Proceedings of the 24th International Conference

Theoretical and Practical Aspects of Public Finance 2019

Praha, 12 and 13 April 2019

University of Economics, Prague
Faculty of Finance and Accounting
Department of Public Finance

Praha 2019

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Prologue

On April 12 and 13, 2019 the Department of Public Finance organized already the 24th international conference "Theoretical and Practical Aspects of Public Finance" with over 35 participants from the Czech Republic, Slovakia, Russia and Poland. The conference took place for the first time in March 1995 and since then it gained a significant position among similar events in both the Czech Republic and Slovakia. It is first of all a scientific conference, but it is relevant for practitioners and policymakers as well.

The first topic of the plenary session was “Lessons for Predictive Modelling and Economic Policy Learnt from the Crisis“, presented by Aleš Michl, member of the Czech National Bank Board. The second topic was „VAT Reform in the EU“, presented by Hana Zídková, Assistant Professor, University of Economics, Prague.

The conference tries to offer enough space for young scholars including graduate students. The day before the conference starts there is a students´ competition organized. Participation of students at the conference is highly encouraged so there is a special proceeding of the students section issued. It is quite encouraging as it means that a new generation of scholars grows and that it is going to bring new research questions and new approaches into our discipline.

The contributions were presented in two sessions: A - Tax Policy, B - Public finance and public policy. This volume includes 19 papers from the conference out of the total of 24 submitted papers. All contributions and conference details are available at the website of the conference at *https://kvf.vse.cz/vyzkum/konference-tpavf/.*

Regarding the applied methodological approaches, we can see a positive trend as the number of empirical papers which apply modern econometric methods grows. At the same time there are papers which present original primary data or have clearly interdisciplinary roots.

Lucie Sedmihradská

University of Economics, Prague

Contents

A Comparison of Health Resource Capacities: An Application to Statistical Regions of Turkey

Martin Dlouhý* – Jakub Hanousek**

Abstract. One of major goals of the national health policy is to minimize unwanted regional variations in equal access to health care, health services utilisation, and health expenditures. In this paper, we focus on regional variations in health resource capacities. Surprisingly, the differences in regional health resource capacities are observed in many publicly financed health systems. The objective of this study is to present three alternative methods to a comparison of regional health resource capacities. The described methods are applied to the regional distribution of doctors and nurses in Turkey. The data cover the years 2013-2015 and come from the Eurostat regional statistics database that divides Turkey to 26 statistical regions. The common weights and production function models that take into account the possibility of resource substitution show lower differences between regional capacities. We argue that both researchers and policy makers should consider the possibility of resource substitution in their allocation decisions.

Keywords: health care, equal access, regional inequality, data envelopment analysis, common weights, Turkey.

JEL Classification: I14, D63

Introduction

One of major goals of the national health policy is to minimize unwanted regional variations in equal access to health care, health services utilisation, and health expenditures (e.g., de Looper, Lafortunate, 2009, OECD, 2014). In fact, this goal is an essential element of publicly financed health system that affects the organization of the whole health system. Since the majority health systems in the world is publicly funded and highly regulated by the government, the regional variations represent shortcomings in national health policies.

In this paper, we focus on regional variations in health resource capacities. Surprisingly, the differences in regional health resource capacities are observed in many publicly financed health systems. An analysis of the regional distribution of health resources is one of the tools of evaluation of equal access to health care. The usual analytical approach to a comparison of such regional differences is to evaluate each health resource separately. The objective of this study is to present alternative methods of regional comparisons to the method of separate evaluation. The described methods are applied to the regional distribution of health resources in Turkey.

Methods

A separate evaluation of each health resource is simple and easily understandable by all health policy stakeholders. However, the separate evaluation has some disadvantages, especially ignorance of possible substitution among health resources. To show how a resource substitution can affect the results of regional comparisons we present other two alternatives of health resource capacity evaluation. Hence, the available alternatives of regional capacities evaluation are as follows:

(1) *Separate evaluation*. The most common possibility is to evaluate regional capacities for each health resource separately. The researchers usually compare regional capacities of doctors, nurses, hospital beds and the numbers of medical technology. No substitution among health resources is considered and therefore the total sum of health resource capacities does not make sense.

For a simplicity, we assume that more is better, although it is not always the case. Hence the population in region A has surely better access to care than the population in region B only in the case if region A mathematically dominates region B, i.e. capacities of all health resources in region A are higher than the capacities in region B. In case that some capacities of health resources are higher in region A and some capacities are higher in region B, we are not able to say which regional population has better access.

(2) *Common weights model*. Unlike the method of separate evaluation, we assume that health resources are, at least to some extent, substitutes, so the total weighted sum of health resources can have health policy interpretation.

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It is assumed that the lower capacities in one resource category can be compensated by higher capacities in another resource category. In such a case, the size of geographical inequality is lower than that calculated by the separate evaluation.

To cope with cases with multiple health resources, the total health resource capacity is obtained by the weighted sum of individual health resource capacities. A comparison of health resource capacities in this situation is a problem of multiple criteria decision making, specifically of the weighted sum model in which the key issue is setting of relative resource weights. Such resource weights are then used nationwide for all regions. The question is how to obtain values of weights. A survey among experts that can give us their subjective views is one possibility. The alternative is to calculate weights "objectively" by the mathematical model. The objective function of this model is a maximization of the total weighted sum of health resource capacities. This model is known as the common weights model. Let us have a country with *n* regions that use *m* health resources to provide services to local populations. The mathematical formulation of the common weights model is:

$$
\begin{aligned}
&Maximize \quad \sum_{j=1}^{n} \varphi_j \\
&subject\ to \qquad \varphi_j = \sum_{i=1}^{m} v_i x_{ij} \qquad j = 1, 2, \ldots., n, \\
&\qquad\qquad \sum_{i=1}^{m} v_i x_{ij} \leq 1, \qquad j = 1, 2, \ldots., n, \\
&\qquad\qquad v_i \geq \varepsilon, \quad i = 1, 2, \ldots, m,
\end{aligned}
\tag{1}
$$

where φ_j is the normalized capacity score of the region *j* (the score is one for the region with the highest total capacities and is lower for the others), x_{ij} is the capacity of health resource *i* per 10 000 inhabitants in region *j*, ε represents an infinitesimal constant that assures that the weight for each health resource is greater than zero. The resource weights v_j are variables in the model.

The idea of the common weights model is that the national health system as a whole tends to optimize the value of total health resource capacities and that relative ratios of health resource capacities are the same for all regions in the given country.

(3) *Production function model*. More flexible methods to estimate resource weights and the rate of substitution can be based on the production function (Dlouhý, 2018, 2018a). In this method, the weights of health resources differ for each region. In the production function model, the health resources can be considered as inputs and the served population (as a basic measure of health need) is the single output. In this case, the production function is estimated by the "resource efficient" units with minimal amounts of resources. So the capacities of "resource inefficient units" are compared to the most efficient frontier. In the second form of the production function, the regional population is modelled as the single input and health resources are model outputs. In this alternative, the production frontier is estimated by the most "resource inefficient" units, i.e. the units with the maximal amount of resources. In both cases, the production function can be estimated by the frontier analysis econometric methods or by data envelopment analysis (e.g., Jablonský, Dlouhý, 2015, Dlouhý, Jablonský, Zýková, 2018). In this paper, the data envelopment analysis was chosen.

Data envelopment analysis (DEA) was developed to construct the production frontier and evaluate the technical efficiency of production units (Charnes, Cooper, Rhodes, 1978). DEA is based on the theory of mathematical programming and estimates the production frontier as the piecewise linear envelopment of the data. The production unit uses a number of inputs to produce outputs. The technical efficiency of the unit is defined as the ratio of its total weighted output to its total weighted input or, vice versa, as the ratio of its total weighted input to its total weighted output.

DEA permits each production unit to choose its input and output weights to maximize its efficiency score. A technically efficient production unit can find such weights that the unit lies on the production frontier. The production frontier represents the maximum amounts of output that is produced by given amounts of input (the output maximization DEA model) or, alternatively, the minimum amounts of inputs required to produce the given amount of output (the input minimization DEA model).

