistance is not widely spread in the international practice, in Ukraine it is popular among businesses as a source of extra funds. Our calculations of the amounts of repayable financial assistance have led us to the conclusion about the vast scale of this phenomenon in the Ukrainian economy. The share of repayable financial assistance in the structure of debt financing by the end of the given period exceeded 28%. A considerable increase in the growth rates of repayable financial assistance, starting from 2015, was caused by changes in the tax legislation, which eliminated the negative fiscal implications such as the reduction in the net profit which receivers of such assistance previously had to face.

This process also indirectly points to the intensification of corporate reorganization processes, in particular split-ups of

large and medium-sized enterprises with the aim of getting access to the STS.

The experience of Georgian tax reforms might provide some valuable insights for Ukraine in this matter. The tax on withdrawn capital was introduced in Georgia at the beginning of 2017, which made the STS more attractive for large business. As a result, the tax burden on enterprises decreased to 40%. According to the report 'Doing Business', prepared by the World Bank Group and PwC, Georgian economy moved up the ranking from the 9th to 6th position. The Minister of Finance of Georgia ascribed this success to the reform of the corporate income tax<sup>11</sup>. After tax exemption for reinvested profit was introduced, investment to GDP ratio in 2017 grew by 1.3%<sup>12</sup>.

The next step in the Georgian tax reform was the liberalization of small business taxation: on 1 July 2018, the turnover tax rate was reduced from 5% to 1% and the threshold value for a company to qualify as a small business was raised fivefold.

Another solution to the problem is to follow the example of Latvia, where, in order to qualify as a micro-enterprise and to be eligible for the simplified tax scheme, a limited liability company has to have the board of directors consisting only of its own employees<sup>13</sup>. Since the beginning

of 2018, the corporate income tax does not apply to reinvested profit in Latvia. It should be noted that in their income tax reforms, both Georgia and Latvia followed the example of Estonia, which was one of the first European countries to introduce the tax on withdrawn capital in 2000. As Estonia's experience shows, this tax has a positive impact on national GDP.

Ukraine's small business policy should be more balanced and ensure that small companies should have opportunities to minimize their tax payments through tax preferences and gain additional resources, which will, in turn, help these businesses grow and generate new jobs. Regarding the legislation, it is necessary to reconsider the criteria for defining the size of businesses and abolish administrative regulation in this sphere so that all small businesses could enjoy the benefits of the STS. As for the simplified tax system itself, it can also be improved if tax liabilities of small businesses were correlated with the outcomes of their activity. Since it is hard to maintain control over the incomes of small businesses and the existing mechanism of turnover taxation (sales of goods and services) lacks efficiency, an adequate solution would be to compute the tax for small businesses by using a system of indicators such as the number of employees, electricity consumption, type of activity, and so on.

If the recommendations for tax policy reforms described above were implemented, it could contribute to rectifying the inconsistencies in fiscal instruments and foster the development of small business in Ukraine.

<sup>11</sup> Activity of large, medium-sized, small and micro-enterprises. Statistical Yearbook. State Statistics Service of Ukraine. Kyiv, 2018, pp. 193, 203. Available at: [http://www.ukrstat.gov.ua/druk/publicat/kat\\_u/publ9\\_u.htm](http://www.ukrstat.gov.ua/druk/publicat/kat_u/publ9_u.htm)

<sup>12</sup> Official Web-Site of the Ministry of Finance of Georgia. Available at: <https://mof.ge/en/News/8814>

<sup>13</sup> Available at: <http://ua-outlook.com.ua/ru/>

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### Modelling of Fiscal and Monetary Policy Interactions in the Republic of Belarus

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#### ABSTRACT

The article discusses classical and modern macroeconomic models of interaction of fiscal and monetary policies in Belarus. The hypothesis of this research is that the interaction of fiscal and monetary policies has a synergistic effect on economic growth and that at certain stages, one of these policies prevails over the other. This hypothesis was tested with the help of an IS-LM model, which was used to investigate the joint effects of monetary and fiscal policies on business activity in Belarus. A Markov switching model was developed in Eviews software to analyze the interaction between these policies. Regression dependences of the average tax burden (including the burden imposed by social security contributions) and GDP, investment and the refinancing rate were built by using Excel software. To solve the IS-LM model, the value of autonomous consumption was computed with the help of the adjusted value of the average propensity to consume. It was found that autonomous consumption is comparable with the budget of subsistence minimum in Belarus. The share of government spending in the GDP structure was on average 35.01%. The comparison of gross savings and investment showed that in the majority of periods, gross savings insignificantly exceeded the amount of investment, that is, the available funds were used for consumer lending rather than for investment. Analysis of the Markov switching model has led us to the conclusion that from the first quarter 2005 until the fourth quarter of 2009, the fiscal policy in Belarus was in the active regime. The passive fiscal policy regime was observed in the period between the first quarter of 2010 and the first quarter of 2019. In this period, a rise in the public debt was accompanied by an increase in the budget surplus. In the second quarter of 2019, there was a transition to a more active fiscal policy, which points to the need to intensify tax reforms.

#### KEYWORDS

taxation system, tax reform, tax burden, fiscal policy, monetary policy, economic growth

JEL H20, H21, E62

УДК 336.221

### Тестирование моделей взаимодействия налоговой и монетарной политики в Республике Беларусь

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#### АННОТАЦИЯ

Статья посвящена тестированию классических и современных макроэкономических моделей взаимодействия налоговой и монетарной политики в Республике Беларусь. Гипотезой исследования является предположение о том, что

взаимодействие фискальной и монетарной политик обеспечивает синергетическое воздействие на экономический рост, при этом на определенных этапах преимущества имеет фискальная либо монетарная политика. В качестве основной модели для исследования совокупного влияния монетарной и фискальной политики на деловую активность в республике Беларусь выбрана модель IS-LM. С помощью программного продукта Eviews построена модель с марковским переключением, анализирующая взаимодействие монетарной и фискальной политики. Средствами Excel построены регрессионные зависимости средней налоговой нагрузки (включая налоговую нагрузку по взносам на социальное страхование) и ВВП, инвестиций и ставки рефинансирования. В ходе решения модели IS-LM скорректированное значение средней склонности к потреблению позволило рассчитать значение автономного потребления, которое сопоставимо с бюджетом прожиточного минимума в Республике Беларусь. Доля государственных расходов в структуре ВВП в среднем составила 35,01%. Сопоставление валового сбережения и инвестиций показало, что в большинстве периодов валовое сбережение незначительно превышает размер инвестиций, то есть свободные средства используются для потребительского кредитования, а не для инвестиционных целей. Анализ модели с марковским переключением позволил установить, что режим активной фискальной политики в Республике Беларусь соответствовал периоду с 1 квартала 2005 г. по 4 квартал 2009 г. Режим пассивной фискальной политики соответствовал периоду с 1 квартала 2010 г. по 1 квартал 2019 г., когда параллельно с ростом государственного долга наращивался и профицит бюджета. Во 2 квартале 2019 г. наметился переход к активизации фискальной политики, что свидетельствует о необходимости активизации налоговых реформ.

#### **КЛЮЧЕВЫЕ СЛОВА**

налоговая система, налоговая реформ, налоговая нагрузка, фискальная политика, монетарная политика, экономический рост

### **1. Introduction**

The tax system of Belarus emerged at the moment when the country acquired sovereignty and obtained the right to organize its own taxation, set priorities in the fiscal policy, and create taxation mechanisms providing the country's tax sovereignty [1].

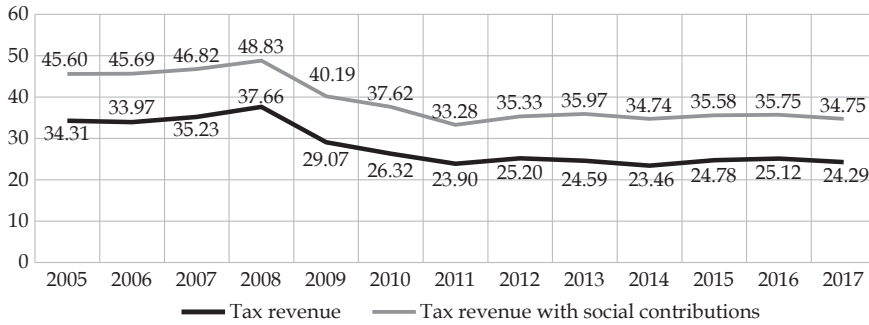
The process of creation and development of the national tax system can be roughly divided into the following stages:

1. At the first stage, the tax system was oriented towards the formation of market relationships and ensuring stable budget revenues (1992–1995). At this stage, the fiscal function was the main priority of the tax system. The number of tax payments exceeded 30 and the level of the tax burden as a percentage of GDP was so high that it resulted in tax evasion.

2. At the second stage (1996–2000), the tax system developed and different regulatory instruments were tested. In this period, incentives to stimulate foreign investment were introduced, such as special tax schemes and systems.

3. The third stage (2001–2010) was characterized by codification and unification of the tax system, which was integrated into the system of international taxation. The government also sought ways to balance the fiscal and regulatory components of taxation. The general part of the Tax Code in Belarus came into force on 1 January 2004, while the special tax code has been in operation since 1 January 2010. From 2006 to 2009, 17 taxes were eliminated and 34 independent tax levies and charges were included into the single state tax.

4. At the fourth stage (since 2011 to present), the tax system was modernized and simplified, becoming oriented towards more advanced fiscal tools and methods. The government has also been searching for new ways to optimize the fiscal policy models in order to ensure economic growth. At this stage, the government also defined priorities of economic development and tried to stimulate innovation in business as well as economic growth and investment activity, create the infrastructure for e-government.



**Figure 1. Tax revenues as a percentage of GDP in Belarus in 2005–2017, %**

*Source: built by the authors on the basis of the IMF data*

The Belarusian government is now taking active steps to reduce the tax burden (Figure 1). The percentage of tax revenues in GDP in the given period was on average 39.24% (taking into account contributions to the National Social Security Fund), with the smallest share in 2011, and the largest, in 2008.

As it is illustrated by the data above, Belarus fits into the global trends in tax burden. Belarus can be described as a country with a moderate tax burden. Its level corresponds to the average tax burden in OECD states (in 2017 it was 34.48%<sup>1</sup>).

Overall, it can be concluded that the Belarusian tax system is affected by the key global trends such as globalization, international competition and search for investment, which have rendered introduction of new taxes virtually impossible. Moreover, the openness of Belarusian economy makes doubtful the possibility of the multiplier effect for tax change and government spending.

In Belarus, like in other countries, fiscal instruments are used to regulate socio-economic processes. Fiscal policy instruments are used along with those of monetary policy, which makes it particularly interesting to look at the joint effects of monetary and fiscal policies on the country's economy. The hypothesis we are going to test further in this research is that the interaction of fiscal and monetary policies has a synergistic effect on the na-

tional economic growth and that at certain stages, either one or the other prevails.

## 2. Literature review

The global financial crisis of 2008 spurred a renewed discussion about the role of fiscal and monetary policies in macroeconomic stabilization. Until the crisis, the majority of economists had been in agreement that the monetary policy should be playing the main role in the process of macroeconomic stabilization. It was, however, the fiscal policy that provided the main support for aggregate demand.

The fiscal policy played an active role during the crisis, which led to a massive increase in debt levels in developed countries and, as a result, raised a number of questions concerning fiscal stability in the future and potential risks for the monetary policy. The financial crisis of 2008 also triggered new trends in studies of the correlation between economic growth and fiscal regulation. There was a long period when governments resorted to unpopular measures such as tax raising in order to restore the former growth rates in the country. After the crisis, however, OECD experts, who analyzed tax reforms and prospects of fiscal policy implementation, voiced their doubts about the tax burden's ability to affect economic growth<sup>2</sup>.

<sup>1</sup> OECD database. Available at: <https://stats.oecd.org/viewhtml.aspx?datasetcode=REV&lang=en#>

<sup>2</sup> OECD (2018), Tax Policy Reforms 2018: OECD and Selected Partner Economies, OECD Publishing, Paris. DOI: [10.1787/9789264304468-en](https://doi.org/10.1787/9789264304468-en); OECD (2010), Tax Policy Reform and Economic Growth, OECD Publishing. DOI: [10.1787/9789264091085-en](https://doi.org/10.1787/9789264091085-en)

The analysis of empirical data no longer led scholars to definite conclusions regarding the impact of taxation on economic growth.

I. Mayburov, for example, pointed out that the lack of the empirical connection (or its weakness) between economic growth and the size of the state (provided that there is a theoretical justification for the existence of the optimal state size) shows that either economic growth is insensitive to the level of taxation or the real tax burden is on average close to the optimum [2, p. 33].

Contemporary studies have focused on general fiscal policy indicators and on its effects in combination with other instruments of state regulation such as monetary policy. For instance, T. Sargent and N. Wallace [3] have shown that depending on the way fiscal and monetary policies are coordinated, the latter may fail to control inflation. M. Woodford and E. Leeper [4; 5] have demonstrated the impact of fiscal policy on the level of prices. E. Cevik et al. [6] studied interactions between fiscal and monetary policies in emerging European states by using a Markov regime-switching model.

Game theory methodology enabled W. Nordhaus to study the 'fiscal-monetary mix' [7] and to describe the optimal monetary and fiscal policies. O. Blanchard studied fiscal dominance in Brazil and its implications [8].

Russian scholars [9] tested the interaction between monetary and fiscal policies by using the empirical data of the Russian Federation and demonstrated that in modern Russia the fiscal policy is quite restrictive while the monetary policy provides excessive stimulation, which means that such coordination of policies is far from optimal.

Contemporary studies use a variety of econometric models and tests to evaluate fiscal and monetary policy interactions [10–11]. The most widely used models are DSGE, SWAR and Markov switching models. The Markov switching model is one of the most popular nonlinear time series models. In this model, behaviours of time series switch between different

regimes. The process of regime switching is controlled by the unobservable Markov chain.

The dynamic stochastic general equilibrium model (DSGE) is a modern instrument used in applied macroeconomics. These models are now widely used by central banks and other economic institutions. The National Bank of Belarus has been conducting studies in the sphere of DSGE-modelling since the mid-2000s [11]. DSGE-models are based on economic theory and have structural parameters describing behaviours of economic agents on the micro-level, which means that such models are not subject to the Lucas critique.

To work with such models, international scholars use the free Dynare package, which runs on MatLab. Dynare is a software platform for handling a wide class of economic models, in particular DSGE models [11].

Since the early 1980s, VAR-models have been used successfully in economic research. Vector-autoregressive models are quite easy to use and they generally provide more accurate forecasts than other complex macroeconomic models [13].

Thus, classical, Keynesian and modern models show that fiscal policy and monetary policy are interdependent and coordination of their goals and mechanisms are crucial for their implementation [14–18]. In our study, we chose the IS-LM model as the main model to investigate the joint effects of monetary and fiscal policies on business activity in Belarus.

### **3. Research methodology**

The empirical part of the study focuses on the level of tax burden and its connection with economic growth by taking into account specific macroeconomic conditions and indicators.

Calculations were made with the help of Eviews software. Databases of OECD<sup>3</sup>, World Bank<sup>4</sup>, and the International Mon-

<sup>3</sup> OECD database. Available at: <https://stats.oecd.org/viewhtml.aspx?datasetcode=REV&lang=en#>

<sup>4</sup> World Bank database. Available at: <https://data.worldbank.org/indicator/GC.TAX.YPKG.RV.ZS?view=chart>

etary Fund<sup>5</sup> were used as a source of statistical data.

We built an IS-LM model to study the joint impact of monetary and fiscal policies on business activity in Belarus.

The main equations of the IS-LM model can be presented in the form of a system of identities (1):

$$\begin{aligned}
 \text{Main macroeconomic identity} & Y = C + I + G + Xn \\
 \text{Function of consumption} & C = a + b(Y - T) \\
 \text{Function of taxation} & T = Ta + tY \\
 \text{Function of investment} & I = e - dR \quad (1) \\
 \text{Function of net export} & Xn = g - m'Y - n'R \\
 \text{Function of demand for money} & \frac{M}{P} = kY - hR
 \end{aligned}$$

where  $Y$  is the income;  $C$ , consumption;  $I$ , investment;  $G$ , government spending;  $Xn$ , net exports;  $R$ , the interest rate;  $Ta$ , autonomous taxes; and  $t$  is the marginal tax rate. The empirical coefficients ( $a, b, e, d, g, m', n, k, h$ ) are positive and relatively stable while  $k$  is the sensitivity of income to demand for money and  $h$  is the sensitivity of demand for money to the interest rate.