Let us have *n* production units that use *m* inputs to produce *r* outputs. The formulation of the input-oriented version of the constant returns-to-scale DEA model for production unit *q* is:

$$
\begin{aligned}
&Maximize \quad \varphi_q = \sum_{k=1}^{r} \varphi_k y_{kq} \\
&subject\ to \ \sum_{k=1}^{r} u_k y_{kj} - \sum_{i=1}^{m} v_i x_{ij} \leq 0, \quad j = 1, 2, \ldots., n, \\
&\qquad \sum_{i=1}^{m} v_i x_{iq} = 1, \\
&\qquad u_k \geq \varepsilon, \ \ k = 1, 2, \ldots, r, \\
&\qquad v_i \geq \ \varepsilon, \quad i = 1, 2, \ldots, m,
\end{aligned}
\tag{2}
$$

where φ_q is the technical efficiency score, x_{ij} is the amount of input i used by unit j, y_{kj} is the amount of output k produced by unit j, and ε represents an infinitesimal constant. The output weights u_k and input weights v_i are variables in the model. In the input-oriented model, the efficiency score φ_q is one if the unit q is technically efficient, and is lower than one if the unit is technically inefficient. The efficiency score calculates a size of input reduction that makes production unit q technically efficient. In the output-oriented model, the efficiency score is one if the unit q is technically efficient, and is greater than one if the unit is technically inefficient. The DEA model (2) must be solved for each unit.

An Application

The application of the above described methods is illustrated on the example of Turkey that was selected by authors (a) because of the relatively higher number of regions, and (b) because in the less developed European health system, it is possible to expect that more is better with higher certainty. The regional Turkish data come from the Eurostat regional statistics database that divides Turkey to 26 statistical regions, which are composed from 81 original provinces. The statistical regions of Turkey are similar to the NUTS 2 classification. The regional capacities of two health resources, doctors and nurses per 10 000 inhabitants, are compared. The data cover years 2013 to 2015.

In 2015, Turkey had a population 77,7 million inhabitants. The population was served by 144 827 doctors (18.5 per 10 000 inhabitants) and by 205 889 nurses (26.5 per 10 000 inhabitants). Health services are financed through a social security scheme, which covers the majority of the population, and services are provided by both public and private sector facilities. Total health expenditure as a proportion of GDP has risen from 2.4% in 1980 to 6.1% in 2008. The share of health expenditure from public sources as a proportion of total health expenditure was 73% in 2008 (Tatar et al., 2011).

A comparative analysis with other European countries shows the scarcity of health care personnel in Turkey in relation to its population. In the 1990s and early 2000s, Turkey had the lowest number of doctors and nurses per 100 000 population, and one of the lowest nurse to doctor ratios in Europe. The human resource shortages led to inequalities in health service delivery and access, with east–west, rural–urban, and poor–rich divides (Atun, et al., 2013). Despite insufficient overall numbers, a significant improvement has been made in the geographical distribution of health care personnel, particularly general practitioners, since the early 2000s. Compulsory service and strictly applied health care personnel transfer rules are used as tools to balance geographical inequalities in deprived areas (Tatar, et al., 2011).

The results of separate evaluation methods are presented in Table 1. In all tables, regional health resource capacities are normalized to the maximal regional capacity being 100. In all tables, the unweighted averages are presented to show the national trend.

The statistical region of Ankara has the extremely high capacity in the number of doctors and almost the highest capacity in the number of nurses (Table 1). It is worth to mention that in the Ankara region, there is only 1.02 nurse per doctor, which a quite low ratio. It seems that population of the Ankara region is best served, however the Ankara capacities do not dominate all Turkish statistical regions. Two statistical regions, “Trabzon” and “Malatya” for shortening, have the higher numbers of nurses. Without any additional information on the substitution rate between the doctors and nurses one cannot say with the certainty that statistical region of Ankara is better than other two “non-dominated” statistical regions.

Table 1: Separate Evaluation of Regional Health Resource Capacities

Statistical Region	Doctors per 10 000			Nurses per 10 000		
	2013	2014	2015	2013	2014	2015
Istanbul	58	59	62	53	53	60
Tekirdag, Edirne, Kirklareli	52	52	51	73	74	75
Balikesir, Çanakkale	44	45	46	89	88	88
Izmir	75	75	75	79	79	81
Aydin, Denizli, Mugla	54	55	56	83	84	87
Manisa, Afyonkarahisar, Kütahya, Usak	44	45	47	78	80	82
Bursa, Eskisehir, Bilecik	51	51	52	80	78	79
Kocaeli, Sakarya, Düzce, Bolu, Yalova	49	50	51	70	70	72
Ankara	100	98	99	95	92	93
Konya, Karaman	54	54	56	75	76	78
Antalya, Isparta, Burdur	63	63	63	85	84	87
Adana, Mersin	50	50	52	68	69	72
Hatay, Kahramanmaras, Osmaniye	39	39	40	61	64	67
Kirikkale, Aksaray, Nigde, Nevsehir, Kirsehir	42	41	43	77	77	80
Kayseri, Sivas, Yozgat	57	55	55	83	81	83
Zonguldak, Karabük, Bartin	49	49	51	83	83	89
Kastamonu, Çankiri, Sinop	37	36	36	83	78	80
Samsun, Tokat, Çorum, Amasya	51	51	52	85	86	88
Trabzon, Ordu, Giresun, Rize, Artvin, Gümüshane	49	50	52	97	97	97
Erzurum, Erzincan, Bayburt	58	58	62	88	88	87
Agri, Kars, Igdir, Ardahan	34	33	35	60	55	56
Malatya, Elazig, Bingöl, Tunceli	57	55	56	98	97	100
Van, Mus, Bitlis, Hakkari	36	33	34	53	51	52
Gaziantep, Adiyaman, Kilis	41	41	43	58	63	67
Sanliurfa, Diyarbakir	42	42	45	55	56	58
Mardin, Batman, Sirnak, Siirt	31	29	31	48	48	50
Unweighted Average	**50.6**	**50.4**	**51.7**	**75.3**	**75.1**	**77.2**

Source: Eurostat and own calculations.

On the basis of comparison of the minimal regional values and the unweighted averages (Tables 1-3) we observe that both the common weights and production function models that take into account the possibility of resource substitution show lower differences between regional health resource capacities than the separate evaluation. Because the data envelopment analysis that is used in the production function model allows unit-specific weights, the DEA results are expected to be better than the results of the common weights model.

Table 2: Regional Health Resource Capacities, Common Weights Model

Statistical Region	**2013**	**2014**	**2015**
Istanbul	56	56	63
Tekirdag, Edirne, Kirklareli	75	75	76
Balikesir, Çanakkale	88	88	87
Izmir	82	83	85
Aydin, Denizli, Mugla	84	84	87
Manisa, Afyonkarahisar, Kütahya, Usak	79	80	82
Bursa, Eskisehir, Bilecik	81	79	80
Kocaeli, Sakarya, Düzce, Bolu, Yalova	71	71	74
Ankara	100	97	98
Konya, Karaman	77	77	80
Antalya, Isparta, Burdur	87	86	88
Adana, Mersin	69	70	73
Hatay, Kahramanmaras, Osmaniye	62	64	68
Kirikkale, Aksaray, Nigde, Nevsehir, Kirsehir	77	76	79
Kayseri, Sivas, Yozgat	84	82	84
Zonguldak, Karabük, Bartin	83	84	89
Kastamonu, Çankiri, Sinop	82	77	79
Samsun, Tokat, Çorum, Amasya	85	86	88
Trabzon, Ordu, Giresun, Rize, Artvin, Gümüshane	96	96	97
Erzurum, Erzincan, Bayburt	89	89	88
Agri, Kars, Igdir, Ardahan	60	55	56
Malatya, Elazig, Bingöl, Tunceli	98	97	100
Van, Mus, Bitlis, Hakkari	54	51	53
Gaziantep, Adiyaman, Kilis	59	64	68
Sanliurfa, Diyarbakir	56	57	59
Mardin, Batman, Sirnak, Siirt	49	48	50
Unweighted Average	**76.2**	**76.0**	**78.1**

Source: own calculations.

Table 3: Regional Health Resource Capacities, DEA model

Statistical Region	2013	2014	2015
Istanbul	58	59	63
Tekirdag, Edirne, Kirklareli	75	75	76
Balikesir, Çanakkale	89	88	88
Izmir	82	83	85
Aydin, Denizli, Mugla	84	84	87
Manisa, Afyonkarahisar, Kütahya, Usak	79	80	82
Bursa, Eskisehir, Bilecik	81	79	80
Kocaeli, Sakarya, Düzce, Bolu, Yalova	71	71	74
Ankara	100	98	99
Konya, Karaman	77	77	80
Antalya, Isparta, Burdur	87	86	88
Adana, Mersin	69	70	73
Hatay, Kahramanmaras, Osmaniye	62	64	68
Kirikkale, Aksaray, Nigde, Nevsehir, Kirsehir	77	77	80
Kayseri, Sivas, Yozgat	84	82	84
Zonguldak, Karabük, Bartin	83	84	89
Kastamonu, Çankiri, Sinop	83	78	80
Samsun, Tokat, Çorum, Amasya	85	86	88
Trabzon, Ordu, Giresun, Rize, Artvin, Gümüshane	97	97	97
Erzurum, Erzincan, Bayburt	89	89	88
Agri, Kars, Igdir, Ardahan	60	55	56
Malatya, Elazig, Bingöl, Tunceli	98	97	100
Van, Mus, Bitlis, Hakkari	54	51	53
Gaziantep, Adiyaman, Kilis	59	64	68
Sanliurfa, Diyarbakir	56	57	59
Mardin, Batman, Sirnak, Siirt	49	48	50
Unweighted Average	**76.4**	**76.2**	**78.3**

Source: own calculations.

Conclusion

We have presented three alternative methods of comparison of regional health resource capacities. Illustrative calculations were carried out on regional data from Turkey. We can observe that both the common weights and production function models that take into account the possibility of resource substitution show lower differences between regional health resource capacities. We argue that both researchers and policy makers should consider the possibility of resource substitution.

Geographical access to services is still a problem in certain areas of Turkey. There is compulsory service for physicians after graduation and after specialization mainly in deprived regions. The duration of this compulsory service varies, being approximately one to two years. There are also incentives for health care personnel working in these areas, such as housing and special allowances. The policy seems to have had a positive impact on the accessibility of specialist physicians (Tatar et al., 2011). The doubling of the number of health human resources in 2002–2012 was accompanied by improved service access across the country, especially in eastern Turkey. In spite of these improvements, there are still discrepancies between rural and urban areas.

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Problems of European Union Clean Energy Public Finance Policies

Karel Janda*

Abstract. This is a policy paper devoted to public policy problems connected with massive public finance support of renewable energy in Central Europe, especially in Germany and neighboring countries. This policy brief serves as a companion to several analytical papers written by Karel Janda and his coauthors on the issues of financing solar electricity in Czech Republic and Slovakia and on the policy issues of managing the electricity transmission congestion on Czech borders caused by intermittency of German wind and solar production. Particular attention is drawn to the conflict between EU Energy Union goal of fully integrated European energy market and renewable energy policies.

Keywords: Energiewende; transmission networks; congestion; loop flows; Central Europe; renewable electricity.

JEL Classification: L94, Q21, Q48, C61

Introduction

European power industry has undergone a very dynamic development in the last decade. This rapid energy landscape change was largely driven by public policies. Alongside the wide environmental issues of public health (mainly reduction of air pollution (Ščasný et al., 2015) and concerns with possible negative effects of nuclear energy) and climate change mitigation, one of the major drivers of European energy transition was the aim of the European Union (EU) political establishment to reduce energy dependency of Europe.

With regard to a fact that European fossil-fuel base and reserves are very limited (according to the BP Statistical Review of World Energy 2015, reserves of EU countries account only for 0.3% of proved world oil reserves, 0.8% of proved gas reserves and 6.3% of coal reserves), the only way of attaining the goal of increased self-sufficiency was the redirection of the energy sector towards locally produced energy coming from renewable resources or from nuclear power plants. However, there are a couple of policies going against this trend and not in line with the decarbonisation pathway. For instance, the Czech government decided in 2015 to lift the ban on brown coal reserves at one of two open pit mines under the ban to increase supply of domestic coal to be used in particular for district heating. Rečka and Ščasný (2017, 2018) analyse the effect of lifting the ban on the energy-mix and on renewable energy use in the Czech Republic. This requirements have led to massive public finance support of clean renewable energy resources all over the Europe and in Germany in particular (Janda, 2018; Lunackova et al., 2017). The aim of this short policy paper is to highlight some key policy problems connected with massive support of renewable electricity supply in Europe.

EU energy and climate policies

Already the strategy of the European commission, called "Europe 2020'' presented on 3rd March 2010, set several clearly quantitatively qualified targets for European energy and environmental policies which are commonly known as 20-20-20 agenda. This strategy implied that by 2020 the EU aimed to reduce its greenhouse gas emissions by at least 20% as compared to 1990, increase the share of renewable energy to at least 20% of consumption, and achieve energy savings of 20% or more (European Commission 2009). Rapid successful progress towards the implementation of 20-20-20 agenda including public willingness to accept public finance implications of these policies and the technological progress mainly in the area of wind and solar electricity generation enabled that in 2014 this agenda was updated and even more ambitious targets in the form of 40-27-27 were set to be reached until 2030 (European Commission 2014) and most recently it was re-formulated in the Clean Energy for All Europeans Package. The 2018 adoption of this Package by Council of the European Union fixes two new targets for the EU for 2030: a binding renewable energy target of at least 32% and an energy efficiency target of at least 32.5% - with a possible upward revision in 2023. When these policies are fully implemented, they will lead to steeper emission reductions for the whole EU than anticipated --- some 45% by 2030 relative to 1990 (compared to the existing target of a 40% reduction). These policies enable EU to fulfill its commitments under 2015 Paris Climate Change Agreement.

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Another complex and ambitious project of the EU in energy sector is the effort to create a European Energy Union which was officially launched in 2015 (European Commission 2015a). This policy project includes five main objectives (European Commission 2015b) concerned with energy security, energy market integration, energy efficiency, climate action, and support for low carbon and clean energy technologies which could increase the EU's global competitiveness. In the context of this paper, we pay particular attention to the objective of "fully integrated European energy market" (European Commission 2016) and its compatibility with the other goals of European Energy Union focused on decarbonising the economy.

A fully integrated internal EU energy market means that energy should flow freely across the EU without any technical or regulatory barriers. There are some examples of market integration in the EU which can be seen as precursors of future integrated market. One major example in the region of Central Europe was a controversial bidding zone of Germany, Austria and Luxembourg, which allowed unrestricted electricity trading in this three countries block. Similarly Single Electricity Market for the island of Ireland covers the whole island across the national borders.

Nevertheless these mentioned policies and objectives are, under the current situation in the European energy sector, quite in a contradiction. A rapid increase of renewable energy sources has brought wide range of challenges to whole electricity sector. Price distortions, instability of supply or capacity of transmission networks are generally considered to embody the most serious examples of these challenges. At the same time, inappropriate delineation and integration of the market contributes furthermore to these problems instead of eliminating them.

In the context of Central Europe, this can be demonstrated in a following way. With the development of solar and wind power plants in Germany, severe problems with transmission occurred. Excess production in the north has to be transported to the consumption centers in the south and to Austria and other energy deficient countries in southern Europe. The existing German grid is not able to accommodate such a big feed-in of intermittent renewable energy and, therefore, exhibits congestion. As a result, electricity flows through the systems of adjacent countries, Poland and the Czech Republic, and causes severe problems in their grids as well. Furthermore, these problems were exacerbated by the market integration, in particular by the existence of German-Austrian-Luxembourg bidding zone which enabled these three countries to trade electricity disregarding the physical grid constraints.

The Czech, Polish and Slovak electricity transmission system operators (TSOs) are, naturally, dissatisfied with the state of current affairs as nobody compensates the expenses that have to be incurred to tackle this problem. Whole situation becomes subject of heated debates on the highest political levels. While Czech and Polish TSOs strived for splitting up of the bidding zone or even for splitting up Germany in more zones, Austrian bodies opposed this and tried to avoid such solution as it would significantly increase the cost of electricity there. Except the political measures, TSOs also attempt to solve this problem by installing phase-shifting transformers that are able to stop the physical electricity flows in case of emergency. On this example, we can see that higher amount of installed variable renewable electricity sources (VRES) capacities induces grid congestion. Therefore, simultaneously attaining the goals of both these proposed EU strategies is mutually incompatible.

Cross-border problems

From the international perspective, electricity generation as well as transmission systems were historically maintained primarily on local, mostly national, level by domestic highly-controllable production. Trading was limited and cross-border transmission interactions took place only in case of emergency grid balancing. Transmission grid and power system infrastructure reflected this setup fully throughout Europe.

However, real efforts of integrating the European electricity market into one area as well as promoting renewable energy led to a transition that came in 1996 and afterwards. In this time, three legislative packages and other legislature were passed by the European Parliament aiming to the transparency, regulation, consumer protection and overall integration.