Our analysis of the monetary policy regimes in Belarus is based on the Taylor equation, which models the dynamics of the interest rate's dependence on the inflation rate and the deviation of real output (GDP) from potential GDP.

The Taylor equation used to analyze the monetary policy regime in Belarus is estimated as a Markov switching model (dependence 1):

$$\begin{aligned}
 stavka_t = & a_0(s_t) + a_1(s_t)inf_t + \\
 & + a_2(s_t)cycle_t + \varepsilon_t, \quad (2)
 \end{aligned}$$

where  $stavka_t$  is the interbank interest rate, % per annum;  $inf_t$ , the inflation growth rate, %;  $cycle_t$ , deviation of real GDP from potential GDP;  $\varepsilon_t$ , error;  $s_t$ , unobservable variable characterizing the monetary policy regime;  $a_0$ ,  $a_1$  and  $a_2$ , parameter estimations.

For model (1) estimation, we used the quarterly data for 2005–2019.

In order to obtain variable  $cycle_t$ , we applied the Hodrick-Prescott filter to smooth the data of GDP variable. By applying this filter, we estimate the trend and cyclical component. When we subtract the trend and cyclical component from the real values of the initial time series, we obtain values of the initial time series devoid of the trend and cyclical component. The latter procedure is often used in applied macroeconomic research, for example, to obtain such variables as output gap or GDP (deviation of real GDP from potential GDP).

We estimated the fiscal policy regimes in Belarus in the given period with the help of the Markov switching model. The behaviour of fiscal authorities and their choice of the active or passive regime are primarily determined by the reaction of the tax burden to the changes of the public debt. In the previous periods, when the public debt was growing, it was stabilized by increasing the tax burden. In this case, the fiscal policy was passive. A decline in the tax burden accompanied by an increase in the public debt in the previous periods signify that the fiscal policy was active.

In this case, econometric modelling shows that estimation of the regression coefficient with a variable characterizing public debt should have a negative value for the active monetary policy regime and a positive value for the passive monetary policy regime.

Therefore, we propose to use the following equation to describe fiscal policy with the help of a Markov switching dependence (2):

$$\begin{aligned}
 tax_t = & a_0(s_t) + a_1(s_t)debt_{t-1} + \\
 & + a_2(s_t)cycle_t + a_3(s_t)cost_t + \varepsilon_t, \quad (3)
 \end{aligned}$$

where  $tax_t$  is the tax burden (consolidated budget revenue to GDP ratio), %;  $debt_{t-1}$ , gross external public debt, % of GDP;  $cycle_t$ , deviation of real GDP from potential GDP;  $cost_t$ , total expenditures of consolidated budget, % of GDP;  $\varepsilon_t$ , error;  $s_t$ , unobservable variable characterizing the fiscal policy regime;  $a_0$ ,  $a_1$  and  $a_2$ , parameter estimations.

<sup>5</sup> IMF database. Available at: <https://data.imf.org/regular.aspx?key=60991467>



## 4. Results discussion

### 4.1. Analysis of monetary and fiscal policies in Belarus in the IS-LM model

To solve the IS-LM model, we need to conduct a trend analysis of the dynamics of specific macroeconomic indicators and build linear regression equations of their dependences upon the income level ( $Y$ ) and the refinancing rate ( $R$ ). Figure 2 illustrates the dynamics of nominal GDP, final consumption expenditures and investment in Belarus, according to the System of National Accounts.

The Belarusian System of National Accounts uses gross savings instead of investment. The equation does not include government spending as an indicator.

It can be explained by the fact that final consumption expenditures include the corresponding amount of spending in the government sector. Therefore, in order to convert the equation of the national system of accounts into the main macroeconomic identity which the IS-LM model is based on, we used such indicators as total final consumption, final consumption net of government spending, investment and savings (Table 1).

As Table 1 illustrates, in the majority of cases, fixed investment is smaller than gross savings, which might mean that a part of gross savings is used through credit operations of banks for final consumption.

It should also be noted that final consumption expenditures include govern-

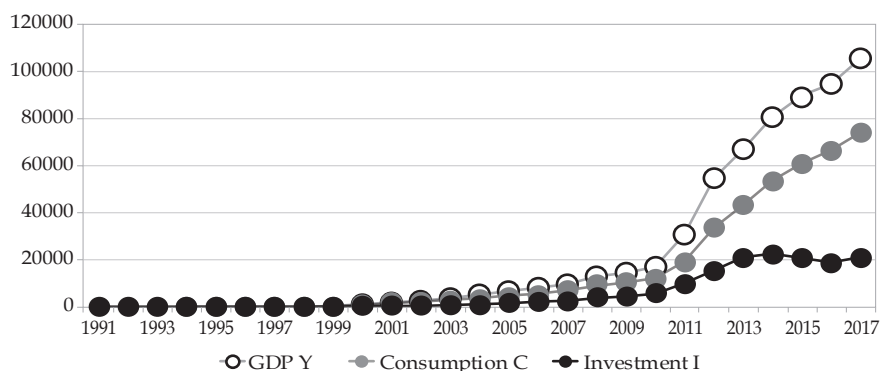


Figure 2. Dynamics of GDP, final consumption and investment in Belarus, 1991–2017 (in nominal prices and by taking into account the denomination of 1995, 2000 and 2016)

Note: based on the data of statistical yearbooks 'System of National Accounts of the Republic of Belarus', 1995–2018

Table 1  
Indicators of the system of national accounts, investment and consolidated budget expenditures in 2005–2017 (in nominal prices and by taking into account the denomination of 1995, 2000 and 2016), mln Belarusian roubles

Year	GDP	Gross savings	Final consumption	Net exports of goods and services	Fixed investment	Real government spending
2005	6506.71	1819.5	4735.14	46.283	1509.58	3125.7
2006	7926.7	2343.35	5602.82	-330.74	2037.41	3725.6
2007	9716.53	2835.01	6834.05	-609.01	2605.33	4762.7
2008	12979.08	3963.67	8888.36	-1002.5	3720.23	6381.1
2009	14209.1	7893.94	10274.55	-1546.34	4337.76	5111.739
2010	17046.6	4574.69	12216.68	-2245.41	5538.08	2500.64
2011	30724.5	9813.97	19096.47	-320.62	9866.49	2134.68
2012	54761.7	17108.28	33743.22	2447.05	15444.24	1463.15
2013	67068.8	19085.25	43384.27	-2111.87	20957.46	6711.15
2014	80579.3	22155.16	53650.85	-619.99	22526.97	5393.28
2015	89909.8	25627.34	60958.05	95.94	20715.25	3228.47
2016	94949	25057.9	66619	-181.00	18710	3453.1
2017	105748	29617.3	74138.8	223.6	21033.7	1768.3

ment spending. Furthermore, the System of National Accounts of the Republic of Belarus contains the indicator ‘statistical discrepancies’. For example, when GDP is computed by applying the income approach, these statistical discrepancies make up from 0.85% to 3.1%, depending on the period. The conversion of the data from the System of National Accounts into the main macroeconomic identity leads to an increase in statistical discrepancies, which are now 3.3–10.6%. These discrepancies are still smaller than the real expenditures of the state budget. Thus, in order to solve the IS-LM model, we are going to introduce real final consumption expenditures of the consolidated budget into the formula through the statistical discrepancy and reduction of final consumption expenditures. In consideration of the above, the updated

data for solving model (1) are shown in Table 2.

Taking into account that we have significantly adjusted final consumption expenditures, it seems reasonable to estimate the new GDP structure formed to solve the IS-LM model according to sources of income. Final consumption with consideration of the adjustments that we made still accounts for the largest share in GDP. However, the adjusted average propensity to consume is 45.46% while before the adjustment, the average value of this indicator in 1994–2017 was 72.98%. There was a parallel increase in the share of government spending, which was on average rather high – 35.01% and can be interpreted as a sign of extensive state intervention in socio-economic processes.

Our analysis of the average propensity to save (Figure 3) shows that in this pe-

Table 2  
**Indicators of the System of National Accounts, investment and consolidated budget expenditures in 2005–2017 (mln Belarusian roubles, measured in 2016 prices)**

Year	GDP	Final consumption	Fixed investment	Real government spending
2005	6506.71	1825.15	1509.58	3125.7
2006	7926.7	2494.43	2037.41	3725.6
2007	9716.53	2957.51	2605.33	4762.7
2008	12979.18	3880.25	3720.23	6381.1
2009	14209.1	6497.6	4337.76	4920.08
2010	17046.6	8455.95	5538.08	5297.98
2011	30724.5	13235.81	9866.49	7942.82
2012	54761.7	21353.49	15444.24	15516.92
2013	67068.8	29448.07	20957.46	18775.14
2014	80579.3	37556.92	22526.97	21115.4
2015	89909.8	44060.91	20715.25	25037.7
2016	94949	49098	18710	27322
2017	105748	55763.9	21033.7	28726.8
Average value	26368.12	12321.18	6600.81	7742.94

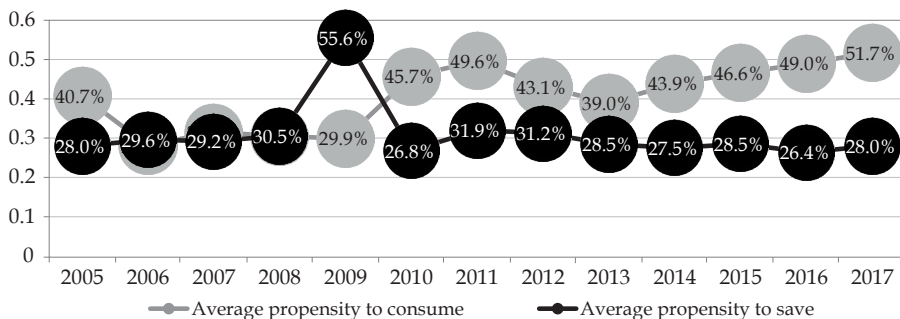


Figure 3. Analysis of the average propensities to consume and save in Belarus in 2005–2017 (Consumption was adjusted to account for the sum of government spending)

riod, this indicator varied between 26.4% and 55.6% and the average propensity to consume, between 29.9% and 51.7%. Recently, the latter indicator has been rising steadily.

It should be noted that in a closed economy the average propensities to consume and save equal 1. In Belarus, net exports do not equal zero and in most periods are negative, which means that (APC+APS) can be different from 1 but in any case should be positive.

After the amount of final consumption is adjusted for the sum of government spending, let us calculate autonomous consumption and evaluate the adequacy of this result (Figure 4).

To confirm the adequacy of our results regarding autonomous consumption, it is necessary to take into account the following: the economic meaning of this indicator is that it allows us to estimate the amount of resources people need to consume to meet their basic needs. For easier comparison, Figure 4 shows the dynamics of real final consumption, calculated values of autonomous consumption and autonomous consumption. Autonomous consumption can be calculated in two ways:

- 1) as the annual budget of subsistence minimum multiplied by the average annual population of Belarus;
- 2) as the annual minimum wage multiplied by the average annual population of Belarus.

It should be noted that before the adjustment of final consumption for the expenditures of consolidated budget in

2013–2016, the calculated value of autonomous consumption was considerably below the budget of subsistence minimum, which contradicts the economic meaning of this indicator. After it was adjusted, the calculated value of autonomous consumption either corresponds to the budget of subsistence minimum or exceeds it, which looks quite normal from the economic point of view, since the data were calculated by using the average income and consumer demand of the population.

The function of consumption is included in model (1) and shows the dependence of the final consumption expenditures on GDP. We introduce two auxiliary factors *a* and *b* in the equation of final consumption, where *b* is the marginal propensity to consume. The economic meaning of factor *a* is that it reflects the so-called autonomous consumption, which does not depend on income. To build the function of consumption depending on the GDP level, we are going to apply correlation and regression analysis. As a result, we obtain the following equation of consumption:

$$C = -795.208 + 0.497Y \quad (4)$$

$$R^2 = 0.989$$

Thus, the value of the marginal propensity to consume (*b*) equals 0.497, which is 0.0526 less than the average value obtained by direct estimation. We find such discrepancy acceptable. A cause for concern might be the value of parameter (*a*), characterizing autonomous consumption, since, according to the regression model we have obtained, its value is negative

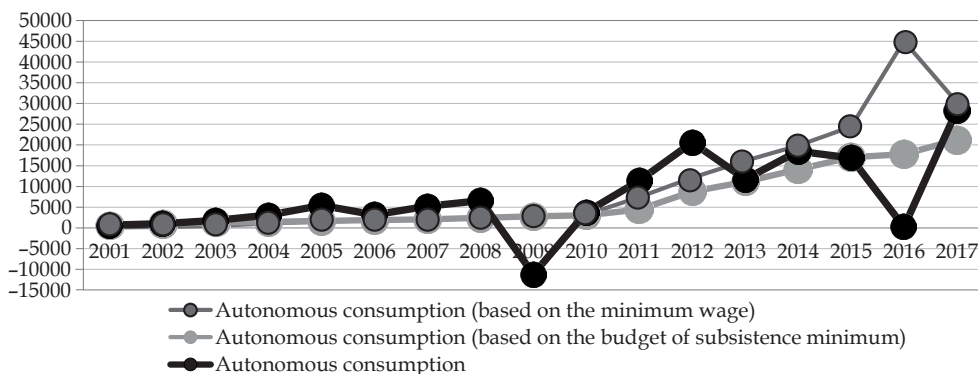


Figure 4. Evaluation of the adequacy of the adjusted value of autonomous consumption

and does not correspond to the average calculated value.

Therefore, we recalculated the marginal propensity to save and autonomous investment. The dynamics of the marginal propensity to save adjusted for government spending is shown in Figure 5. The adjusted marginal propensity to consume demonstrates that the rouble change of GDP leads to an increase in final consumption from -0.14 to 2.13 roubles. On average, the marginal propensity to consume is 0.55 roubles for every rouble change of GDP.

In order to build an IS-LM model, we will need a set of equilibrium points of savings and investment in relation to GDP and the refinancing rate. We are going to build a graph illustrating the dependence of savings and investment on the refinancing rate (Figure 6). The points of intersections of lines *S* and *I* show the equilibrium rate of investment and of savings.

Tax burden is one of the factors that influence investment. Since fiscal policy is

implemented simultaneously with other policies, in our study of the interrelation between fiscal and monetary policies we are going to consider the dynamics of the average refinancing rate and tax burden in 1994-2017 (Figure 7).

Despite the change in the tax legislation, the level of tax burden measured as the tax revenue-to-GDP ratio, varied between 18.5% in 1995 and 36.1% in 2008. Interestingly, in the periods of 2004-2008 and 2015-2016, a fall in the refinancing rate was accompanied by an increase in the tax burden while in 2009-2012, a rise in the refinancing rate coincided with a decline in the tax burden. In other periods, the direction of the changes in the refinancing rate coincided with that of the changes in the tax burden. It should be noted that while the level of tax burden changed by 17.6 percentage points, the average refinancing rate in the given period dropped from 211.7% in 1994 to the minimum of 10.4% in 2008. As of the time of the study (July 2019), the refinancing rate

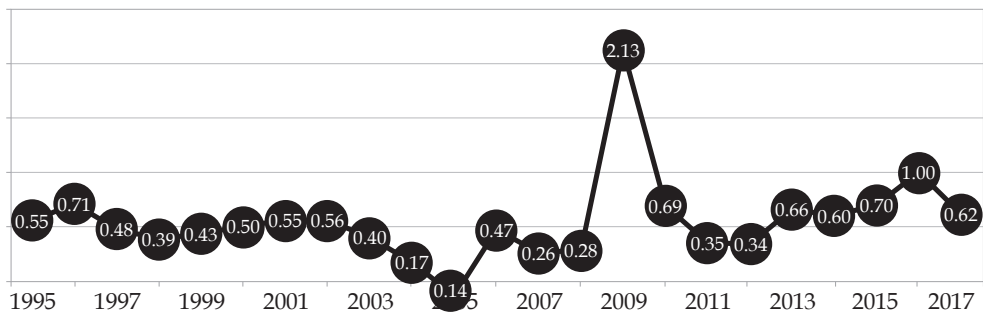


Figure 5. Adjusted marginal propensity to consume

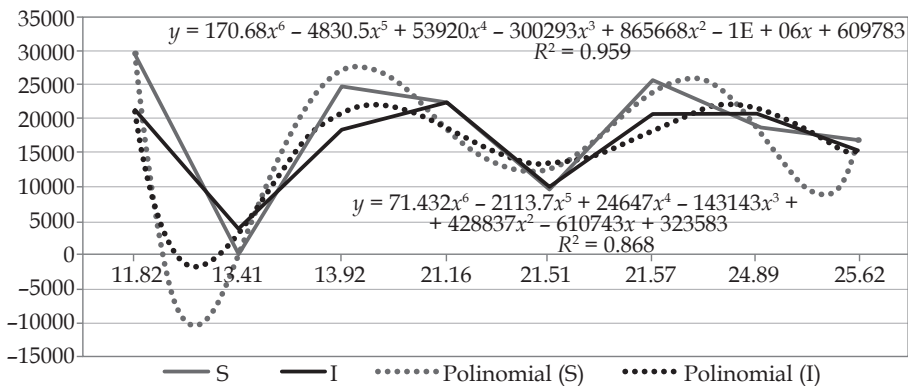


Figure 6. Dependence of investment (I) and gross savings (S) on the average refinancing rate (horizontal axis) in 2005-2017

in Belarus was 10% and it did not change since 27 June 2018.