These packages, combined with the packages on promotion of renewable policies, started to change the structure of European energy markets completely without having considered the side-effects of these policies on cross-border congestion, volatility and unpredictability of VRES production resulting from such setup.

These concerns are confirmed also by IEA publication on EU energy policy which states following: "The investment and large-scale additions of variable non-dispatchable renewable energies in Central and South Europe have brought about a number of new challenges for the wholesale electricity markets, the merit-order dispatch, system operation and grid management, as electricity trade flows across borders and at the distribution network level increased" (IEA 2014).

Eventually, to illustrate briefly the interconnections problems in more depth, we can have a look on interregional interconnection level. The x% EU interconnection means that each EU member state should have in place electricity cables and transmission lines that allow at least x% of the electricity that is produced by their power plants to be transported across its borders to its neighboring countries. Even though 10% interconnection level was set in 2002 and reassessed in 2014 (confirmed in November 2017) to reach 15% by 2030, it is quite clear that

with increasing amount of trade and growing production from VRES, such target is insufficient. According to IEA, the capacity should be increased by at least 40% (IEA 2014).

In order to quantify an influence of renewable energy sources on cross-border profiles in transmission networks in Central Europe Janda et al. (2017) use the direct current load flow simulation model ELMOD. They evaluate two development scenarios for the year 2025 on the basis of four representative weeks. They use two simulation scenarios, where the first scenario focuses on the effect of Energiewende on the transmission networks and the second one drops out nuclear phase-out and thus assesses isolated effect of increased feed-in. The results of Janda et al. (2017) indicate that higher feed-in of solar and wind power increases the exchange balance and total transport of electricity between transmission system operator areas as well as the average load of lines and volatility of flows. Solar power is identified as a key contributor to the volatility increase, wind power is identified as a key loop-flow contributor. Eventually, they conclude that German nuclear phase-out does not significantly exacerbate above mentioned problems.

While Janda et al. (2017) focus on cross-border profiles as a key issue in international policy discussions related to energy transmission, Malek et al. (2018) use the same simulation model ELMOD to investigate transmission load on the electricity transmission lines in Germany and its Eastern neighboring states. The evaluate two development scenarios for the year 2025 using 3 representative weeks. The results of Malek et al. (2018) illustrate the electricity transmission issue from three different perspectives. Firstly, they simulate the distribution of loads in the grids. Secondly, they analyze hourly patterns during particular weeks. Thirdly, they provide a geographical decomposition and identify problematic regions in each of the Central European countries. They show that the high solar or wind power generation decrease the periods of very low transmission load and increase the mid- and high load on the transmission lines. They also find out that high solar feed-in has less detrimental impacts on the transmission grid than high wind feed-in. Another of their policy relevant results is that high wind feed-in burdens the transmission lines in the north-south direction in Germany and water-pump-storage areas in Austria.

Institutional features of Central European electricity transmission systems

Market design description and cooperation setup

Electricity market has one major feature in comparison to other commodity markets. Under current level of technology, possibilities of storing electricity are extremely limited as well as expensive. Hence, the condition of equality of supply and demand at particular time and place has to be satisfied. Various forms of electricity trading on long-term markets (forward), short-term markets (day-ahead, intraday markets) and balancing markets are used as a tool to assure the overall equilibrium. The results of this trading are called commercial or scheduled flows.

Nonetheless, it is important to have in mind that the nature of physical electricity flows does not have to, and actually mostly does not, correspond to the planned commercial flows. In fact, the flows are subject to physical laws which determine the flows based on current situation in the network. The differences between the actual and scheduled flows of electricity are called unplanned flows. Practically, they present the deviation of expectations in form of traded contracts from the real flows of electricity. Maintenance of unplanned flows is the main task in securing safe functioning of the system with respect to the necessary condition of balancing demand and supply of electricity in the grid.

The responsibility for maintenance of stability is most frequently in hands of TSOs. All of TSOs in Central European countries covered in this paper are legally obliged to assure such stability (Source: web pages of TSOs). TSOs supervise their particular territory and monitor and manage cross-border electricity flows by the means of trade as well as by the means of physical controls, including congestion management. Kunz (2013) gives following definition of congestion and congestion management: Congestion represents the situation when technical constraints (e.g. line current, thermal stability, voltage stability, etc.) or economic restrictions (e.g. priority feed-in, contract enforcement, etc.) are violated and thus restrict the power transmission between regions. Therefore, congestion management is aimed at obtaining a cost optimal power dispatch while accounting for those constraints.

Czech Republic

Czech transmission system consists of country-wide control area which is under the maintenance of the Czech transmission system operator, state - owned company CEPS. According to the TSO, Czech backbone transmission system constitutes of 3510 km of 400 kV lines and 1909 km of 220 kV lines which were finished in the 1980s and 1970s respectively. In addition, the system comprises 41 substations with 71 transformers for both basic voltage levels. The transmission network serves three purposes. Firstly, it transmits electricity throughout the whole Czech Republic. Secondly, it supplies electricity to distribution networks from which electricity is then delivered to final consumers. In the Czech republic, distribution is ensured by three major companies: PRE distribuce, a.s., CEZ distribuce, a.s., E-ON distribuce, a.s.. Thirdly, it is part of European international transmission network.

The institution CEPS as a TSO, has several key responsibilities. Primarily, it is legally obliged to ensure the stability of the grid by balancing the supply and demand of the electricity. Next, it is in charge of maintenance and development of the grid. Eventually, it administers the transmission of electricity between the producers and distributors of electricity and collaborates with foreign TSOs.

Due to the fact that the backbone transmission system in the Czech Republic merely reflects the design at the time of completion at the end of the 1980s, investments to the grid enhancement and reinforcement need to be done so that the grid is able to cope with upcoming challenges. CEPS is well aware of this fact and thus development of the grid is among its indispensable, ongoing activities.

The process of planning the further development of the Czech electricity grid is mostly driven by the "Ten-year investment plan for the development of the transmission system". Current plan works with the time scope of 2015-2024.

Following objectives are defined in the document:

- system sections necessary to be constructed or extended in the following 10 years ,
- all investment projects already decided by the company to be implemented, including implementation schedule,
- new investment projects to be implemented in the following 3 years, including implementation schedule.

Especially the system sections objective is of the greatest concern due to the international-related impacts on the Czech transmission system. According to its legal obligation, CEPS prepares the implementation of measures aiming to ensure system stability. These include expansion and upgrade of existing substations, construction of second circuits on selected lines as well as building of several new ones. Installation of phase-shifting transformers at Czech-German interconnectors is one of important implemented measures. The total volume of investment funds for these projects amounts to CZK 44.90 bn.

Germany

German power system naturally exhibits much more complexity than the Czech one, which should be of no surprise as both the amount of electricity and area of Germany are much greater than in the Czech case.

The German grid consists of four stages. Three are subject to distributional grid and one, extra high voltage grid (220 kV and 380 kV), embodies the transmission system. Total length of the transmission network accounts approximately for 35200 km .

There are four TSOs in Germany. Each of these companies was previously owned by one of the big four utilities. There have been, however, a number of changes to the ownership structure in recent years, as the big utilities divested transmission assets for a number of reasons, including regulatory pressure of the European Commission and German government. This resulted in the sale of assets to independent shareholders or legal unbundling from the parent company. Resulting list includes following operators: TenneT, Amprion, 50Hertz Transmission and TransnetBW.

Likewise in the Czech Republic, TSOs are responsible for the secure transmission of energy, constant monitoring of the balance between the demand and supply and intervening in the market if necessary. In addition, they are responsible for the maintenance of the grid and its expansion as needed . The TSOs are supervised and regulated by the German federal network agency, Bundesnetzagentur (BnetzA) which ensures discrimination free grid access and, since 2011, has also played an essential role in implementing the grid expansion codified in the Grid Expansion Acceleration Act (NABEG).

German transmission grid faces severe problems. In the past, electricity generation was based on two criterions: Availability of resources in place or in proximity and close location to the demand. The first case can be observed on the distribution of coal power plants in coal reservoirs in western and eastern Germany, the latter case can be seen on the existence of nuclear power plants in southern Germany.

Today, the main challenge lies in the complete transition from the old model as many bottlenecks and congestion in the transmission system occur. The reasons are twofold. Firstly, there is the goal of increasing electricity production from renewables, where the greatest RES increments are projected to come from off-shore wind turbines in the North Sea. Centers of electricity consumption situated mostly in the south and west of the country seldom overlap with regions suitable for most economic production of renewable electricity. These are located in the north of Germany where, on the contrary, electricity consumption is low. The electricity generated there must therefore be transported over long distances to the consumers in north-south way. In the process, the existing network is frequently reaching its capacity limits.

The second goal, related to nuclear phase-out, further contributes to the north-south grid pressures. Nuclear power plants are mostly located in southern regions, Bavaria and Baden-Wurttemberg. To be more specific, 8386 MW of nuclear installed capacity in these two states should be disconnected from the grid by 2022. The loss of capacity is not expected to be fully offset by new installed capacities, which is the result of limited RES potential.

Having seen the effects of planned energy transition in form of increase of capacities in the north and its decline in the south and combining it with the current situation of intra-German electricity balance, where the balance

design is such that southern regions import electricity whereas norther regions export it, the necessity of strengthening the infrastructure in north-south direction is unquestionable. This is also a standpoint of both, German and especially neighbouring TSOs. Nevertheless, the volume of the infrastructure extension as well as the realization itself seems to be a matter of controversy and contributes thus to prolongation of problems.

The grid expansion agenda is backed by two laws - Power Grid Expansion Act (EnLAG) from 2009 and Federal Requirements Plan Act (BBPlG) from 2013. EnLAG stands for Gesetz zum Ausbau von Energieleitungen, while BBPlG stand for Bundesbedarfsplangesetz.

EnLAG legislature specified 23 mostly north-south transmission lines in the length of 1876 km that need to be urgently built to preserve the stability of the system in the environment of increasing RES production. The construction should have been finished by the end of 2015. Nonetheless, in the second quarter of 2015, only 8 kilometers of lines were built which gives 487 km with previous construction. Similarly slow progress in building new high-voltage German power lines was characteristic for the years 2016-2019.

BBPlG, which came into effect in July 2013, added another 36 planned extension lines out of which 16 are considered of cross-regional or cross-border importance. Corridors of future networks are now determined and a public discussion about the exact tracing is in progress.

Mainly EnLAG activities take up major project delays which can be ascribed to the negative public opinion and resistance which accompanies the network construction. The general public refuses the grid construction in the vicinity of their places of living and requires mostly the underground cable solutions. Nevertheless, this is estimated to be up to 5 times more expensive than ordinary lines. Kilometre of lines costs 1,2 Mio EUR whilst kilometre of cable costs 6 Mio EUR. This is, to a certain extent, interesting paradox as wind and solar parks have previously been mostly approved by German public. As a result, it barely seems that fast short term improvement with mentioned 40% target is foreseeable. However urgent completion of north-south lines is absolutely crucial in context of the whole region. As long as the new power lines between north and south Germany are not completed, the problem of a lopsided system that requires frequent interference from grid operators will only worsen.

Austria

Austrian transmission network, operated by the company APG, plays a key role in Central Europe as it is a crucial cross-road for transport of electricity form the Czech Republic and Germany to south-eastern European countries. The high-voltage transmission grid consists of 380 kV (2577 km), 220 kV (3212 km) and 110 KV (1182 km) of lines summing up to 6971 km. There are also 63 substations.

The responsibilities of APG are similar to previous TSOs and include transport coordination, grid operation management, load flow optimisation and congestion management as well as grid development. Especially a grid development is a current topic in Austria. In 2015, ten year Network development plan was approved which proposes grid reinforcement and expansion measures to meet the common challennges of European energy transition. These measures include upgrade of existing lines to higher voltage levels, construction of substation and transformers as well as 370 km of new transmission lines.

Slovakia

Likewise the Czech grid, Slovak transmission network was for a very long time part of common Czechoslovakian system which was developed together as one system. This explains the extraordinary good interconnection capacity of Slovak network, which reaches as high as 61% and the absence of bottlenecks on the Czech-Slovak border. It is also important to note that Slovak grid is important in the international context for the Czech Republic as exports to Slovakia are almost fully passed further on Hungary

The high-voltage grid itself is mantained by the state owned company SEPS which acts as a Slovak TSO. It is responsible for 1953 km of 400 kV lines, 826 km of 220 kV lines, 80 km of 110 kV lines and 26 substations. Also the Slovak grid will be subject to reinforcements and upgrades. In 2014, SEPS issued Ten year development plan for the years 2015-2024. In here, investments reaching 564 mil EUR are outlined. They concern mostly internal advancement of infrastructure as well as expansion of cross-border transmission lines, particularly on Slovak-Hungarian borders. All other border profiles are not included in projected investment plans as their capacity is sufficient.

Poland

Polish high-voltage transmission network, whose operator is the company PSE, consists of 3 types of lines - 1 line of 750 kV (114 km), 89 lines of 400 kV (5984 km), 167 220 kV lines (7971 km) and 106 substations. There is also one DC connection in the form of undersea cable of 450 kV of 254 km (but only 127 km is mantained by PSE).

Generally, Polish system suffers from very low density in northern areas as well as very low interconnection level of only 2% which entails severe problem when transmission of electricity is considered. Very often, congestion and hitting up of limits of the lines occur. The most critical situations appear on Polish-German border where only 4 interconnectors on the voltage level 220 kV are present.

Contemporary "Development Plan for meeting the current and future electricity demand for 2016-2025" takes this fully into account. The existing interconnectors are planned to be upgraded to 400 kV levels. Moreover, after the grid in western Poland is reinforced by 2020, new interconnector is projected after 2025. PSE also plans major infrastructure enhacment within whole Poland which is the precondition for successful connection of new expected power plant units, including mostly wind, gas and coal ones. Outlays in the first half of the period should account 6.98 bn PLN, in the second half then 6.28 bn PLN.

Conclusions

In the context of Central European region, all the aforementioned is represented by the following major policy issues:

- Grid bottlenecks between southern and northern Germany.
- German Energiewende leading to unprecedented growth of VRES production and nuclear phase-out.
- Market setup: German-Austrian-Luxembourg electricity bidding zone.

The international dimension of this problem is represented by the fact that, in accordance with the physical nature of electricity, in the absence of particular capacities, electricity flows through free capacity in the grid elsewhere which creates unscheduled flows affecting all neighboring countries (predominantly the Czech Republic and Poland). In here, several problems in national transmission grids are caused (Misik, 2015) These unplanned power flows can be split into external flows created by internal commercial transactions in one country (traditionally called “loop flows”) and external power flows created by commercial transactions between two countries (traditionally called “transit flows”) (CEPS et al., 2012). In Central Eastern European context, especially loop flows exemplify substantial threat to the stability of the grid as these flows over particular interconnections are mostly unplanned and are thus unexpected by the TSO. Unpredictable production from VRES, mainly wind parks, is main determinant of these flows as this production is gusty both in amount and time (CEPS, 2010).

Conceptually simple solution to the contradiction between supporting renewables and promoting energy markets integration would be to eliminate cross border electricity transmission congestion by building sufficiently many high-voltage transmission lines across the Europe. Obviously this would imply huge financial expenditures, which would be partly covered by public finance, partly passed to consumers in the increase of electricity prices. However the direct financial costs are not the only impediment to this conceptually simple solution. There is an important public policy problem in securing the agreement of concerned individuals and communities in the vicinity of such newly build power lines with their construction. Partly this again reverts to the financial side of the problem, since significantly more expensive underground cable lines are usually more publicly acceptable than cheaper overland lines.

While the higher integration of electricity markets and transmission systems is the mainstream of European policy and technology, there also exist different conceptual approaches both in Europe and globally. One of them is the concept of growing local production and consumption. This is closely connected with local decentralised production of electricity, mainly solar one. However, no small local energy island are able to cope with fundamental technological constraint of geographically located wind generated electricity capacity in the North of the Europe. Therefore the need for the North-South high voltage connection is difficult to avoid, the remaining issue to decide being mainly the size of the needed additional transmission capacity to be constructed.

An interesting positive aspect of this energy transmission infrastructure problem is the fact that actually these required high-voltage lines which would help to alleviate cross border congestion problems would be fully internal lines inside a country (mainly inside Germany). So as opposed to for example gas and oil pipelines which require intensive international cooperation, the problem of electricity transmission is solvable internally, mainly by construction of high-voltage power lines between north and south Germany, which may be technologically efficiently fully located in Germany. Such power lines would automatically remove the congestion on border crossing of neighboring states. Instead of costly installation of phase shifting transformers which close country borders to electricity flows or instead of building new inter-country connecting power lines, the enhancement of intra-country transmission capacities in major renewable electricity producing countries may provide a socially more efficient solution to the contradiction between energy market integration and climate change mitigation EU policies.