The next set of tasks that need to be addressed to solve the IS-LM model is to build the function of taxation, in which tax revenues depend on GDP. The initial data and the results of our study for building a taxation function are shown in Table 3. Although GDP growth is usually accompanied by rising tax revenues of the consolidated budget, there are periods when tax sensitivity to GDP growth is negative.

For example, the negative value of the tax burden's sensitivity to GDP changes

was observed in 1995, 1996, 2001, 2002, 2004, 2009–2011, 2013–2014, and 2016. This dynamics requires further investigation and may be connected to changes in the taxation legislation, expanded use of tax preferences, and so on. The data shown in Table 3 demonstrate that on average, for every one rouble increase in GDP, we observe a 0.023% decrease in the tax burden.

We are going to use the above-described data and correlation and regression analysis to derive the following equation of the dependence of budget revenues on GDP change:

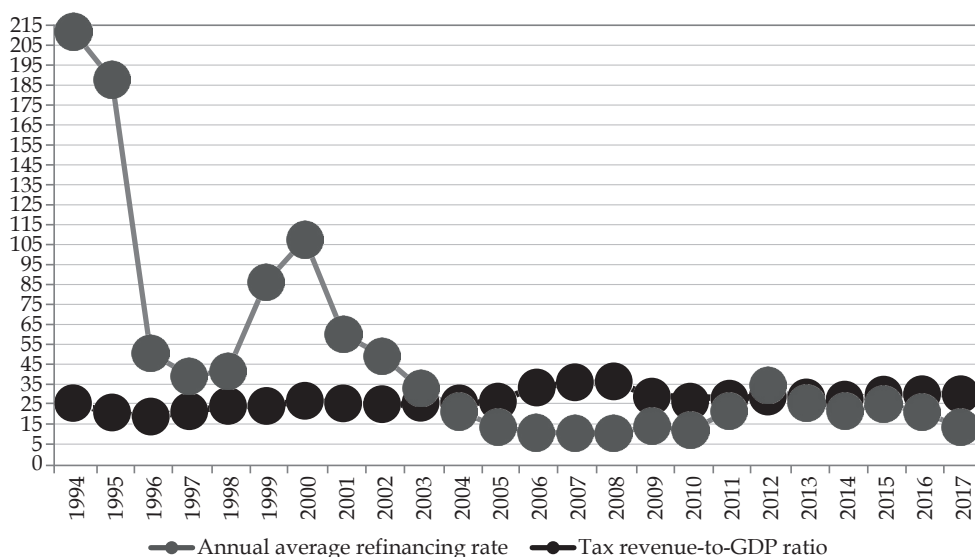


Figure 7. Dynamics of the average refinancing rate and tax burden in 1994–2017

Table 3

**Initial data for constructing the taxation function  
(mln Belarusian roubles measured in 2016 prices)**

Year	GDP	Tax revenues of the consolidated budget	Autonomous taxes	Sensitivity of tax burden to GDP changes (coefficient)
2005	7926.7	1706.3	1706.27	0.0000060
2006	9716.53	2692.9	2692.54	0.0000546
2007	12979.08	3423.6	3423.54	0.0000071
2008	14209.1	4680.8	4680.78	0.0000025
2009	17046.6	4130.47	4131.21	-0.0000569
2010	30724.5	4875.42	4875.44	-0.0000017
2011	54761.7	8560.83	8560.84	-0.0000005
2012	67068.8	15795.6	15795.59	0.0000004
2013	80579.3	18923.22	18923.25	-0.0000005
2014	89909.8	21928.06	21928.11	-0.0000007
2015	94949.0	26632.1	26631.89	0.0000026
2016	105748.0	28526.3	28526.22	0.0000008
2017	26368.12	31651.4	24915.08	-0.0000001

$$\begin{aligned} T &= -6.439 + 0.292Y \\ R^2 &= 0.997 \end{aligned} \quad (5)$$

We will use the data shown in Table 3 and in Figure 6 and apply correlation and regression analysis to derive the following equation of the investment function depending on the changes in the refinancing rate:

$$\begin{aligned} I &= 10962.441 - 123.716R \\ R^2 &= 0.135 \end{aligned} \quad (6)$$

Even though the value of  $R^2$  is quite low, we find it acceptable for the solution of the IS-LM model since our aim was to find the dependence of investment on the refinancing rate.

The equation we have thus obtained shows a 13.5% dependence of investment on the refinancing rate. Autonomous investment is used to take into account the influence of other factors. It seems reasonable at this point to compare the values of investment sensitivity to changes in the refinancing rate and autonomous investment obtained in equation 6 with the calculated data (see Table 4). As the table illustrates, the values of the coefficient of investment's sensitivity to changes in the refinancing rate do not fully comply with the laws of economics. For instance, if we decrease the refinancing rate, the sensitivity of investment becomes negative and vice versa, which demonstrates feasibility of autonomous investment.

As a part of our study, we also built a regression model of the net export func-

tion, which allows us to estimate the dependence of net exports on GDP and the refinancing rate:

$$\begin{aligned} X_n &= -885.332 + 0.005Y + 13.167R \\ R^2 &= 0.120 \end{aligned} \quad (7)$$

The net export function necessary for the solution of the IS-LM model reflects the dependence of the resulting indicator on the two factors, whose joint impact is weak, according to regression analysis. One of these factors (refinancing rate) is not typical of net exports, which makes it impossible to check the coefficients in formula (7).

The last function we need to consider in order to build the IS-LM model is the function of demand for money. Demand for money is usually estimated with the help of monetary aggregates M0, M1, M2 and M3, which are also used to measure money supply. There should be enough money in the economy for GDP. Therefore, we are going to compare GDP, M0 and M2 (Table 5).

M0 shows the balance of currency in circulation. The data in Table 5 show that the level of the average yearly balances of currency in circulation is not sufficient to pay for the real output in the corresponding period. M1 is larger than M0 because, apart from currency and coins, it also includes transferable deposits of physical persons and legal entities. M2 is the sum of M1 and savings and other deposits in national currency. M3 comprises the sum

Table 4

**Initial data for constructing the investment function  
(mln Belarussian roubles measured in 2016 prices)**

Year	Investment	Autonomous investment	Sensitivity of investment to changes in the refinancing rate (coefficient)
2005	1509.58	1706.27	-56.005
2006	2037.41	2692.54	-182.010
2007	2605.33	3423.54	-3549.500
2008	3720.23	4680.78	-5867.895
2009	4337.76	4131.21	172.978
2010	5538.08	4875.44	-571.581
2011	9866.49	8560.84	443.939
2012	15444.24	15795.59	433.055
2013	20957.46	18923.25	-624.374
2014	22526.97	21928.11	-381.876
2015	20715.25	26631.89	-536.012
2016	18710	28526.22	537.601
2017	21033.70	31651.41	-299.832

of M2 and money market instruments issued by banks in national currency.

To justify the choice of this or that indicator to estimate the demand for money, we are going to build three equations for the real demand for money depending on GDP and the refinancing rate (Table 6).

Securities are not a legal monetary circulation medium while cash constitutes only one of the many payment instruments used in Belarus. Therefore, for the purpose of this study, we are going to use M2 as an indicator of supply and demand for money. It is also necessary to take into account the effect of the bank multiplier and other instruments for regulating the

balance of the money supply in cash and non-cash.

Let us now consider the results of the correlation and regression analysis (see Table 8). By using the average values of government spending and real demand for money and substituting any values from  $-100$  to  $=100$  for  $R$ , we obtain the following graphical representations of the IS-LM model (see Figure 7). For each curve we derived linear equations with the help of 'Trendline' tool. The equilibrium rate of refinancing will be achieved if the right-hand side of the simplified equation of the IS curve will be equal to the right-hand side of the LM equation.

Table 5

**Initial data for building the function of demand for money  
(mln Belarusian roubles measured in 2016 prices)**

Year	M0	M2	Average annual refinancing rate, %	Inflation level, %
2009	364.72	1718.71	13.92	107.8
2010	449.39	2189.92	11.82	153.2
2011	671.18	3140.06	21.57	159.2
2012	1130.73	5202.03	34.45	118.3
2013	1230.20	7250.80	25.62	118.1
2014	1392.38	8586.39	21.51	113.5
2015	1423.61	8913.56	24.89	106.0
2016	1692.76	9099.18	21.16	104.9
2017	234.66	1368.66	13.41	104.9

Table 6

**Matrix of the demand-for-money equations obtained through correlation and regression analysis**

Demand for money = M0	Demand for money = M2	Demand for money = GDP
$M/P = 0.01792Y - 4.7924R$	$M/P = 0.092254Y - 2.49317R$	$M/P = 0.887407Y - 19.2708R$
$R^2 = 0.993198$	$R^2 = 0.983345$	$R^2 = 0.983345$

Table 7

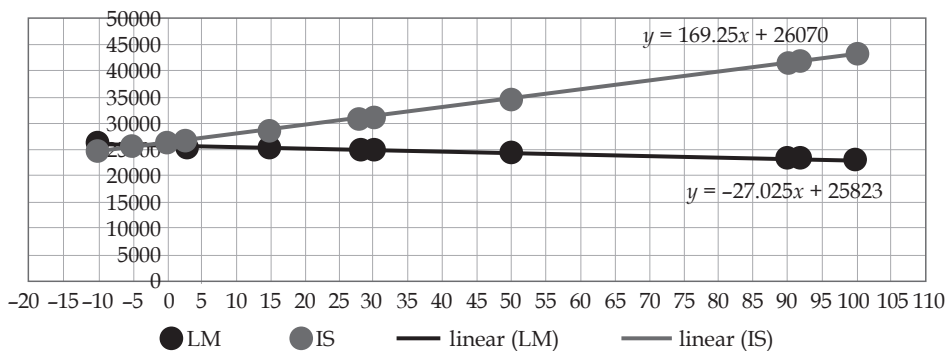
**Coefficient values for the system of equations (1) obtained through correlation and regression analysis**

Indicator	Notation	Value
Autonomous consumption	$a$	-795.208
Marginal propensity to consume	$b$	0.497
Sensitivity of tax burden to GDP change	$t$	0.292
Autonomous tax revenues to the consolidated budget	$Ta$	-6.439
Autonomous investment	$e$	10962.440
Sensitivity of investment to changes in the refinancing rate	$d$	-123.716
Free balance in the net export function	$g$	-885.332
Import coefficient (M/GDP) for the net export function	$m$	0.005
Coefficient on the refinancing rate for the net export function	$n$	13.167
Sensitivity of income demand for money	$k_{M2}$	0.092
Sensitivity of demand for money to changes in the refinancing rate	$h_{M2}$	-2.493

Table 8

**Equilibrium refinancing rate and GDP in the IS-LM model, taking into account different ways of measuring the demand for money (results of correlation and regression analysis)**

Indicator	Demand for money = M0	Demand for money = M2	Demand for money = GDP
Equilibrium refinancing rate, %	82.140	-1.258	-2.744
Equilibrium GDP, mln Belarusian roubles	39972.236	25857.009	25605.588
Tax burden corresponding to the equilibrium point	29.216	29.207	29.207



**Figure 8. IS-LM model with the demand for money measured as M2 (according to the results of correlation and regression analysis)**

If the demand for money is measured as M2 and GDP, the equilibrium refinancing rate is negative, which contradicts the laws of economics. On the other hand, the negative equilibrium rate means that the National Bank does not use the refinancing rate as an instrument to regulate investment. If the demand for money is measured as M0, then the equilibrium of investment, savings, supply and demand for money will be achieved when the refinancing rate is 82.14% and GDP, 39 972.235 mln roubles. At the same time, taking into account the average inflation level in Belarus, such rate will not be justified as it is likely to impede stable economic growth in the country.

Since the IS-LM model reflects the equilibrium of the monetary market, savings and investment in the short term influenced by monetary and fiscal policies, we are going to estimate equilibrium in short periods corresponding to 1995, 2000, 2005, 2009–2017. The results of the correlation and regression analysis demonstrate a considerable discrepancy between the equilibrium rate and the annual average refinancing rate. It is remarkable that for

those periods when the National Bank decreased the refinancing rate, the model shows that a sharp increase of the rate was necessary to ensure the equilibrium of the monetary market, savings and investment.

**4.2. Analysis of the interaction between fiscal and monetary policies in the Markov switching model**

Table 9 shows the results of equation (2) estimation by using Markov switching models.

Table 9

**Estimation of the Markov models of switching monetary policy regimes in Belarus in 2005–2019**

Coefficient	Estimated parameter	
	regime 1	regime 2
$a_1$	0.525 (0.001)	1.941 (0.000)
$a_2$	-0.001 (0.757)	-0.002 (0.577)

The empirical verification of the Markov switching model (1) has enabled us to identify regime 2 as corresponding to active monetary policy. This conclusion is based on our estimation of parameter  $a_1$ .



Its value exceeds 1, that is, the interbank market rate grows faster than inflation. *Regime 1* corresponds to passive monetary policy, which can be explained by the parameter estimation value.

The advantage of Markov switching models is that they allow us to estimate the transition probability matrix, which shows the probability of regime change at the time  $t + 1$  (see Table 10).

Table 10  
**Matrix of the transition probabilities of monetary policy regimes in Belarus in 2005–2019**

	Regime 1, $t$	Regime 2, $t$
Regime 1, $t + 1$	0.965	0.035
Regime 2, $t + 1$	0.086	0.914

The transition probability matrix shows that the regimes of active and passive monetary policy are quite stable.

The periods of active (*regime 2*) and passive (*regime 1*) monetary policy in Belarus are illustrated by Table 11.

Table 11  
**Model duration of active and passive monetary policy in Belarus in 2005–2019**

Periods	Regime 1 (passive monetary policy)	Regime 2 (active monetary policy)
	1 <sup>st</sup> quarter, 2005 – 3 <sup>rd</sup> quarter, 2011; 3 <sup>rd</sup> quarter, 2016 – 1 <sup>st</sup> quarter, 2019	4 <sup>th</sup> quarter, 2011 – 2 <sup>nd</sup> quarter, 2016

The results of equation (3) estimation by applying the Markov switching models are shown in Table 12.

Table 12  
**Estimation of the Markov models of switching fiscal policy regimes in Belarus in 2005–2019**

Coefficient	Estimated parameter	
	regime 1	regime 2
$a_1$	-0.237 (0.001)	0.075 (0.000)
$a_2$	-0.001 (0.412)	-0.000 (0.138)
$a_3$	-0.303 (0.013)	0.446 (0.000)

The results of the empirical verification of the Markov switching model (1) shown in Table 10 have enabled us to identify *regime 1* as a regime of active

fiscal policy. This conclusion is based on our estimation of parameter  $a_1$ . Its value is below zero, that is, the growth of external public debt in the previous periods does not affect the tax burden and even reduces it. *Regime 2* corresponds to passive fiscal policy, which is explained by the parameter estimation value. Such regime signifies an increase in the tax burden in response to the growing public debt in the previous periods (in this study the time lag is one quarter).

Our estimation of the parameters of the Markov model of switching fiscal policy regimes enables us to construct the transition probabilities matrix. The results of the matrix estimation are shown in Table 13.

Table 13  
**Matrix of the transition probabilities of fiscal policy regimes in Belarus in 2005–2019**

	Regime 1, $t$	Regime 2, $t$
Regime 1, $t + 1$	0.974	0.026
Regime 2, $t + 1$	0.023	0.977

The transition probability matrix shows that the regimes of active and passive fiscal policy are quite stable.