While some public policies and public finances devoted to some renewable energy sources did not achieve general public acceptance (Ščasný et al., 2017) and do not seem to further expand, others are expanding and considered as highly promising. An example of renewables which did not fully deliver on initially high expectations are biofules (Filip et al., 2016, 2019). However renewable electricity policies, mainly concerned with supporting

wind and solar electricity, which led to the energy transmission problems described in this paper, met in general with a high level of public acceptance. For instance, Alberini et al. (2018), using the discrete choice experiment, find that the Czechs are accepting and hence willing to pay more for climate change mitigation policy that is based on renewables rather than on energy efficiency support. Also after correction for initially too high public finance support of photovoltaic electricity generation (Prusa et al., 2013) new renewable electricity financing mechanisms were introduces which alleviated the initial high public finance dependence of these energy policies

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Fiscal Decentralization and Economic Integration in Europe

Milan Jílek*

Abstract. The paper investigates the issue of fiscal decentralization in European countries. The aim of the paper is to capture the developments of fiscal decentralization in European Union and EFTA countries since 1995 to 2017 as a reaction on the factor of economic integration in Europe. The fundamental idea behind is straightforward one, more economically integrated countries of Europe are supposed to decentralize more of their national government expenditure. The econometric model with government expenditure (de)centralization as the dependent variable, with the economic integration explanatory variables and a number of control variables is estimated using the OLS estimator with country fixed effects. The estimation results confirm the positive effect of economic integration on the government expenditure decentralization.

Keywords: Fiscal federalism, Fiscal decentralization, Secession, Government expenditure, European Union, Economic integration,

JEL Classification: H70, H77

Introduction

The paper investigates the issue of fiscal decentralization in European countries. The aim of the empirical analysis is to capture the developments of fiscal decentralization in in European Union and EFTA countries since 1995 to 2017 as a reaction on the economic integration in Europe. The key idea behind is straightforward one, more economically integrated countries of Europe are supposed to decentralize more of their government expenditure. The following text departs from the fiscal federalism and economics of secession literature in order to formulate theoretical relationships between fiscal (expenditure) decentralization and economic integration.

Theory of Fiscal Federalism

The topic of fiscal decentralization, or more generally fiscal federalism, was brought about into the normative theory public finance in the middle of twentieth century. The main issue to solve was the extent to which fiscal competences and responsibilities should be decentralized from central to lower sub-central levels of government. The gradual development of the theory of fiscal decentralization led to distinguishing between a first and a second generation theories of fiscal decentralization, as explained in Oates (2005a) and Vo (2010).

The first generation theory of fiscal federalism relate the fiscal decentralization with the government sector responsiveness to a demand for government provided goods and services and, consequently, due to better linking of allocation of resources with public preferences, to higher economic efficiency of government goods and services provision. Among many others, the seminal contributions made by Tiebout (1956), Musgrave (1959), Tullock (1969) and Oates (1972), together with the concept of fiscal equivalence of Mancur Olson (1969) and the early public choice approach Brennan and Buchanan (1980), form the foundations of the first generation theory of fiscal federalism. As Rodden (2004) points out, the first generation of studies of the causes and consequences of decentralization and federalism viewed decentralization as a simple zero-sum transfer of authority from the center to subnational governments and drew upon the assumptions of welfare economics. While the first generation theory explains well the cross country differences (Canavire-Bacarreza et al., 2017, Wallis et al., 1991, Kee, 1977, Litvack and Oates, 1970, Arzaghi and Henderson, 2005, Bahl and Nath, 1986, Cerniglia, 2003, Letelier-Saavedra, 2005, Panizza, 1999, Mullen, 1980, Bodman and Hodge, 2010, Alesina et al., 2003), it fails to give an acceptable explanation of recent decentralization trends.

The second generation theory of fiscal federalism draws on ideas from outside the traditional scope of the normative public finance literature, notably from the theory of public choice, theory of the firm, the economics of information, the principal–agent problem, and the theory of the contract (Oates, 2005b). The contribution of public choice theory to the fiscal federalism theory started to be significant with erosion of the central assumption of the first generation normative theory, which was that the government is benevolent, pursuing exclusively the fulfilment of citizens' preferences. The public choice theorists considered the governments, i.e. politicians and bureaucracy to be self-interest players. Such an assumption shifted emphasize to institutional, i.e. political, administrative and legal aspects of decentralization. This approach points the way towards the second generation of more precise

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empirical research that takes politics and institutions seriously. Among the most influential papers attributable to the second generation theory are Weingast (1995), Seabright (1996), Inman and Rubinfeld (1997), (Lockwood, 2002), Besley and Coate (2003), Rodden (2004) and Weingast (2009) and (2013).

The massive body of the normative literature on fiscal federalism, the prevailing attitude within the literature, pays attention to allocation efficiency gains from fiscal decentralization and to different roles of government levels (Oates, 1972, Musgrave, 1959). The positive approach to fiscal federalism has been much less frequent. The positive literature (Oates, 1972, Wallis et al., 1991) on decentralization suggest that there are empirical regularities concerning factors that promote or discourage decentralization. Generally, there are two types of empirical studies on fiscal decentralization. Within the first group, the concern is in the consequences of fiscal decentralization in terms of economic growth and the growth of public sector. The second group of studies deals with the determinants of fiscal decentralization including a growing body of literature dealing with the issues of globalization, economic and political integration and its consequences on decentralization or secession.

Decentralization under economic integration

The decentralization has been a characteristic feature of social development in many democratic countries in the last decades of 20th century. The usual presumption is that the federated countries are more decentralized than unitary ones. The process of decentralization, however, is not derived only from the switch to the institutional federal structure, but it is usually more gradual and it is influenced by a number of factors. Even though the institutional (constitutional) changes might be crucial, there are usually many gradual and subtle changes in de-facto decentralization. Moreover, as Arzaghi and Henderson (2005) noted, constitutional changes are discrete events which in certain contexts may be difficult culturally and politically to achieve. The gradual changes are more likely to be reflected in a continuous measure, such as the share of state and local governments in government expenditures or revenue.

Recently, the issue of centralization versus decentralization of government have attracted attention in Europe. The contemporary EU with 28 member countries (beginning of 2019) encompassing more that 70 percent of European population has evolved from the European Coal and Steel Community after the WWII, through the European Community Treaty of Rome of six countries in 1958. On the one hand, we can see an effort to further integrate or even federalize the European Union, on the other hand we can hear voices against further integration, or even more in the case of United Kingdom we can see the (br)exit from EU. Also some secession tendencies at the subnational level of individual countries, i.e. in Spain, Italy, Belgium or in the UK, are quite strong. In these cases, a prominent argument behind these tendencies is an insufficient (fiscal) decentralization or an excessive centralization in the country or in the EU. The EU and its member countries are experiencing two parallel tendencies of decentralization and centralization. Centralization in the case of EU consists of a partial transfer of national decision-making at the EU (supranational) level. By contrast, decentralization of competencies and responsibilities to subnational governments takes substantially different form across countries. It includes the question of decentralization in member countries and also the way the responsibilities are distributed or shared between the countries and EU institutions.

Ackerman (1997) claims that there is a continuum between international treaties based integration and the federal constitutions and thus between international organizations and federations. European Community, even before it became the European Union, has moved a long way along the continuum towards the federation. This is true mostly with regards to the capacity to legislate or regulate. The EU budget is still rather small, amounting to approximately 1 % of GNI. According to Spahn (2015), the EU is entity sui generis, not a federation, although this might be contested. The EU has all institutions of a federation including a Second Chamber in the form of the European Council, powerful exclusive policy competencies in competition and commerce.

Under certain circumstances, decentralization trend might result in a secession (Šedová et al., 2017). A deep insight into the causes of decentralization or even secession trends is provided by Alesina and Spolaore (1997). They formulated the trade-off between the benefits of large jurisdictions and the cost of heterogeneity of large and diverse populations, which determines the size of countries. Majority decisions in democracies favor secessions. By reducing the political and economic transaction cost, economic integration extends the size of market and lowers the benefits of large jurisdictions, thus further enhancing incentives to secession. They conclude that the democratizations (as is in the case of EU) leads to secessions. In equilibrium one generally observes an inefficiently large number of countries and finally, the equilibrium number of countries is increasing with the amount of economic integration. Decentralization can however be associated with lower cost and may be preferred over secession (Bolton and Roland, 1997).

Rodrik (1998) formulated the positive effect of economic openness on the size of the public sector due to higher government expenditures for redistribution and macroeconomic stabilization. Because these government functions are generally centralized, we can expect higher degree of fiscal centralization in more open economies. Garrett and Rodden (2000) while admitting that economic integration strengthens incentives to fiscally decentralize, argue that under some circumstances, an increased integration causes fiscal centralization. Such circumstances

may come with economic crisis, which can have a character of asymmetric shock to individual regions, or to member countries in the case of EU. The elimination of remaining obstacles to trade and factor movement brings an increased demand for interregional risk sharing and central government transfers to prevent the secession of regions. Similarly, Verdier and Breen (2001) found positive relationship between financial openness (globalization) and fiscal centralization in European countries, where the EU structural funds substituted the national regional insurance function. Because the EU enlargements have gradually created large single internal market, the EU economy as a whole is much less open compared to individual countries. Therefore, one can hypothesize tendency to smaller central government budgets in individual EU countries.

The effects of economic and political integration on the vertical structure of government and therefore on fiscal decentralization in OECD countries were analyzed by Stegarescu (2009) and by Ermini and Santolini (2014). Both studies support the hypothesis of the positive effect of economic, political and in case of the later study also of social integration on fiscal decentralization. The demand for regional autonomy or secession in EU countries supports a hypothesis of a causal relationship between decentralization and economic and political integrations. The political integration as in the EU case may bring a mixture of effects on fiscal decentralization. The demands for fiscal decentralization are likely to intensify, provided that the preference heterogeneity is high. The cost of decentralization in terms of higher taxes are further reduced, because part of formerly central government services is provided by the EU on a larger scale. This involves the structural and cohesion policies, which partly replace the insurance function of national governments. On the other hand, owing to the transfer of the national competences to a supranational authority, this process involves centralizing effect. National governments therefore run the risk of getting squeezed between the supranational and the subnational levels of government. Lower government expenditure centralization ratio may be expected in such cases.

Data and methodology

The central assumption of the paper is that the deepening economic and political integration of European countries will promote fiscal decentralization in individual countries. To analyze this research assumption, the following text defines the indicators of fiscal decentralization, the indicators of European integration and econometric model. The overview of variables, data resources and hypothesis is provided in appendix 1 and 2.

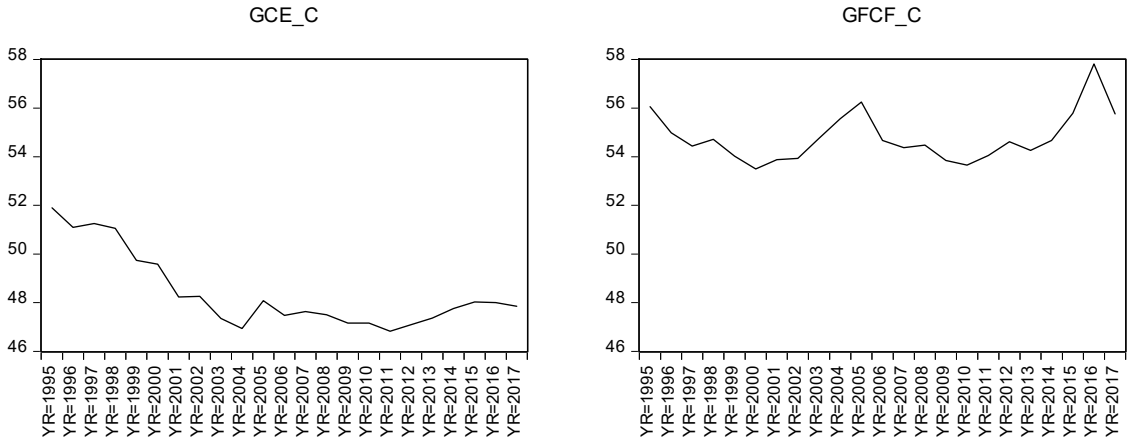
Decentralization indicators

To analyze the fiscal decentralization, suitable indicator is needed. Due to the complexity of the decentralization issue, the task is complicated. There are variety of approaches of expressing the fiscal decentralization phenomenon (for complex overview see Vo, 2008, Stegarescu, 2005). This paper follows in principle the approach of Cerniglia (2003) and Arzaghi and Henderson (2005), using rather the ratio of centralization. The advantage of this simple approach is that it avoids the problems with various, complicated and not easily comparable structures of decentralized levels of governments.

First, the government consumption expenditure centralization ratio (GCE_C) is used. It is the share of the central government consumption expenditure to the general government consumption expenditure. It emphasizes current expenditure on goods and services by governments, which is considered to be the prominent motive for fiscal decentralization. Second, the government gross fixed capital formation centralization ratio (GFCF_C) is used. The government capital expenditure decentralization is usual feature of decentralized systems, especially at local government levels. Last indicator combines both above mentioned approaches in the form of government consumption and capital expenditure centralization ratio (GCCE_C), representing the fulfilment of allocation function of public finance. Data were collected from Eurostat government finance database.

The figure 1 shows mean values of government expenditure centralization ratios over 22 year for 30 highly integrated European countries. The government consumption expenditure are more decentralized with prevailing tendency of further decentralization, with correction after 2011. Gross fixed capital formation of governments is, compared to the consumption expenditure, more centralized, without any apparent tendency. However, both curves display very similar drops and peaks over time period.

Figure 1: Mean government expenditure centralization ratios of European Countries



Source: Eurostat, Government finance statistics, GCE_C…Government consumption expenditure centralization in %, GFCF_C…Government gross fixed capital formation centralization in percent, EU-28 together with Switzerland and Norway, 1995-2017.

Economic and European integration variables and hypothesis formulation

The level of economic integration is approximated through the international openness of trade transactions and openness of financial markets. The following variables are used: TR_OPEN: Total exports of goods and imports of goods as percent of GDP (AMECO database) and FIN_OPEN: Chinn-Ito index of financial openness (Chinn and Ito, 2006). The expectation is that economic integration measured by the trade and financial openness might enhance vulnerabilities of national economies and stress the importance of central government stabilizing fiscal policy, especially in cases when there is common monetary policy of ECB. From this point of view, positive sign of regression coefficient would be expected. On the other hand, European Union and EFTA countries enjoy the access on the European Single Market with free movement of goods, services, labor and capital. Under such circumstances, the needs of central government policies is partly diminishing in favor of supra-national policies of EU. If this view prevails, the negative regression coefficient would be expected. The factor of the European Single Market is represented by the EUTRADE variable, which contains the Intra-European exports and imports of goods as a share of total exports and imports in percent (AMECO database). The fact that some central government functions are taken over by the EU with its own budget is reflected by the EUEXP variable interacted with EU membership (EU budget expenditure in percent of EU general government expenditure, DG Budget, Eurostat). The negative regression coefficient might be expected, although the importance of EU policies can hardly by approximated only by budget figures, where the regulatory activities are underestimated. The main stages of European integration are expressed with the use of dummy variables EU (EU membership dummy), SCHEN (Schengen participation dummy) and EMU (EMU membership dummy). The logics behind is similar, the increasing European integration is expected to support the decentralization tendencies and hence lower the relative share of central government expenditure.

Control variables

Since the main focus of analysis is on the effects of European integration on the fiscal (de)centralization, the control for other factors influencing the dependent variable is a necessity. In general, we control for the impact of economies of scale and economies of scope, where higher population size (POP, average population, Eurostat) is expected to support decentralization of expenditure. Even though the focus in on the allocation function performance, the impact of the relative size of welfare state, approximated by social protection expenditure (SPE, social protection expenditure, percent of GDP, COFOG, EUROSTAT) should be taken into account. Because the social protection expenditure are prevailingly centralized, putting potentially large fiscal burden on central government budgets, central governments might prefer higher decentralization (lower centralization) of allocation function to ease to burden of central budget. The level of economic development is approximated by GDP per capita (GDPPC, constant 2010 USD, World Bank database) and economic cycle by rate of unemployment (UNEMP, percentage of labor force, AMECO, EUROSTAT). It is expected that in the case of economic downturn, the central government will not reduce its consumption and investment expenditure carrying the stabilization function, whereas the sub-national governments are rather expected to behave procyclically.