## 5. Conclusion

To solve the IS-LM model, we calculated autonomous consumption with the help of the adjusted value of the average propensity to consume. It was found that autonomous consumption is comparable with the budget of subsistence minimum in Belarus. The share of government spending in the GDP structure was on average 35.01%.

When we compared gross savings and investment, we found that in most periods, gross savings insignificantly exceeded investment, that is, the available funds were used for consumer lending rather than for investment.

Instruments of monetary policy are more dynamic in comparison with instruments of fiscal policy and can be changed multiple times within a year if the circumstances require state interference. For instance, if the National Bank of Belarus

chooses inflation targeting as a monetary policy regime and sets clear inflation targets and if the monetary policy is tailored to the national circumstances through institutional transformations, the government will be able to activate and modernize the fiscal policy.

Analysis of the Markov switching model has led us to the conclusion that from the first quarter 2005 until the fourth quarter of 2009, the fiscal policy in Belarus was in its active regime. Thus, the growth in the gross external debt in these periods (the lag equals 1) led to a fall in the revenues of the consolidated budget as percentage of GDP. From the first quarter of 2010 to the first quarter of 2019, the fiscal policy regime could be described as passive, that is, the growth of the public debt was accompanied by an increase in

the budget surplus. In the second quarter of 2019, there were signs of transition to a more active fiscal policy, which means that tax reforms should be intensified.

The choice between the active and passive regimes was determined primarily by the response of the tax burden to the changes in the public debt. In the previous periods, an increase in the tax burden aimed at neutralizing the growing public debt meant a passive fiscal policy regime while the declining tax burden together with the increasing public debt, an active fiscal policy regime.

At the moment, the National Bank of the Republic of Belarus has chosen inflation targeting as a regime of monetary policy, which provides more opportunities for activating fiscal policy instruments to regulate socio-economic processes.

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## Tax Buoyancy and Economic Growth: Empirical Evidence of Bulgaria

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### ABSTRACT

The study analyzes the long-run and short-run tax buoyancies of Bulgaria and their relationship with Bulgaria's economic growth. The buoyancy measures the response of tax revenue to changes in economic growth. The buoyancy indicates whether collectability of the tax on income, profit, and consumption increases. The object of this study is the collectability of aggregate tax revenues and of the revenues from different types of taxes – value added tax, personal income tax, corporate tax and social security contributions in Bulgaria. The subject of the study is the relationship of different tax revenues with economic growth. The research methods employed are the fully modified least squares (FMOLS) and autoregressive distributed lag model (ARDL). The research covers the period from the first quarter of 1999 to the second quarter of 2017 and uses the Eurostat data (78 observations). The study aims to show which type of revenues (from direct or from indirect taxes) is more important for Bulgaria's state budget. It is shown that the buoyancies of aggregate tax revenue, personal income tax and social security contributions significantly differ from one another in the long-run. The buoyancies of the value-added tax and the corporate tax are above one in the long run. In the short-run the buoyancy of the aggregate tax revenues, the corporate tax, the income tax and the social security contributions are different from one. The short-run buoyancy of VAT exceeds one, hence dynamics of VAT revenues is sustainable. The collectability of the aggregate tax revenue, personal income tax and social security contributions has increased neither in the long run nor in the short run. It is therefore recommended that inefficient taxes, whose collectability does not increase, be reformed.

### KEYWORDS

tax buoyancy, aggregate tax revenue, direct taxes, indirect taxes, economic growth, fully modified least squares, autoregressive distributed lag model


JEL H24, H25, H63

УДК 336.258

## Эмпирическое исследование взаимосвязи динамичности налоговых доходов и экономического роста в Болгарии

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### АННОТАЦИЯ

В настоящем исследовании анализируется динамичность налоговых доходов в Болгарии в кратковременной и долговременной перспективе, а также связь этого показателя с экономическим ростом. Динамичность налоговых доходов – показатель, который характеризует чувствительность налоговых поступлений к изменениям в темпах экономического роста. Это выражается прежде всего в наличии или отсутствии увеличения собираемости налоговых платежей для налогов на доходы физических лиц, прибыль и потребительских налогов. В фокусе настоящего исследования – суммарная собираемость налоговых платежей и доходы от различных видов налогов, в частности, налога на добавленную сто-

имость, налога на доходы физических лиц, налога на прибыль и отчислений в систему социального страхования в Болгарии. Иными словами, анализируется взаимосвязь между доходами от различных видов налогов и экономическим ростом. Методология исследования включает в себя полностью модифицированный метод наименьших квадратов и авторегрессионную модель с распределенным лагом. В качестве эмпирических данных используются данные Евростата (78 наблюдений) за период с первого квартала 1999 г по второй квартал 2017 г. Цель исследования – установить, поступления каких видов налогов (прямых или косвенных) наиболее важны для государственного бюджета Болгарии. Полученные результаты показали, что в долгосрочной перспективе существуют значительные различия в динамичности суммарных налоговых доходов, поступлений от налога на доходы физических лиц и отчислений в систему социального страхования. Динамичность доходов от НДС и налога на прибыль превышает единицу в долгосрочной перспективе. В краткосрочной перспективе динамичность суммарного налогового дохода, а также дохода от налога на прибыль, налога на доход физических лиц и отчислений в систему социального страхования отличалась от единицы. В краткосрочной перспективе динамичность доходов от НДС превышает единицу, поэтому можно заключить, что динамика поступлений НДС является достаточно устойчивой. Собираемость в долгосрочной и краткосрочной перспективе не увеличилась для суммарного налогового дохода, налога на доходы физических лиц, а также для отчислений в систему социального страхования. В результате делается вывод, что необходимо реформирование неэффективных налогов, чья собираемость не повышается.

#### **КЛЮЧЕВЫЕ СЛОВА**

динамичность налоговых доходов, суммарный налоговый доход, прямые налоги, косвенные налоги, экономический рост, полностью модифицированный метод наименьших квадратов, авторегрессионная модель с распределенным лагом

#### **1. Introduction**

Over the last years the rates of direct and indirect taxes in Bulgaria were changed several times. VAT was introduced in 1994 with a rate of 18%, in 1996 the VAT rate was raised to 22%, and in 1999 it was lowered to 20%. The corporate tax was substantially decreased from 40.2% in 1997 to 10% in 2007. The rates of the progressive income tax (18%, 20% and 22%) were also diminished to 10% in 2008. After the changes made, the revenues in Bulgaria's state budget became highly dependent on consumption taxes. The proclaimed goal of the 2007–2008 tax reform was to stimulate economic growth and increase the revenues from direct and indirect taxes.

The relationship between the revenues from different types of taxes and economic growth is broadly discussed in specialized literature. There is much theoretical and empirical evidence that a link exists between the tax structure and the economic growth. There is no consensus among economists on how to determine the optimal combination of consumption

taxes and income taxes. Barro considers taxation essential to economic development [1]. He finds that the tax on income and tax on capital distort revenues and cause a slowdown of the economy, but consumption taxes do not. According to Stiglitz, taxes are distortionary, no matter if they are imposed on labor or consumption [2]. Contrary to theoretical expectations, there is no empirical evidence that the fiscal revenues are affected by distorting or non-distorting taxes. According to liberal economics, if income tax is proportional, fiscal revenues will increase [3]. On the other hand, Keynesian economics proves that fiscal revenues will increase if the progressive income tax rate is applied [4]. The change in the income tax rate altered the structure of the entire tax system. It is possible to generate a higher revenue to the budget if the high progressive taxes on income and capital are abolished and a single tax rate on consumption is introduced [5].

It should be noted that specific types of taxes have different impact on investment, saving, consumption and economic

growth [6]. Lowering direct taxes increases investment and employment in the short term [7]. Some empirical investigations have shown that a tax rate increase of 1% will cause a GDP decrease of 0.36% [8]. A study of the taxes in 63 countries [9] has proven that tax rates have a negative effect on economic growth. In the long run, higher rates of indirect taxes increase commodity prices and lower industrial production in Britain and the United States. In the short run, wages grow after lowering direct taxes, but there is no long-run influence of direct taxes on wages [10]. Madsen and Damania [11] investigate the impact of the decrease in indirect tax rates and the increase in budget revenues in OECD countries over the period of 1960–1990. They conclude that budget revenues do not grow when they depend mainly on consumption. Lower indirect taxes have a long-term negative effect on economic growth. At the same time an increase in government spending associated with higher taxes has a strong negative effect on investment spending. Increased government spending has a positive effect on production and growth, but higher taxes negatively influence production and growth [12]. The study of the tax structure in 70 countries for the period of 1970–1997 showed that if the corporate tax falls by 10%, the rates of economic growth rise by 1.1% per year [13].

An empirical study of Nigerian economy has demonstrated that indirect taxes have a negative impact on consumption, government revenues and economic growth [14]. In OECD countries, economic growth can be stimulated by lowering direct taxes and increasing consumption taxes [15]. In that case, it should be noted that many countries shift the focus on taxation from income taxes to consumption taxes [16]. Tax revenues are an important variable for any economy as they have implications for budget deficit depending on how they relate to government expenditure [17].

Our research aims to analyze whether higher indirect tax rates and lower direct tax rates lead to higher aggregate tax revenue (ATR) in Bulgaria's budget. The so-

called tax buoyancy is used to measure the efficiency of the tax system.

## 2. Literature review

Tax buoyancy is a term used to measure and show the rate of responsiveness of taxes due to increase in GDP) of any nation, that is, to what extent tax revenues and tax collection increase as a result of an increase in national income [18]. "Tax buoyancy may differ between the short-run and the long-run. Short-run buoyancy is closely related to the stabilization function of fiscal policy. Indeed, if tax revenue increases by more than GDP (short-term buoyancy exceeding one), the tax system is a good automatic stabilizer. If short-term buoyancy is smaller than one, tax revenue is more stable than GDP and functions less as an automatic stabilizer. Long-run buoyancy is important for the impact of economic growth on long-term fiscal sustainability. Long-run buoyancy exceeding one would *ceteris paribus* imply that higher growth will improve the fiscal balance through the revenue side of the budget, while with a long-run buoyancy smaller than one growth will do the opposite. A buoyancy of one would imply that an extra percent of GDP would increase tax revenue also by 1 percent, thus leaving the tax-to-GDP ratio unchanged. A tax buoyancy exceeding one, however, would increase tax revenue by more than GDP and potentially lead to reductions in the deficit ratio" [19].

There is evidence showing a long-run positive relationship between the buoyancy of aggregate revenue and economic growth in Kenya for the period of 1963–2010 [20]. Another study demonstrates that for the economy of Nepal, the long-run buoyancies of aggregate tax revenues, VAT, personal income tax and import taxes were sustainable during 1975–2005 [21]. The revenue productivity of the Zambian tax structure for the period between 1981 and 1999 was analyzed by means of Divisia Index. The results showed elasticity of the ATR of 1.15 and buoyancy of 2.0, which confirmed that tax reforms had improved the revenue productivity of the overall tax system [22]. For Indian economy, the tax

buoyancy estimate was above one during the pre-tax reform period, which showed that during the pre-tax reform period, the ratio of the total tax revenue to GDP was increasing along with the increase in GDP.

There are several studies using the data on Ghana: according to one, the tax buoyancy was less than one during the post-tax reform period [23]. Overall, the tax system in Ghana was buoyant and elastic in the long run, with the overall tax elasticity 1.03 [24]. Another investigation of the tax reform in Ghana for the period between 1970 and 1993 showed the pre-reform buoyancy of 0.72 and elasticity of 0.71 for the period 1970–1982. The period after the reform (1983–1993) showed increased buoyancy of 1.29 and elasticity of 1.22. The study concluded that the reforms had contributed significantly to tax revenue productivity from 1983 to 1993 [25].

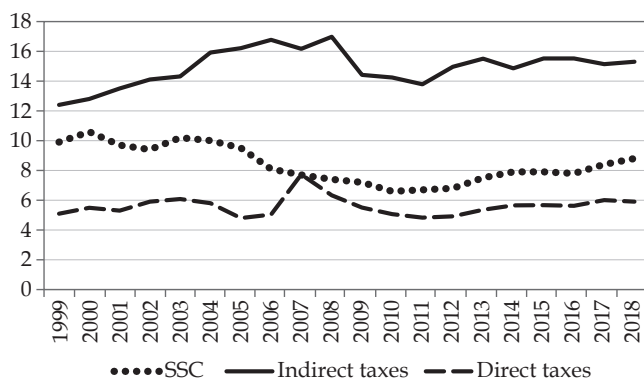
A study of Ethiopia indicates that ‘the share of service sector value added, import and over all government budget deficits to GDP affects positively, whereas the share of official development assistance to GDP affects it negatively’ [26, p. 182]. The IMF research by Belinga et al. [19] estimates the long-run and short-run buoyancies of the aggregate revenue (AR), personal income taxes (PIT), corporate income taxes (CIT), social security contributions (SSC), goods and services taxes (GST), excise taxes and property taxes for 34 OECD countries over the period of 1965–2012. The IMF experts

infer that the short-run buoyancy of aggregate tax revenues has been growing steadily in twenty-five countries, while the long-run buoyancy of aggregate tax revenues has also demonstrated a stable upward trend in fourteen countries. The corporate tax revenues have been found to be most sustainable in all countries. The revenues from the personal income tax and social security contributions are sustainable neither in the short run nor in the long run.

### 3. Empirical data analysis and research methods

In Bulgaria, fiscal revenues are largely dependent on consumption taxes (see Figure 1).

As can be seen (Figure 1), consumption taxes provide 75% of all fiscal revenues. Over the analyzed period, the revenues from direct taxes and social security contributions in Bulgaria’s state budget are relatively stable as a share in GDP, while the indirect revenues have increased their share in GDP. The rise of the share of indirect tax revenues in GDP can be explained by the following: first, the increase in nominal income; second, the decrease in the direct tax rates; and third, the increase in domestic consumption. Such structure of tax revenues is only effective if the economy grows and consumption rises. During the recession (after 2008), indirect tax revenues fell because of the decline in consumption.



**Figure 1. Revenues from direct taxes, indirect taxes and social security contributions in Bulgaria’s state budget for the period 1999–2018, percentage of GDP**

Source: Eurostat. Available at: [https://ec.europ.eu/taxation\\_customs/business/economic-analysis-taxation/data-taxation\\_en](https://ec.europ.eu/taxation_customs/business/economic-analysis-taxation/data-taxation_en)

According to IMF [19], if the long-run tax buoyancy exceeds one, it can be assumed that the budget revenues are sustainable. On the other hand, if in the short run, tax revenues increase faster than GDP, the tax structure is considered to be a good automatic stabilizer.

As a whole, the growth rates of aggregate tax revenues and social security contributions (SSC) do not exceed the growth rates of nominal GDP over the period of investigation (Figure 2). Hence, it may be inferred that Bulgaria’s tax structure is not well structured. In the case of recession, tax revenues and SSC in Bulgaria decline faster than the nominal output.

One reason for the lack of fiscal sustainability is the replacement of the progressive income tax by the proportional income tax in 2008. The proportional tax, unlike the progressive one, does not function as an automatic economic stabilizer.

Another reason is that after 2008 fiscal revenues have depended mainly on the consumption taxes.

Figures 3 and 4 show the linear relationship between GDP growth and the growth of total tax revenue and SSC. We obtained this relationship by using the following equation:

$$Y_t = C + X_t + \varepsilon_t, \tag{1}$$

where  $Y_t$  is the growth rate of aggregate tax revenue and social security contributions as a percentage of GDP;  $C$  is the constant;  $X_t$  is the growth rate of GDP;  $\varepsilon_t$  is the vector of residuals.

There is a positive connection between the rates of change of tax revenues and GDP (see Figure 3), which is confirmed by the positive sign of the regression coefficient before GDP (0.6986). The tax system is well structured when the regression coefficient before GDP is above one. Since

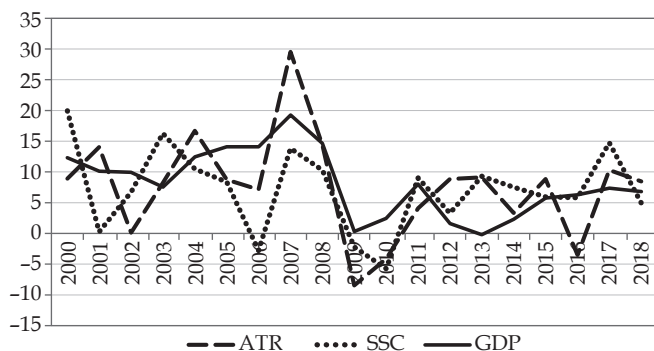


Figure 2. Growth rates of Bulgaria’s nominal GDP, aggregate tax revenue and social security contributions for the period 1999–2018 (in percentage)

Source: Eurostat. Available at: [https://ec.europa.eu/taxation\\_customs/business/economic-analysis-taxation/data-taxation\\_en](https://ec.europa.eu/taxation_customs/business/economic-analysis-taxation/data-taxation_en)

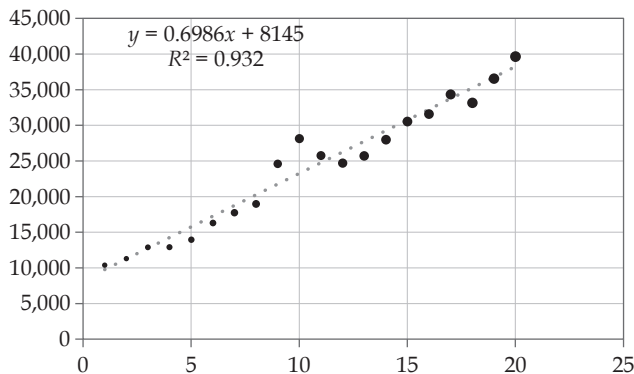


Figure 3. Percentage change on the previous year of GDP and aggregate tax revenue (Period of calculations: 1999–2018)



this coefficient is below one, it may be concluded that Bulgaria’s tax system does not provide fiscal stability.

The revenues from SSC and GDP are negatively related (the regression coefficient before GDP is -0.0019). When GDP rises, the collectability of SSC decreases. A possible reason for the decline of SSC revenues in times of economic growth is that SSC are regressive in relation to income, i.e. they charge the income to an upper limit (2600 BGN). All incomes above the upper limit of 2600 BGN are not charged with SSC.

Tax buoyancy is defined as the ratio between the percentage increase in tax revenues and the percentage increase in the tax base. Typically, the base is taken to be GDP, when the revenue collectability is analyzed. The revenue collectability could refer to total tax revenue or to revenue from any given tax in the long and short run.

We estimated the long- and short-run buoyancies for aggregate tax revenue (ATR); revenue from Value Added Tax (VAT); income tax (IT); corporate tax (CT) and social security contributions (SSC) over the period of 1999–2017 by using quarterly time series data for the period 1999Q1–2107Q2 (78 observations).

The methods employed are fully modified least squares (FMOLS) for the long run and the auto regressive distributed lag model (ARDL) with fixed effects for the short run.

As it was mentioned above, tax revenues are influenced by GDP growth.

Buoyancy measures the effectiveness and sustainability of tax revenues and is calculated as the ratio of revenue growth to GDP growth.

In this study the tax buoyancy in Bulgaria is estimated by applying the empirical methodology proposed by the IMF [27]. If buoyancy is above one in value, it means that in the long run fiscal revenues are sustainable and in the short run they serve as automatic fiscal stabilizers. When buoyancy is below one, in the long term the revenue side of the state budget is not sustainable and in the short term budgetary revenues do not serve as automatic fiscal stabilizers.

According to the IMF, the long-run and short-run buoyancies of budget revenues and (different types) of taxes (equation 2) can be estimated by applying the following equation:

$$\Delta \ln y_{it} = \varphi_i y_{it-1} + \beta'_i x_{it-1} + \sum_{j=1}^{p-1} \lambda_{ij} \ln y_{it-j} + \sum_{q=1}^{q-1} \gamma'_{ij} \Delta \ln x_{it-j} + \mu_i + \xi_{it}, \quad (2)$$

$i = 1, 2, \dots, N; t = 1, 2, \dots, T,$

where  $it$  is natural logarithm of tax revenues,  $ex_{it}$ ,  $K \times 1$  vector of explanatory variables for a group  $I$  (which includes the natural logarithm of GDP);  $\mu_i$ , fixed effects;  $\varphi_i$ , the coefficient before the lagged dependent variable;  $\beta'_i$ ,  $K \times 1$  vector of the coefficients in front of explanatory variables;  $\lambda_{ij}$ , scalar coefficients before the lagged first differences of dependent variables; and  $\gamma'_{ij}$ ,  $K \times 1$  coefficient vector of first differences of explanatory variables and their lagged values.

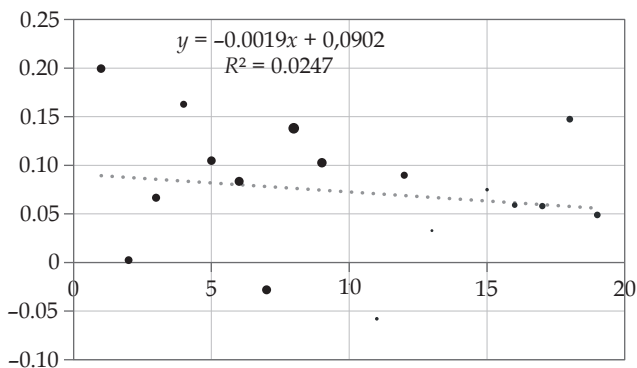


Figure 4. Percentage change on the previous year of GDP and SSC (Period of calculations: 1999–2018)

It is assumed that the disturbance  $\xi_{it}$  in the ARDL model is independently distributed across  $i$  and  $t$ , with mean zero and constant variances. Equations 2 mean that developments in tax revenues can be explained by the distributed lag of order  $p$  of the dependent variable, and the distributed lag of order  $q$  of GDP (independent variable).

Assuming that  $\varphi_i < 0$  for all  $i$ , there is a long-run relationship between  $y_{it}$  and  $x_{it}$ :

$$\ln y_{it} = \theta'_i \ln x_{it} + \eta_{it}, \quad (3)$$

$$i = 1, 2, \dots, N; t = 1, 2, \dots, T,$$

where  $\theta'_i = -\beta'_i / \varphi_i$  is a  $K \times 1$  vector of the long-run coefficients, and  $\eta_{it}$ 's are stationary with possible non-zero means (including fixed effects).

Therefore, equation 3 can be rewritten as:

$$\Delta \ln y_{it} = \varphi_i \eta_{it-1} +$$

$$+ \sum_{j=1}^{p-1} \lambda_{ij} \ln y_{it-j} + \sum_{q=1}^{q-1} \gamma'_{ij} \Delta \ln x_{it-j} + \mu_i + \xi_{it}, \quad (4)$$

$$i = 1, 2, \dots, N; t = 1, 2, \dots, T,$$

where  $\eta_{it-1}$  is the error correction term (that is, the deviation of variables at a certain point in time from their long-run equilibrium), and  $\varphi_i$  is measured the speed of adjustment towards the long-run equilibrium.

This research is based on the quarterly data for the period of 1999Q1-2017Q2 (78 observations). The trend is removed and the time series are seasonally adjusted using Census X12.

Stationarity of variables is tested for the period 1999Q1-2017Q2 by the Aug-

mented Dickey-Fuller Test with the critical significance level of 5% [28]. All variables – GDP, VAT, Income taxation (IT), Corporate taxation (CS), Social Security Contributions (SSC) – are found to be integrated of the first order  $I(1)$  (see Appendix 1).

Co-integration means the presence of a long-run or equilibrium relationship between variables. The co-integration test [29] shows that variables are co-integrated (see Appendix 2).

**4. Empirical results**

The estimation of the relationship between long-run and short-run tax buoyancies and economic growth requires that the data have logarithmic values. The method of fully modified least squares (FMOLS) is applied to determine the long-run tax buoyancies. Short-run tax buoyancies are estimated by an auto regressive distributed lag model (ARDL) with fixed effects. The relationship of the buoyancies for each type of tax and economic growth is examined separately in the long- and short-run.

Under such tax system, which relies primarily on consumption taxes, the buoyancy of aggregate tax revenue is slightly below one – 0.889878 (see Table 1). The closer to one the aggregate tax revenue buoyancy is, the more stable the tax system is. The coefficient before GDP shows that total tax revenues are near equilibrium with economic growth. The lack of equilibrium (value of the aggregate tax revenue buoyancy below one) caused an increase in Bulgaria’s public debt after the global financial crisis in 2008.

Table 1

**Long-run tax buoyancies and relationship with economic growth**

Variable	Coefficient	Std. Error	t-Statistic	Probability	R-squared	Long-run buoyancy
Aggregate tax revenue	0.060042	0.068463	3.223650	0.0237	0.968956	$K < 1$
GDP	0.889878	0.028043	31.73272	0.0000		
VAT	-3.543782	0.419305	-8.451564	0.0000	0.951719	$K > 1$
GDP	1.115117	0.043799	25.45963	0.0000		
Income tax	-0.611466	0.086469	-10.42623	0.0007	0.865022	$K < 1$
GDP	0.759480	0.061261	12.39746	0.0000		
Corporate tax	-13.16542	1.500402	-8.774590	0.0000	0.826141	$K > 1$
GDP	1.732225	0.156728	11.05244	0.0000		
Social security contributions	0.385398	0.077745	2.020259	0.0111	0.934822	$K < 1$
GDP	0.698947	0.039458	17.71360	0.0000		

Dependent variable: ATR; VAT; IT; CT; SSC

Independent variable: GDP

Table 2

**Short-run tax buoyancy and its relationship with economic growth**

Variable	Coefficient	Std. Error	t-Statistic	Probability	R-squared	Short-run buoyancy
Total revenue GDP	0.394510 0.437780	0.119465 0.109724	3.302320 3.989845	0.0015 0.0002	0.974358	$K < 1$
VAT GDP	0.590386 1.034938	0.122213 0.124103	4.830816 2.698864	0.0000 0.0088	0.971020	$K > 1$
Personal income tax GDP	0.769207 0.180648	0.119209 0.065808	6.452570 2.745074	0.0000 0.0077	0.946370	$K < 1$
Corporate tax GDP	1.153475 0.008970	0.119212 0.079433	9.675833 3.112921	0.0000 0.0104	0.982842	$K < 1$
Social security contributions GDP	0.914589 0.049381	0.121775 0.042872	7.510457 1.151815	0.0000 0.2534	0.985549	$K < 1$

*Depend variable:* ATR; VAT; IT; CT; SSC

*Independ variable:* GDP

In the regression equation for the VAT buoyancy there is a long-run relationship with GDP dynamics. The regression coefficient is 1.115117, which means that in the long-run, the VAT revenues grow more rapidly than GDP. The reason for the VAT revenue long-term sustainability is the rise in domestic demand for goods and services after the crisis. The VAT revenue sustainability has a positive effect on the Bulgarian state budget, where revenues depend mainly on consumption taxes (see Figure 1). The corporate tax revenues are the most sustainable of all tax revenues in the long-run with a coefficient of 1.732225. A possible reason for the sustainability of the corporate tax revenue is the decrease in the corporate tax rate from 37% to 10% in 2007. It may be concluded that the corporate tax rate may be raised to generate higher corporate tax revenues in the long-run. This inference is in agreement with the IMF findings for developing economies such as Bulgaria [28].

In the equation of labor tax revenue, the GDP coefficient has a value of 0.75948, which implies that there is no sustainable long-run nexus between GDP and the buoyancy of income tax revenues. A possible explanation for this result is the change in the income tax rate in 2008, when the progressive income tax was replaced by the proportional income tax and the non-taxable minimum income was abolished. Another explanation for the lack of a long-term equilibrium between income tax and GDP is the regressive effect of the former

on low incomes<sup>1</sup>. To achieve revenue sustainability in the long run, the non-taxable minimum for the lowest income and the progressive tax ought to be restored.

The results for the social security contributions are similar to the income tax revenues. The GDP coefficient is 0.698947. This result is not surprising for the economy of Bulgaria, because social security contributions are charged only on income up to BGN 2600. The income above BGN 2600 is not charged with social security contributions, which generates a regressive effect of social security payments on income. This effect resembles the regressive effect of the proportional tax on income. To increase the buoyancy of social security contributions, the upper threshold of income charged with social security contributions should be raised.

Table 2 presents the short-run relationships between buoyancies of different tax revenues and economic growth.

In the short term, aggregate tax revenue is not in equilibrium with economic growth. The GDP coefficient is significantly below one with a value of 0.437780. This means that in the short run taxes cannot act as automatic stabilizers and it is hard to ensure fiscal sustainability.

The buoyancy of the VAT revenues is 1.034938, which implies a short-run equilibrium with economic growth. VAT reve-

<sup>1</sup> The proportional income tax in Bulgaria was adopted in 2008 without a non-taxable minimum, which contradict to the theory of linear taxes. For more detail on the theory of linear taxes see [3].

nues raise the sustainability of the Bulgarian tax system both in the short and in the long run with buoyancies above one.

However, the buoyancies of the personal income tax and corporate tax do not follow economic growth. The GDP coefficients with income tax and with corporate tax (0.180648 and 0.008970 respectively) are well below one, which means that there is no sustainability between these variables. A similar result is obtained for the buoyancy of social security contributions with a GDP coefficient of 0.049381.

In the long run, the buoyancy of the corporate tax is sustainable but in the short run it isn't. The reason is that corporate tax revenues are paid in advance (for profits from 0 to 300 000 BGN one annual advance payment is made, for profits from 300 000 to 3 000 000 BNG there are four quarterly advance payments and if the profit is above 3 000 000 BNG, there are 12 monthly advance payments). The full amount of tax should be paid in the year after the profit is made, which is why the buoyancy of the corporate tax does not follow economic growth in the short run.

The buoyancies of the revenues from the personal income tax, social security contributions and corporate tax do not follow economic growth in the short run. These buoyancies are below one, which implies that they are not sustainable and do not serve as stabilizers for Bulgarian economy. If the buoyancies of the income tax and social security contributions are compared in the long and short period, it can be seen that the short-run coefficients are lower than long-run coefficients. This means that the personal income tax and social security contributions are not effective short-run stabilizers for the Bulgarian economy.

The buoyancies of the aggregate tax revenue, VAT, PIT, CT and SSC are much

more sustainable in the long term than in the short term. The empirical results from this study are in agreement with the results of the IMF [28].

## 5. Conclusion

From the equations of the relationship between GDP and the buoyancies of different types of tax revenue in the long and short run, the following conclusions can be drawn:

1. The buoyancy of aggregate tax revenues in the long run is close to equilibrium. Its coefficient is slightly below one. However, only if higher economic growth generates higher government revenues, fiscal balance can be considered sustainable in the long term. The buoyancies of the VAT revenues and the corporate tax revenues are the most sustainable of all buoyancies in the long run.

2. In the short term, the buoyancy of the aggregate revenues is considerably below one, which means that they do not serve as an automatic stabilizer. The main part of fiscal revenues is generated by consumption taxes, such as VAT, which has a coefficient above one. In order to create fiscal sustainability, progressive income taxation should be introduced and the ceiling of the income on which social security contributions are payable should be raised.

3. In the long run, it is possible that the Bulgarian government will face difficulties in financing its expenditures. In the short run, there is no evidence that Bulgaria's tax system is an effective automatic stabilizer. VAT is the main contributor to aggregate government revenues, which implies that the revenue part of the state budget is not well structured.

4. In order to guarantee the sustainability of the revenue side of the state budget, the reforms in the Bulgarian tax system are imperative.

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## APPENDICES

## Appendix 1

## Unit Root test (1999Q1-2017Q2)

Test critical values: 5% level	Augmented Dickey-Fuller test statistic	t-Statistic	Prob.*
GDP	-2.901779	-0.438714	0.8961
(D)GDP	<b>-2.902358</b>	<b>-8.216024</b>	<b>0.0000</b>
Aggregate revenue	-2.902358	-0.859342	0.7955
(D)Aggregate revenue	<b>-2.902358</b>	<b>-12.60518</b>	<b>0.0001</b>
Income taxation	-2.901779	-1.142139	0.6949
(D)Income taxation	<b>-2.902358</b>	<b>-9.638030</b>	<b>0.0000</b>
Corporate taxation	-2.902358	-1.607704	0.4735
(D)Corporate taxation	<b>-2.902358</b>	<b>-5.662774</b>	<b>0.0000</b>
Social contributions	-2.901779	0.332575	0.9785
(D) Social contributions	<b>-2.902358</b>	<b>-8.887032</b>	<b>0.0000</b>
VAT	-2.902358	-0.779836	0.8186
(D)VAT	<b>-2.902358</b>	<b>-12.75150</b>	<b>0.0001</b>

## Appendix 2

## Johansen Cointegration Test (1999Q1-2017Q2)

Series: GDP-AGREGATE REVENUE

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None	0.065744	13.72134	15.49471	0.0909
At most 1*	0.023797	3.588621	3.841466	0.0495

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None	0.065744	10.13272	14.26460	0.2034
At most 1*	0.023797	3.588621	3.841466	0.0495

Series: GDP-VAT

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None	0.065744	13.72134	15.49471	0.0909
At most 1*	0.023797	3.588621	3.841466	0.0499

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None	0.065744	10.13272	14.26460	0.2034
At most 1*	0.023797	3.588621	3.841466	0.0499

Series: GDP-INCOME TAXATION

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None	0.051889	11.86009	15.49471	0.1638
At most 1*	0.025971	3.920760	3.841466	0.0477

## Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None	0.051889	7.939335	14.26460	0.3849
At most 1 *	0.025971	3.920760	3.841466	0.0477

*Series: GDP-CORPORATE TAXATION*

## Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None	0.065744	13.72134	15.49471	0.0909
At most 1 *	0.023797	3.588621	3.841466	0.0495

## Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None	0.065744	10.13272	14.26460	0.2034
At most 1 *	0.023797	3.588621	3.841466	0.0495

*Series: GDP-SOCIAL CONTRIBUTIONS*

## Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None	0.051883	11.86004	15.49470	0.1635
At most 1 *	0.025970	3.920759	3.841464	0.0471

## Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None	0.051883	7.939335	14.26460	0.3849
At most 1*	0.025970	3.920759	3.841464	0.0471






### Sector-Specific Characteristics of Tax Crime in Russia

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#### ABSTRACT

The article discusses the hypothesis that fiscal crime has some sector-specific characteristics, which tend to become more pronounced as new technologies emerge and develop. These characteristics should be taken into account when devising policies targeted at fighting tax evasion. To test this hypothesis, we analyzed quantitative (the level of economic crime in Russia in general and for different types of economic activity) and qualitative characteristics of crime (structure, dynamics and nature of crime). We also conducted analysis of the correlation between these indicators and the structure of costs and financial performance of organizations. The research relies on crime statistics, which reflect the scale of tax evasion better than financial statistics (since the latter are influenced by a large number of factors and are subject to significant change even within one year). Pearson's and Spearman's correlation coefficients were used for verification. Sectors of economy were ranked in descending order according to the corresponding economic crime rates and loss to gross value-added in the sector. The findings show that unlike the cases of tax evasion, the number of economic crimes does not closely correlate with the structure of costs. Most tax crimes and corporate tax evasion in particular are recorded in sectors with lower labour costs, social security contributions and other prime costs but with higher depreciation of fixed assets (capital intensive industries). Thus, the results of this study contradict the findings of international scholars that shadow economy is larger in highest paying industries. It is shown that the sectors with higher losses are characterized by higher crime rates, that is, the loss in many cases is connected to tax evasion and related economic crime. The research has brought to light certain sector-specific characteristics of tax evasion, which means that these characteristics should be taken into account in governance and policy-making as well as in further research on this topic.

#### KEYWORDS

tax evasion, tax crime, economic crime, sectors of economy, shadow economy

JEL H26, K42

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### Отраслевые особенности налоговой преступности в России

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#### АННОТАЦИЯ

Выдвинута гипотеза о том, что налоговая преступность имеет отраслевую специфику, углубляющуюся с развитием новых технологий и эти различия необходимо учитывать при формировании мер борьбы с уклонением от уплаты на-

логов. Для проверки выдвинутой гипотезы проведен анализ количественных характеристик преступности (уровень экономической преступности в России в целом, а также в разрезе видов экономической деятельности); качественных характеристик преступности (показатели структуры, динамики и характера преступности); проведена корреляция со структурой затрат и финансовыми результатами деятельности организаций. Использована криминальная статистика, которая лучше отражает изменения масштабов уклонения, чем финансовая (на которую влияют множество факторов, подверженных значительному изменению даже в пределах одного года). Для верификации использованы коэффициенты корреляции Пирсона и Спирмена. Отрасли экономики проранжированы по степени убывания экономической преступности в соответствие с величиной причиненного ущерба к валовой добавленной стоимости отрасли. Оценка показала, что количество экономических преступлений не имеет тесной связи со структурой затрат, в отличие от уклонения от уплаты налогов. Больше число как налоговых преступлений в целом так и преступлений по составу «уклонение от уплаты налогов и сборов с организаций» зарегистрировано в отраслях с меньшей долей затрат на оплату труда и социальных платежей, а также прочих затрат в себестоимости, но с большей долей амортизации основных средств (фондоёмких отраслях). Это противоречит выводам о распространенности теневой экономики, прежде всего в зарплатоёмких отраслях, полученных в зарубежных исследованиях. Показано, что большее число преступлений совершается в отраслях с большим размером убытков, то есть, размер убытка во многих случаях связан с уклонением от уплаты налогов и экономическими преступлениями. Проведенное исследование подтвердило наличие отраслевой специфики уклонения от уплаты налогов и налоговой преступности и необходимость учета этой специфики, как в деятельности государственных органов, так и в научных исследованиях.

#### КЛЮЧЕВЫЕ СЛОВА

уклонение от уплаты налогов, налоговая преступность, экономическая преступность, отрасли экономики, теневая экономика

### 1. Introduction

Despite the growing body of research on shadow economy and tax evasion, there are comparatively few studies on sector-specific characteristics of these phenomena, although historically, it was precisely these characteristics that the research on Soviet shadow economy initially focused on<sup>1</sup>.

First and foremost, we need to answer the question if there are any sector-specific characteristics of tax crime, provided that all sectors of economy are determined by the same socio-economic and political factors and that in all sectors similar taxes are imposed.

<sup>1</sup> Sector-specific analysis of shadow economy was first conducted in the 1970s at the Research Technological Institute of Public Services (NITKHIB). The calculations were made to estimate the actual level of consumption of consumer services by taking into account the services offered by private individuals and adding them to the officially recorded turnover of services (see [1]).

In our previous research on shadow economy and tax evasion, we explored fiscal behaviours and the motives that drive them in Russia by applying experimental methods. The results of our experiments have shown that there is a certain level of unconditional compliance or non-compliance with tax legislation, regardless of the rigorousness of tax control and the amount of penalties imposed. In our experiments, the level of unconditional voluntary tax compliance varied between 25 and 35% (in Russia this level was higher than in Belarus) while the level of unconditional tax evasion was between 10 and 15% [2].

It is, however, highly doubtful that individual fiscal behaviour changes depending on the sphere of economic activity: in other words, it is unlikely that people's attitudes towards the tax system depend on the sectors of economy their employing enterprises belong to.

Crime is shaped not only by such factors as personal characteristics of offenders (in our case tax offenders), which act as

causes of crime, but also by specific conditions of the environment. Thus, we need to distinguish between the causes and conditions of crime. The causes of crime are understood as socio-psychological determinants which naturally engender crime and lead to the reproduction of crime. The conditions of crime do not engender crime themselves but are conducive to crime by intensifying the effect of the causes of crime<sup>2</sup>. In other words, 'condition does not generate crime but affects the process of crime generation...'<sup>3</sup>. The domain in which causes are operative includes first and foremost the stage of motivation and decision-making, that is, causes operate when motives and goals are formed while those means of their achievement are selected that would be criminal. The choice of a specific type of misconduct is determined by the conditions of the environment. Thus, the causes and conditions of tax evasion play different roles: causes lead to consequences, while conditions are contributing factors. Together, they produce a joint effect.

Causes of tax evasion have a general and permanent character and are similar in all sectors of economy and for all types of economic activity. Conditions of tax evasion intensify the effect of causes by making non-compliance easier and can be sector-specific.

Our hypothesis is that tax crime can have sector-specific characteristics, which can become more pronounced due to the development of new technologies. These differences are linked to the conditions which are either conducive to tax evasion or prevent it in various sectors. These conditions should be taken into account in devising adequate policies to fight tax crime and in particular tax evasion.

The hypothesis is tested through the analysis of Russian legal statistics, which shed light on economic crime and tax crime in the country. We chose legal statistics for the following reasons. There is a variety of forms of tax evasion: starting from attempts to exploit loopholes in the

tax legislation through various schemes of tax abuse to concealing income or economic activities. In theory, what constitutes tax evasion appears to be quite obvious but in practice it may sometimes be difficult to distinguish between legal ways of reducing one's tax bill and illegal ones. Vagueness and lack of clarity of laws, taxpayers' illiteracy, inadequate qualification of tax officials, and legislative compliance practices can create problems. The usage of legal statistics enables us to deal with the problem of discrepancies and divergent interpretations since statistics reflect only tax crimes, that is, unlawful acts committed with the criminal intent.

The article is structured as follows. The second section contains a literature review with a special focus on the causes and conditions of tax crime. The third section describes the data and methodology of the study. The fourth section deals with the results and their discussion and the fifth, with the conclusions.

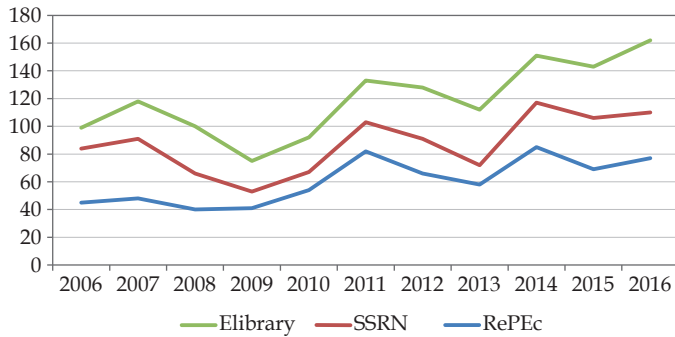
## **2. Studies of sector-specific characteristics of tax crime in different fields**

Tax evasion is widely discussed in contemporary research literature. Our previous bibliometric analysis shows that there is a persistent interest in this topic. The number of publications on this topic both in Russia and in the world tends to increase exponentially, which corresponds to the general increase in the number of articles published worldwide. Figure 1 demonstrates the upward trend in the number of publications in the largest open-access digital libraries RePEc and SSRN (publications in English) and Elibrary (publications in Russian) as of the end of January 2017. For our analysis we chose the articles and other types of academic publications whose titles contained the phrase 'tax evasion'.

International studies of shadow economy mostly focus on tax evasion as such and its causes (over 60% of the articles we analyzed). It should be noted that economic studies, unlike criminological research, tend not to distinguish between the causes and conditions of tax evasion.

<sup>2</sup> Kuznetsova N. F., Luneev V. V. *Criminology: Textbook*. Moscow: Wolters Kluwer; 2004, p. 169.

<sup>3</sup> Dolgova A. I. *Criminology: Textbook*. Moscow: Norma; 2005, p. 236.



**Figure 1. Dynamics of the number of articles on tax evasion in databases in 2006–2016 (units) [3; 4]**

To explain the reasons for tax non-compliance we need to consider two levels: macro-level and micro-level. The macro-level deals with the conditions of crime occurrence and change. Economic development of a country or a region, poverty, inequality, demography, urbanization, state system, cultural traditions, religion, and so on are the variables that determine the level of crime on the macro-level. The micro-level is the level of individual choices and motivations to engage in unlawful behavior.

Let us look at the sector-specific characteristics of tax evasion from the perspectives of different theories. Since it is a rather broad topic, we are going to limit ourselves to specific examples of political economic, economic and criminological theories.

In accordance with Stuart Hall's theory of ideology (1977), which followed the Marxist tradition, non-compliance is historically determined by asymmetrical, non-equivalent relationship between the state and its citizens [5]. Some Russian scholars have also adopted this approach: for instance, V. Pushkareva points to historical reasons behind tax evasion in Russia. The concept of the USSR as the first 'taxless' society in the world implied that Soviet citizens paid virtually no taxes (the income tax was withheld at source), which means that compliant taxpayer's mentality was not formed<sup>4</sup>. V. Radaev believes that the main reason for tax evasion is the impact of pow-

er groups within the ruling establishment and corruption. High taxes and complexity of the tax system contribute to maintaining the dependence relationship between citizens and the bureaucracy while the flow of bribes and related services partially acts as an informal substitute for tax payments, which is why the problem of tax crime should be considered in its connection to the interests of power groups [6].

Since the theory of ideology is not a new discovery but rather a reinterpretation of the questions discussed by Marx and Engels, it would be reasonable to remember at this point a well-known statement made by Thomas Joseph Dunning about the essence of capitalism. His words were quoted by Karl Marx in *Capital*<sup>5</sup>: 'With adequate profit, capital is very bold.... 300 per cent., and there is not a crime at which it will scruple, nor a risk it will not run, even to the chance of its owner being hanged. If turbulence and strife will bring a profit, it will freely encourage both. Smuggling and the slave-trade have amply proved all that is here stated...'<sup>6</sup>. Tax evasion can be included into this list

<sup>5</sup> Marx K. & Engels F. *Capital. A Critique of Political Economy. Volume 1. Book I: The Process of Production of Capital. In: Works. 2nd ed. Moscow: Gosudarstvennoe izdatelstvo politicheskoy literatury; 1960. Vol. 23, p. 770.*

<sup>6</sup> Dunning, Thomas Joseph. *Trade's Unions and Strikes: Their Philosophy and Intention. London: Published by the author, and Sold by M. Harley, No 5, Raquet court, Fleet street, E.C., 1860. Available at: [https://ru.wikipedia.org/wiki/Даннинг,\\_Томас\\_Джозеф#CITEREFTrade's Unions and Strikes: Their Philosophy and Intention1860](https://ru.wikipedia.org/wiki/Даннинг,_Томас_Джозеф#CITEREFTrade's_Unions_and_Strikes:_Their_Philosophy_and_Intention1860)*

<sup>4</sup> Pushkareva V. *History of Financial Thought and Fiscal Politics: Textbook. Moscow: Infra-M; 1996.*

of 'crimes of capital' since its primary motive is to gain a certain financial advantage. Therefore, in the light of the theory of ideology, tax evasion can be differentiated according to the benefits gained and can have sector-specific characteristics.

M. Allingham and A. Sandmo (1972) [7], who adapted G. Becker's (1972) rational choice model of crime to study economic crime [8], developed the classical A-S model and came to a similar conclusion. This model was widely applied and developed in numerous neoclassical models, which supplemented it with various factors and assumptions. Traditionally, according to the classical model, the factors that affect tax evasion are as follows: audit probability; fine rates; tax rates; and the taxpayer's income. Sectoral differentiation is possible for the two of them: audit probability and the taxpayer's income. The study of G. Yaniv on cash-intensive businesses (firms that receive a large portion of receipts in cash) [9] may serve as an example of research focused on those businesses whose activities are shaped by differences in terms of revenues and the likelihood of a tax audit. There are also studies of tax evasion in monopolies (G. Yaniv [10], P. R. Kim et al. [11], S. H. Lee [12]).

The classical behaviourist model of tax evasion proposed by M. W. Spicer<sup>7</sup> considers the impact of several non-economic factors on taxpayers' behaviour as well as the impact of penalties. Different authors, for example, S. E. Kaplan, P. M. J. Reckers [13], and M. W. Spicer [14], discuss such factors as taxpayers' perception of tax evasion as a serious problem (whether taxpayers consider tax evasion as a widely spread problem detrimental to economy or not) and characteristics of individual tax evaders. We believe that the key factors studied by behavioural economics are not sector-specific. For instance, tax amnesty, state spending policies, public morality and public disapproval, personal moral qualities, integrity and honesty of

fiscal authorities play the same role in all sectors of economy.

The issue of tax evasion is also addressed by the research on crime and the so-called white-collar crime in particular. V. Braithwaite [15] provides an overview of research literature on the factors that determine tax evasion and classifies tax evasion as a type of white-collar crime, pointing out the elusive nature of the latter, which changes depending on economic and social conditions. The main characteristics of white-collar crime, namely the preponderance of upper and middle-class delinquents, the motivation of financial gain, non-violence, systemic character, the breach of trust, and diffuse victimisation are also typical of tax evasion (H. Berghoff, U. Spiekermann [16]).

One of the theories that seeks to combine the approaches to white-collar crime developed in sociology, psychology, organizational behaviour, management, criminology and other spheres is the theory of convenience proposed by P. Gottschalk and L. Gunnesdal [17]. They point out that convenience can be both an absolute and a relative construct. As an absolute construct, it is attractive to commit financial crime as such. As a relative construct, it is more convenient to commit crime than to carry out alternative actions to solve a problem or to gain benefits from an opportunity without resorting to criminal behaviour.

Criminological theories pay much attention to crime opportunities as a causative factor in the production of crime. Perspectives that address situational opportunity in crime include the rational choice theory, routine activity theory and situational crime prevention theory.

M. Felson and R. V. Clarke [18] identify two types of criminal opportunities: those that provide potential offenders with an easy access to the target of crime and those that are created by motivated offenders themselves. Easy access may involve new crime opportunities created by new social and technological trends (Internet, mobile telephones, companies and banks). The type of crime or product is less important than the illegal means of

<sup>7</sup> Spicer M. W. A behavioral model of income tax evasion: The Ohio State University; 1974. Available at: <https://s3.amazonaws.com/academia.edu.documents/39518882/>

obtaining and using this product. Opportunities created by offenders often include bribery and extortion. J. S. Albanese [19] argues that new crime opportunities (Internet access, money laundering, political upheavals etc) may increase criminal motivation even among those who previously were not involved in any criminal activity. P. Horoszowski [20] describes the situations and events when people used extreme circumstances to commit a crime.

Within the framework of crime opportunity theory, D. B. Cornish and R. V. Clarke [21] formulated the following principles underlying the relationship between crime and crime opportunity:

1. The occurrence of a crime to a great extent depends on opportunities or conditions of the environment.
2. Crime opportunities are specific.
3. The occurrence of a crime is not random in time and space.
4. Crime opportunities depend on routine activities of daily life.
5. One crime creates opportunities for another.
6. Some products offer more tempting crime opportunities.
7. Social and technological change engenders new crime opportunities.
8. It is possible to reduce offending by reducing the opportunity for crimes to occur.
9. Reducing the opportunity, however, does not entirely eliminate the possibility of crime.
10. Search for ways to consistently reduce crime opportunities can help achieve crime reduction on a larger scale.

Principles (2, 4, 5, 6, 7) can be used to study the sector-specific characteristics of tax crime.

Based on the situational crime prevention theory, Ceccato and Benson [22] investigated tax evasion in Sweden while S. H. J. Robben et al. [23] proved experimentally that greater opportunity to evade taxes will lead to increased evasion.

Following the logic of crime opportunity theory, it can be said that tax crime can be differentiated according to sectors of economy and the corresponding crime opportunities and potential gains from crime. From the perspective of this theory, it can be said that what is important is not only the fact of crime as such but also the offender’s access to opportunities to benefit from its results. This can also refer to tax crime since it makes sense to dodge taxes only if the money generated this way is available for later use.

Economic crime and corruption are examples of crime opportunities for dodging taxes created intentionally by motivated offenders. By using a sample of 120 countries, I. Amara and H. Khelif [24] have found that the level of financial crime has a positive correlation with tax evasion and this correlation is stronger in high corruption environments. L. M. Tedds [25] used detailed information on firms around the world to investigate factors that affect their under-reporting behaviour. Regression results indicate that government corruption has the single largest causal effect on under-reporting – the percentage of sales not reported to the tax authority is 51.3%. J. K. Amoh and A. Ali-Nakyea [26]’s study of emerging economies found that the majority of such countries tend to have more than one type of dominating corruption dimension, which act as tax-evading triggers. A. Argentiero, B. Chiarini, and E. Marzano [27] investigated the impact of tax evasion

Table 1

**Studies of sector-specific differentiation in tax evasion**

Areas of analysis	Conditions for committing crimes	Criminal environment	Expertise and technology
Principles of analysis	Crime opportunities depend on routine activities of daily life  Some products offer more tempting crime opportunities	One crime creates opportunities for another	Crime opportunities are specific  Social and technological change engender new crime opportunities
Indicators	Economic conditions within the sector: profitability, cost structure	Economic crime rates in the sector	Technological development, innovation, etc

on criminal activities in Italy by using annual data for Italian provinces from 2006 to 2010 to show that tax evasion positively affects the rate of economic crime.

The above-described approaches can be summarized in the following scheme of factors affecting non-compliance and tax crime (Table 1).

### 3. Methodology and data

This research relies on Russian legal statistics, describing the level of economic crime in the country, in particular tax crime. We consider three data sets: on economic crime; fiscal crime; and tax evasion. The statistical data are provided for specific Russian regions and cover 85 federal districts, including 22 republics, 9 kraia, 46 regions, 3 cities of federal significance, 1 autonomous region and 4 autonomous districts. The data on Zabaikalsky krai and the Republic of Buryatia are included into the data on the Siberian Federal District.

The legal statistics comprise the data provided by the Office of the Prosecutor General, Supreme Court and Ministry of Internal Affairs of the Russian Federation.

The statistical data of the Office of the Prosecutor General<sup>8</sup> for 2009–2018 include the following indicators: the number of recorded economic crimes and the number of detected economic offenders.

The data of the Supreme Court Justice Department include reports on the number of people convicted for all types of crime from January to December of 2017<sup>9</sup>.

The data of the Ministry of Internal Affairs on economic crime were provided by the Ministry's Main Information and Analysis Centre. Upon request we were given access to the information about the number of recorded crimes in the reporting period; material damage recorded for closed criminal cases; compensation for criminal damage; and the number of detected offenders.

For our analysis we also used the data of the Federal State Statistics Service: gross regional product for specific Russian

regions<sup>10</sup>; the average annual number of employees in different spheres of economic activity in Russia<sup>11</sup>; sectoral structure of gross value added (GVA) (in current prices; as percentage of total)<sup>12</sup>; adjustment of GVA for economic operations unobservable through direct statistical methods<sup>13</sup>.

We analyze qualitative and quantitative characteristics of crime: the former refer to the level of economic crime (in absolute and relative terms) in Russia in general and in specific regions and spheres of economic activity while the latter, to the structure, dynamics and nature of crime.

This research contains descriptive analysis of the following datasets: gross data (consolidated figures) on the country in general, for specific Russian regions and types of economic activity. The research also comprises the analysis of the structure and dynamics of crime indicators; correlation analysis of crime indicators with shadow economy estimates (based on the data of the Federal State Statistics Service); results of organizations' financial performance in different types of economic activity. We use Spearman's and Pearson's correlation coefficients for verification.

Before correlation analysis, we checked the data for normality of distribution through the Kolmogorov-Smirnov normality test and histograms. If  $p > 0.05$  for variables (the probability of error is insignificant), then the data follow a normal distribution, which means we can apply parametric tests. In this case we apply Pearson's coefficient for correlation analysis. In other cases we use non-parametric tests. Out of the possible indicators (Kendall's coefficient of concordance  $\tau$  and Spearman's rho), we chose Spearman's rho since it enables us to take into account more accurately the quantitative degree of correlation between variables. When the sample size is  $n < 30$ , we also used Spearman's rank correlation coefficient, since in this case the

<sup>10</sup> [http://www.gks.ru/free\\_doc/new\\_site/vvp/vrp98-17.xlsx](http://www.gks.ru/free_doc/new_site/vvp/vrp98-17.xlsx)

<sup>11</sup> [http://www.gks.ru/free\\_doc/new\\_site/population/trud/05-05\\_2017.xls](http://www.gks.ru/free_doc/new_site/population/trud/05-05_2017.xls)

<sup>12</sup> [http://www.gks.ru/free\\_doc/new\\_site/vvp/tab-vrp2.htm](http://www.gks.ru/free_doc/new_site/vvp/tab-vrp2.htm)

<sup>13</sup> [http://www.gks.ru/free\\_doc/new\\_site/vvp/vvp-god/tab14-19.htm](http://www.gks.ru/free_doc/new_site/vvp/vvp-god/tab14-19.htm)

<sup>8</sup> Legal Statistics Portal of the Office of the Prosecutor General of the Russian Federation. Available at: <http://crimestat.ru/opendata>

<sup>9</sup> <http://www.cdep.ru/index.php?id=79> (last accessed date: 20.02.2019)

sample can be described as small. In order to bring the indicators to a common scale, the indicators were normalized.

#### 4. Results

According to the data provided by the Legal Statistics Portal of the Office of the Prosecutor General<sup>14</sup>, the number of economic crimes in 2009–2018<sup>15</sup> demonstrated a clear downward trend, both in absolute and relative terms (rate per 1,000 employees).

According to the Supreme Court Justice Department's<sup>16</sup> 'Consolidated Statistical Data on Convictions in Russia' for 2017, crimes covered by Article 171.2 'Illegal Gambling Organization and Operations' account for the largest share of economic crimes – 21.6%. These are followed by those under Article 175 'Acquisition or Sale of Property Known to be Illegally Obtained' – 20.7%. Crimes covered by Article 199 'Corporate Tax Evasion' rank sixth in terms of the number of convictions (4.6%). Crimes under the following articles make significant shares of the general number of economic crimes: 21.6% – Article 171.2 'Illegal Gambling Organization and Operations'; 20.7% – Article 175 'Acquisition or Sale of Property Known to be Illegally Obtained'; 10.8% – Article 173.2 'Fraudulent Use of Documents to Establish (Set up or Reorganize) a Legal Entity'; 8.7% – Article 171.1 'Manufacture, Purchase, Storage, Transportation and Sale of Unmarked Goods and Products without the Marking and/or Labelling Prescribed by the Russian Legislation'; and 8.4% – Article 186 'Fabrication or Use of Counterfeit Money or Securities'. Tax convictions account for 8.5% of the total number of economic convictions. Crimes under Article 199 'Cor-

porate Tax Evasion' make up the largest share of convictions for tax crimes.

For our analysis we used the number of economic offences in relative terms – the number of offenses in a sector of economy per number of people employed in this sector. The results of our analysis are shown in Table 2.

Table 2

**Crime rates in different sectors of Russian economy in 2017 (per 100,000 employees in each sector)**

№	Sectors of economy	Types of crime		
		Economic	Tax	Tax evasion
1	Agriculture, forestry, hunting, fishing and fish farming	72.07	6.46	2.03
2	Mineral extraction	31.24	5.95	1.69
3	Manufacturing	22.01	7.02	0.86
4	Supply of electricity, gas and vapour; air conditioning and water supply; sewage; waste collection and recycling; decontamination	29.89	2.10	0.76
5	Construction	102.63	13.52	8.93
6	Wholesale and retail trade	96.17	19.69	2.73
7	Transport	82.82	5.15	1.83
8	Hospitality and catering	22.75	1.50	0.54
9	Information and communications	43.00	0.48	0.41
10	Finance and insurance	1722.94	6.74	0.70
11	State administration and defense; social security	249.64	9.24	4.21
12	Education	60.60	0.05	0.00
13	Health care and social services	54.11	0.38	0.02

Note: the sectors with the highest detected crime rates are highlighted by green colour; the lowest – red; the sectors ranking in between – yellow and orange.

In our calculations of the indicator for the manufacturing sector we took into account only the following types of activity: food production and tobacco production; chemical industry; production of vehicles and transportation equipment (these

<sup>14</sup> Legal Statistics Portal of the Office of the Prosecutor General of the Russian Federation. Available at: <http://crimestat.ru/opendata>

<sup>15</sup> The data for 2008 proved to be unsuitable for our analysis since the total for each federal district differed substantially from the figure for the country in general. Some differences are also found in the data for 2008–2018 but they are not that significant. We supposed that the extent of difference may depend on the number of crimes in the transport sector.

<sup>16</sup> <http://www.cdep.ru/index.php?id=79> (last accessed date: 20.02.2019)



spheres were chosen because they were covered by the data made available by the Ministry of Internal Affairs).

We divided the sectors of Russian economy with the highest crime rates as of 2017 into groups according to types of crime (see Table 3).

The highest crime rates are characteristic of the financial sphere. It should be noted that the crimes in this sphere also included those unrelated to taxation.

In construction, transport and trade, the economic and tax crime rates are also high. As for manufacturing (our calculations of this indicator do not take into account all types of production), it has high rates of tax crime, especially tax evasion.

Such types of activity as education, health care, production and distribution of electricity, gas and water have comparatively low tax crime rates. This can be explained by the fact that the share of state and municipal organizations in these spheres is quite significant, which is why taxpayers do not tend to evade their tax duties as the money saved through tax evasion cannot be converted into personal income. Interestingly enough, the sphere of

state administration and social security has a relatively high level of recorded crime (in a different interpretation of this indicator).

We believe that the differences between these state sectors can stem from the scale of crime, that is, the damage per one crime. The sphere of production and distribution of electricity, gas and water is characterized by the largest-scale crime while the sphere of health care and education mostly suffers from minor crimes, offenses and violations. The same refers to the sphere of state administration and social security. This is confirmed by the data shown in Figure 2. In this figure, the economic sectors are ranked according to the damage per one economic crime.

The most substantial material damage – 50.0 billion roubles – was observed in the financial sphere and in construction – 44.1 billion, which is 1.31% and 0.79% of GVA in 2017 in the respective sectors of economy. The ratio of crime damage to GVA for these types of economic activity is the highest. Figure 3 shows the ranking of sectors of Russian economy according to the material damage caused by economic crime.

Table 3

**Sectors of Russian economy with highest crime rates**

Economic crime	Tax crime	Tax evasion
<ul style="list-style-type: none"> <li>● finance</li> <li>● state administration and defense; social security</li> <li>● construction</li> <li>● wholesale and retail trade</li> <li>● transport</li> </ul>	<ul style="list-style-type: none"> <li>● wholesale and retail trade</li> <li>● construction</li> <li>● state administration and defense; social security</li> <li>● manufacturing</li> <li>● transport</li> </ul>	<ul style="list-style-type: none"> <li>● construction</li> <li>● state administration and defense; social security</li> <li>● wholesale and retail trade</li> <li>● agriculture, forestry, hunting, fishing and fish farming</li> <li>● transport</li> </ul>

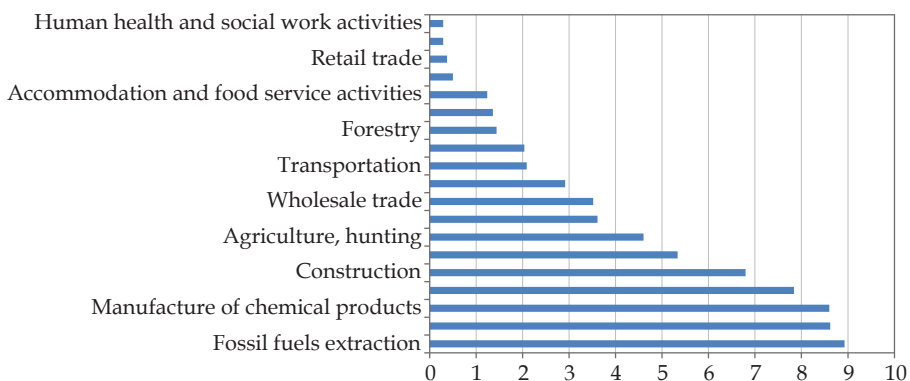


Figure 2. Damage per economic crime in 2017, (thousand rbs)

Correlation analysis shows that the percentage of the compensation for the damage caused by economic crime is in inverse proportion to the number of crimes per number of employees in the sector; the number of detected offenders per number of employees in the sector (that is, how widely spread this type of crime is in the sector); and the ratio of criminal damage to the sector’s GVA (that is, the scale of damage caused by the crime). The percentage of the compensation for criminal damage has virtually no relation to the amount of damage per crime (that is, the scale of crime).

In order to estimate the interrelation between the indicators characterizing the scale of shadow economy and the level of economic crime, we conducted a correlation analysis of the selected indicators. To estimate the shadow economy in the country we need the indicator ‘Adjustment of Gross Value Added for Economic Operations Unobservable through Direct Statistical Methods’, which shows the share of Russia’s GDP – the figure obtained by the Federal State Statistics Service through calculations of non-observed economy in addition to the data on officially registered activities of economic units. The correlation analysis was based on the following indicators:

- adjustment of GVA for economic operations unobservable through direct statistical methods, in % of GDP;
- ratio of material damage to the sector’s GVA;
- number of recorded economic crimes per average annual number of employees;

- number of recorded tax crimes per average annual number of employees;
- number of recorded cases of corporate tax evasion per average annual number of employees;
- number of detected economic criminals per average annual number of employees.

Since the sample is small ( $12 < 30$  observations), the analysis used Spearman’s rho. Table 4 illustrates the results of the correlation analysis. The table includes only the coefficients with values  $> 0.3$  (that is, those that show medium and strong correlations).

All the medium and strong correlations were positive, which means that there is a direct connection between the indicators.

The results show a strong correlation between the following indicators (significant at the 0.05 level):

- ‘Adjustment of Unobservable Economy for the Sector’s GDP’ (financial indicator, %) and ‘Damage Caused by Economic Crime/Sector’s GVA’ (financial indicator, %);
- ‘Adjustment of Unobservable Economy for the Sector’s GDP’ (financial indicator, %) and ‘Number of Tax Crimes per 1,000 Employees in the Sector’ (quantitative indicator, units);
- ‘Number of Tax Crimes per 1,000 Employees in the Sector’ (quantitative indicator, units) and ‘Number of Recorded Corporate Tax Crimes per 1,000 Employees in the Sector’ (regarding the latter re-

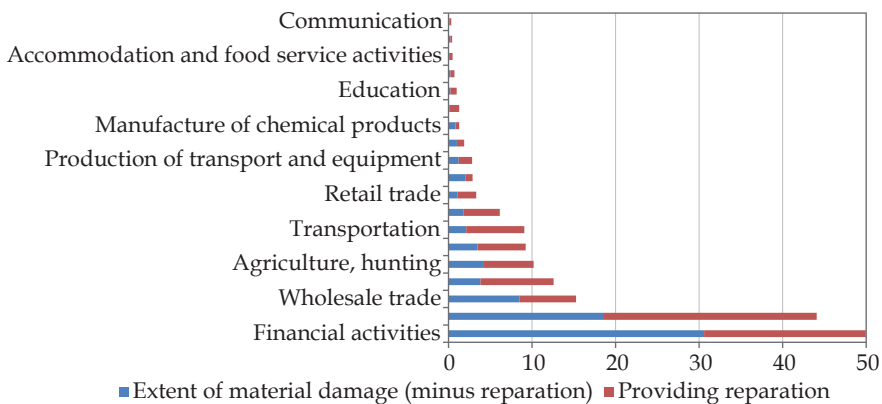


Figure 3. Material damage in different types of economic activity in 2017, bln rbs

Table 4

## Correlation coefficients of economic crime indicators

	Non-observed economy	Crime damage to GVA	Number of economic crimes per number of employees	Number of tax crimes per number of employees	Cases of tax evasion per number of employees	Number of economic offenders per number of employees
Non-observed economy		.761** (.004)	.561 (.058)	.879** (.000)		
Crime damage to GVA	.761** (.004)			.538 (.071)	.517 (.085)	
Number of economic crimes per number of employees	.561 (.058)			.427 (.167)	.497 (.101)	
Number of tax crimes per number of employees	.879** (.000)	.538 (.071)	.427 (.167)		.902** (.000)	.476 (.118)
Cases of tax evasion per number of employees		.517 (.085)	.497 (.101)	.902** (.000)		.524 (.080)
Number of economic offenders per number of employees				.476 (.118)	.524 (.080)	

\*\* Correlation is significant at the 0.01 level (2-tailed).

\* Correlation is significant at the 0.05 level (2-tailed).

relationship, the analysis of the data from 'Consolidated Statistical Data on Convictions in Russia' showed that the percentage of convictions under Article 'Corporate Tax Evasion' is the highest among other kinds of tax crime, for example, in 2017 it was 53.7%).

Thus, we found that of all the given indicators, the indicator 'Number of Tax Crimes per 1,000 Employees in the Sector' (quantitative indicator, units) can be used as one of the indicators of shadow economy.

The indicators 'Damage Caused by Economic Crime/Sector's GVA' (financial indicator, %) and 'Number of Tax Crimes per 1,000 Employees in the Sector' (quantitative indicator, units) have a medium correlation, which can be interpreted as a sign that criminal statistics provide a more accurate picture of shadow economy while financial statistics can be affected by multiple factors and are prone to change even within one year.

We also estimated the correlation between the number of recorded crimes and GRP of Russian regions with the help of Pearson's correlation coefficient. First, we excluded all zero values from the sample.

The analysis was carried out by using standardized data and showed that all the significant relationships between the indicators were direct. The correlation coefficient for the total score was 0.910. The results are shown in Table 5.

The strongest correlation is observed in the financial sphere and trade. An insignificant correlation is found in manufacturing, agriculture and mineral extraction.

We also conducted analysis of the number of recorded crimes for different types of economic activity and compared them with the data on organizations' financial performance. The data on the number of recorded crimes were compared with the data on organizations' financial performance in different types of economic activity in 2016.

Since the sample is small ( $N = 8 < 30$ ), we calculated Spearman's rho correlation between each component of the costs and the number of crimes recorded in this sector and the crime damage. Table 6 shows correlation coefficients with absolute values  $> 0.3$ . There are no coefficients  $> 0.7$  (the correlation for these coefficients can be estimated as medium). Significance is specified in parentheses.

The results of analysis have shown that the number of economic crimes does not have a strong correlation with the structure of costs.

Most tax crimes and in particular cases of corporate tax evasion are recorded in the sectors with lower labour costs, social security contributions and other prime costs but with higher depreciation of fixed

assets (capital intensive industries). This contradicts the opinion of international scholars that high-paying industries tend to have larger shadow economies. We believe that the reason for this lies in the difficulty of detecting cases of non-compliance in high-paying spheres as well as in the small size of the sample used in these studies.

Table 5  
Estimation of correlation relationships between the number of recorded crimes and GRP of Russian regions

Type of economic activity	Pearson's correlation coefficient	Significance level (2-Tailed)	Number of regions in the sample	Strength of correlation
Total number of recorded crime in all types of economic activity	0.910	0.000	80	very strong
Finance	0.934	0.000	80	strong
Retail and wholesale trade; vehicle repairs and maintenance; repairs of household and personal appliances	0.794	0.000	80	
Construction	0.677	0.000	79	noticeable
Transport and communications	0.657	0.000	79	
State administration and defense; mandatory social security	0.623	0.000	79	
Health care and social services	0.611	0.000	78	moderate
Education	0.507	0.000	79	
Production and distribution of electricity, gas and water	0.429	0.000	72	insignificant
Hotels and restaurants	0.388	0.004	54	
Manufacturing	0.219	0.058	76	insignificant
Agriculture, hunting and forestry	0.064	0.572	80	
Mineral extraction	0.028	0.834	59	
Fishing and fish farming	-0.107	0.546	34	

\*\* Correlation coefficient is significant at the 0.01 level (2-tailed).

\* Correlation coefficient is significant at the 0.05 level (2-tailed).

Table 6  
Spearman's rho (components in the structure of costs in different sectors of economy; number of recorded crimes for types of economic activity according to the Russian Industry Classification System)

	Number of economic crimes	Number of tax crimes	Number of corporate tax crimes	Material damage
material costs		.310 (.456)	.357 (.385)	
raw materials and supplies				
fuel				
energy			-.371 (.365)	
labour costs		-.443 (.272)	-.491 (.217)	
unified social tax		-.524 (.183)	-.595 (.120)	
depreciation of fixed assets		.405 (.320)	.381 (.352)	
other costs		-.524 (.183)	-.500 (.207)	-.405 ()

\*\* Correlation coefficient is significant at the 0.01 level (2-tailed).

\* Correlation coefficient is significant at the 0.05 level (2-tailed).

Table 7

**Spearman's rho (organizations' financial performance; number of recorded crimes for different types of economic activity according to the Russian Industry Classification System)**

	Number of economic crimes	Number of tax crimes	Number of corporate tax crimes	Material damage
Balanced financial result (revenue minus losses)		.361 (.155)		.365 (.149)
Percentage of loss-making organizations				
Amount of losses	.355 (.162)	.627** (.007)	.553* (.021)	.789** (.000)
Profitability of products, services and works	-.821** (.000)	-.383 (.130)		-.495* (.043)
Return on assets of organizations	-.565* (.018)			

\*\* Correlation coefficient is significant at the 0.01 level (2-tailed).

\* Correlation coefficient is significant at the 0.05 level (2-tailed).

The number of recorded crimes in different types of economic activity (according to the Russian Industry Classification System) was compared with the indicators of organizations' financial performance in these sectors. This correlation analysis is aimed at showing the relationship between the level of crime and organizations' financial performance. Since the sample is small ( $N = 17 < 30$ ), we calculated Spearman's rho between organizations' financial performance and the number of crimes recorded in the corresponding sector and criminal damage. Table 7 shows correlation coefficients with absolute values  $> 0.3$ . Significance is specified in parentheses.

The results of our analysis have shown that the majority of economic crimes were committed in sectors characterized by higher losses (and, therefore, lower profitability). The same correlation is observed between each sector's losses and tax crimes, in particular corporate tax evasion, and criminal damage.

Finally, we conducted correlation analysis of the 2016 data on material damage in different types of economic activity in comparison with the data on organizations' financial performance. We calculated Pearson's coefficient of the correlation between each component of the costs and the crime damage in each sector. The results of the calculations are shown in Table 8.

Table 8

**Pearson's correlation coefficient (types of costs in different sectors; damage per one crime for types of economic activity according to the Russian Industry Classification System)**

Types of costs	Economic crime
Material costs	<b>0.779</b>
including:	
- raw materials and supplies	0.215
- fuel	0.660
- energy	0.581
Labour costs	<b>-0.742</b>
Social security contributions	<b>-0.771</b>
Depreciation of fixed assets	-0.040
Other costs	-0.675

Source: Russian Statistical Yearbook. 2017 (in Russian and English). Available at: [http://www.gks.ru/bgd/regl/b17\\_13/IssWWW.exe/Stg/d03/24-32-37.doc](http://www.gks.ru/bgd/regl/b17_13/IssWWW.exe/Stg/d03/24-32-37.doc)

Major economic crimes tend to be observed in sectors with higher material costs (mostly fuel and energy costs). Minor economic crimes are committed in sectors with higher labour costs and social security contributions, which confirms the international research findings.

## 5. Conclusions

Based on our analysis of economic crime indicators, we ranked sectors of economy in descending order according to the significance of economic crime. The significance of crime is understood in this case as the ratio of the crime damage to GVA in a specific sector.

1. The sphere of finance ranks highest in gross indicators – the number of offenses and offenders – and in the scale of crime (per number of employees in the sector). The ratio of damage to GVA of this sector is also the highest among the other given sectors. The average damage caused by one crime is lower than average. The number of detected offenders per number of employees in the sector is also below average.

2. In construction the level of crime is below the average level. Crimes in this sphere were recorded in all the regions except one. The ratio of criminal damage to this sector's GVA is quite significant. The number of tax evaders in this sector is also high.

3. Agriculture, forestry, hunting, fishing and fish farming have the highest levels in relative indicators and the crime damage in this sector is also significant. The number of detected tax offenders per number of employees in the sector is high. This sector also has the highest number of tax evaders per number of employees.

4. The sphere of production and distribution of electricity, gas and water is characterized by the largest damage caused by one crime (major offenses), although there are comparatively few recorded crimes of this kind and the crime rates in the sector are also quite low. The number of detected tax evaders per number of employees in the sector is below average.

5. The sector of state administration, defense and social security ranks third in quantitative indicators although the damage caused by one crime is comparatively small (minor offenses). Crimes in this sphere were recorded in all the regions except one and the number of detected tax offenders and tax evaders was quite high.

6. Retail and wholesale trade ranks second after finance in gross indicators. The level of crime in this sector is quite high although the average damage caused by one crime is comparatively small (minor offenses). Crimes in the sphere of retail trade were recorded in all Russian regions; in wholesale trade, in all regions, except for two. Retail and wholesale trade is characterized by the highest number of detected tax offenders per number of em-

ployees. The number of tax evaders in this sector is also high.

7. Transport has high gross and relative values of the indicators. The sector is characterized by medium average damage per one crime. Crimes in this sphere were recorded in almost all the regions. The number of detected tax offenders as well as tax evaders in this sector is quite high.

8. In the manufacturing sector, the damage per one crime is heavy, which signifies large-scale crime. Economic crimes in the sphere of food and tobacco production were recorded in almost all the regions; in chemical industry and in production of vehicles and transport equipment, only in some regions. The number of detected offenders in this sector is significant (the analyzed data did not cover all the subsectors). The sector has a significant number of detected tax evaders.

9. In the sphere of hospitality and catering, the values of relative quantitative indicators are low. Crimes in this sector are recorded in more than a half of the regions.

10. The sphere of education has comparatively low values in quantitative indicators and the average damage caused by one crime is also small (minor offenses). Crimes in these sphere were recorded in all the regions except for two. This sector has the smallest numbers of detected tax offenders and tax evaders per number of employees.

11. Minor crimes (the smallest scale of damage) are prevalent in the sector of health care and social services. Crimes in this sphere were recorded in almost all the regions.

12. The sector of mineral extraction has the lowest crime rates. The average damage caused by one crime in this sector is above the average. As for mineral extraction (except for fossil fuels), tax crimes were recorded in 70% of Russian regions; in the sphere of fossil fuel extraction, tax crimes were detected only in a small number of regions in comparison with crime rates in other sectors.

13. The sphere of communications has low gross crime rates. The average damage caused by one crime is small (minor offenses). Offenses in this sector are recorded in almost all the regions.

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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.

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

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

2. При наборе необходимо учитывать следующее:

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Аннотация является источником информации о содержании статьи и изложенных в ней результатах исследований.

1. Аннотация выполняет следующие функции:

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- оригинальной;
- содержательной (отражать основное содержание статьи и результаты исследований);

- структурированной (следовать логике описания результатов в статье и разделенной на подзаголовки: цель исследования, методы, результаты, заключения);

- 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 кавыч-

ках (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. 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 25–40 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.

### Примеры оформления библиографических записей

#### 1. Статьи в журналах:

Pimenov N. A. Fiscal risks in the system of tax security of businesses and State. *Nalogy = Taxes*. 2010;(4):10–13. (In Russ.)

Slemrod J. Lessons for tax policy in the great recession. *National Tax Journal*. 2009;52(3):387–397. Available at: [http://webuser.bus.umich.edu/jslemrod/Great\\_Recession.pdf](http://webuser.bus.umich.edu/jslemrod/Great_Recession.pdf)

Jensen O. W. Transfer Pricing and output decisions: the dynamic interaction. *Decision Sciences*. 1986;17:428–436.

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;7(7):1–10. DOI: 10.1371/journal.pone.0039464

#### 2. Статьи из сборников научных трудов и материалов конференции:

Reingold I. I. The financial policy of NEP. In: Sokolnikov G. Ya. (ed.) *Fundamentals of the financial system of the USSR*. Moscow: Gosfinizdat; 1930. Pp. 56–61. (In Russ.)

Atkinson A. B. Horizontal equity and the distribution of tax burden. In: Aaron H., Boskin M. (eds) *The Economics of Taxation*. Washington, DC: Brookings Institution; 1980, pp. 3–18.

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.

Alam S. L., Campbell J., Lucas R. Using social media in government: The Australian taxation office e-Tax facebook page. In: *Proceedings of the 2011 IEEE 9<sup>th</sup> International conference on dependable, autonomic and secure computing (DASC, 2011), December 12–14, 2011, Sydney, Australia*. Institute of Electrical and Electronics Engineers; 2011, pp. 1002–1009.

3. *Монографии, учебники, учебные пособия:*

Kormishkina L. A., Koroleva L. P. *Financial security*. Saransk: The National Research Mordovia State University; 2016. (In Russ.)

James S., Sawyer A., Budak T. (eds). *The complexity of tax simplification: experiences from around the world*. London: Palgrave Macmillan; 2016.

Taleb Nassim Nicholas. *The Black Swan. The impact of the highly improbable*. Random House; 2007.

4. *Диссертации, авторефераты диссертаций:*

Gombozhapova S. V. *Improving tax control in context of historical experience*. PhD (Econ.) Thesis. Irkutsk; 2012. (In Russ.)

Urban I. *Redistributive effects of direct taxes and social benefits in Croatia*. Dr. (Econ.). Slovenia; 2010.

5. *Электронные ресурсы, в которых указан автор материала:*

Ivanov A. *Strong ruble and cheap loans. How effective are the proposals of Sergei Glazyev*. Available at: <http://svpressa.ru/economy/article/156619/> (In Russ.)

Feldstein Martin. *The Case for fiscal stimulus*. Available at: <https://www.project-syndicate.org/print/the-case-for-fiscal-stimulus>

### 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).

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.

# **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, footnotes – 11-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):
  - JEL classification;
  - title of the article;
  - information about the author;
  - abstract;
  - 5–10 key words;
  - the list of references;
  - the article should have reference notes given in square brackets provided according to the references.

## **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 and divided into sub-headings: the purpose of the research, methods, results, conclusions);
  - 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 clear 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. 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 25–40 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 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).

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