Econometric model and data

The hypothesis are tested on the panel dataset of 27 EU countries (except Luxembourg) plus Norway and Switzerland from 1995 to 2017. Since there are presumably numerous factors of country fixed, time invariant character, which are difficult to observe and quantify, the model of dependent fiscal centralization ratio variable and explanatory European integration variables is estimated with country fixed effects. Country fixed effect are supposed to capture all the time invariant specificities like institution, culture, history, land area etc. Moreover, the Hausman test rejects specifications using random effects. This approach allows to focus on the European integration influence and on variables controlling for other time variant fiscal (de)centralization factors including scale economies, world economic integration and level of economic development, economic cycle and the size of welfare state.

The model specification follows:

$$EC_{it} = \alpha_i + \beta_{1it} WRLDINT + \beta_{2it} EUINT + \beta_{3it} Other + u_{it} \quad (1)$$

where
- *EC* … *dependent expenditure centralization variable*
- *WRLDINT* … *world economic integration variables*
- *EUINT* … *European integration variables*
- *Other* … *control variables*
- u_{it} … *error term.*

The cross section fixed effect model is estimated using OLS estimator with White robust standard errors. All the continuous explanatory variables (POP, GDPPC) enter the model in natural logarithm specification. Because the dependent variables of expenditure centralization are fractions expressed in percentage, bounded by 0 and 100, we have to consider the possible bias resulting from such boundedness. The model is estimated with log-odd ratio of dependent variable[1] (Papke and Wooldridge, 1996, Cerniglia, 2003).

Estimation results

Table 1 presents estimation results for all three dependent fiscal centralization variables. The function of each dependent variable is estimated in three specifications, with common use control variables. The EU membership (EU), as expected, has statistically significant decentralizing effect, especially when government consumption expenditure (GCE_C) is concerned. Schengen membership (SCHEN), in contrast with the expectation, has positive sign of regression coefficient, although only weakly significant. On the other hand, the so far highest level of European integration (EMU) has strong and significant decentralization effect in case of government consumption expenditure. The trade and financial openness (TR_OPEN and FIN_OPEN) regression coefficients have the expected negative sign and are statistically highly significant in all specifications. The impact of relative size of EU internal trade (EU_TRADE) has only weakly statistically significant regression coefficient for gross fixed capital formation (GFCF_C) with expected negative sign. The relative size of EU budget expenditure (EUEXP) coefficients are not statistically significant, therefore having no effect on the government expenditure decentralization.

As far as the control variables are concerned, the population size of EU countries has surprisingly strong, but not always statistically significant, centralizing effect. GDP per capita brings mixed results with prevailingly positive coefficient. The relative size of welfare state (SPE) variable has expected, statistically significant regression coefficients. The unemployment variable with positive and statistically significant regression coefficients suggests the expected fiscally centralizing effect of economic downturns in European countries.

Table 1: **Estimation results for Government consumption expenditure centralization ratios**

	GCE_C			GFCF_C			GCCE_C		
Specification	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**
EU	-0,130*** (0,034)			-0,117* (0,068)			-0,127*** (0,031)		
SCHEN	0,047** (0,020)			-0,011 (0,042)			0,039** (0,020)		
EMU	-0,125*** (0,024)			-0,028 (0,041)			-0,104*** (0,024)		
TR_OPEN		-0,005*** (0,001)	-0,008*** (0,001)		-0,003*** (0,001)	-0,005*** (0,001)		-0,005*** (0,001)	-0,007*** (0,001)
FIN_OPEN		-0,073*** (0,011)	-0,112*** (0,011)		-0,066** (0,028)	-0,086** (0,037)		-0,069*** (0,011)	-0,103*** (0,012)
EU_TRADE			0,001 (0,003)			-0,008* (0,005)			-0,001 (0,002)

[1] $\log[EC/(100 - EC)]$

EUEXP x EU			0,041 (0,026)			0,050 (0,044)			0,041 (0,026)
log(POP)	1,197*** (0,129)	1,139 (0,106)	1,123*** (0,216)	1,688*** (0,279)	1,850*** (6,697)	2,148*** (0,387)	1,251*** (0,095)	1,232*** (0,027)	1,236*** (0,006)
log(GDPPC)	-0,166** (0,074)	0,041 (0,095)	0,344*** (0,084)	0,311*** (0,118)	0,418** (0,165)	0,351 (0,219)	-0,079 (0,076)	0,099 (0,103)	0,334*** (0,097)
SPE	-0,011 (0,012)	-0,012 (0,009)	-0,032*** (0,007)	-0,054*** (0,013)	-0,050*** (0,013)	-0,061*** (0,012)	-0,018 (0,011)	-0,018* (0,009)	-0,036*** (0,006)
UNEMP	0,005 (0,005)	0,010** (0,005)	0,024*** (0,004)	0,027*** (0,006)	0,028*** (0,007)	0,025*** (0,006)	0,009** (0,004)	0,013*** (0,004)	0,025*** (0,003)
Adj. R-squared	0,955	0,961	0,967	0,868	0,873	0,872	0,956	0,961	0,967
No. of observations	678	620	539	677	619	539	678	620	539
No. of periods	23	22	22	23	22	22	23	22	22
No. of countries	30	29	27	30	29	27	30	29	27

*Note: p-values ***...1%, **...5%, *...10%. Std. errors in brackets.*

Source: own calculation, cross section fixed effect model, OLS estimator with White robust standard errors. EU-28, Switzerland and Norway, 1995-2017.

Conclusions

The aim of the paper was to define the developments of fiscal decentralization in European Union and EFTA countries since 1995 to 2017 as a reaction to the developments of economic integration in Europe. Theory of fiscal federalism and economics of secession suggest that the economic and political integration of countries, either in EU, or even globally, create motives for government sector decentralization. The time span between 1995 and 2017 analyzed in the paper includes the periods of un-precedential EU enlargement, economic crisis and later on the EU sovereign debt crisis, and finally increasing secession tendencies in EU. In contrast to broader previous studies (Garrett and Rodden, 2000; Stegarescu, 2009; Ermini and Santolini, 2014), this papers have focused exclusively on integrated European countries to capture the impact of European integration on expenditure decentralization.

The analysis revealed that EU and EMU membership (but not Schengen membership) have significant decentralizing effect in case of government consumption expenditure. For the decentralization of government gross fixed capital formation, the result is much less persuasive, but still consistent. Similarly, as the trade openness and financial openness brings theoretical motivations to decentralize more, the empirical analysis shows strong expenditure decentralizing effects. This conclusion is largely consistent with Stegarescu (2009) and Ermini and Santolini (2014), who used similar approach to analyze the impact of trade and financial openness or globalization indices on panel of OECD countries between 1965/1975 and 2001.

The size of population, based on scale economies, was expected to push further decentralization. However, the opposite is true. The possible explanation may be found in a behavior of central governments of populous countries, where a higher centralization might be a political choice to keep a control over the various regions through the intergovernmental transfers, preventing thus possible secession. Stegarescu (2009) reports the same relationship, although not statistically significant, but majority of studies (including Ermini and Santolini, 2014) find the expected positive relationship.

The relative size of welfare state has decentralizing effect on government consumption and investment. The larger the social protection expenditure of government, usually on a centralized bases, the higher is the fiscal burden of central government. Central governments might therefore have an incentives to offload more of consumption and investment expenditure (government goods provision) to subnational levels.

Since the European Union countries, in general, have extensive relative size of general government debt, economic downturn might motivate central government to centralize more of government expenditure in order to keep better control over the general government finance. The unemployment increase in the period of economic downturn was associated with a general switch to more centralized government expenditure. This result is consistent with Stegarescu (2009).

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Appendix 1: Variables, data sources and hypothesis

Variable	Symbol	Source of data	Expected coeff. sign
Dependent variables – Expenditure centralization ratios (*EC*)			
Government consumption expenditure centralization ratio	*GCE_C*	share of the central government consumption expenditure to the general government consumption expenditure, percent	-
Government gross fixed capital formation centralization ratio	*GFCF_C*	share of the central government gross fixed capital formation to the general government gross fixed capital formation, percent	-
Government consumption and capital expenditure centralization ratio	*GCCE_C*	share of the central government consumption and gross fixed capital formation to the general government consumption and gross fixed capital formation, percent	-
World economic integration variables (*WRLDINT*)			
Foreign trade openness	*TR_OPEN*	Total exports of goods and imports of goods percent of GDP, AMECO database,	plus/minus
Financial openness	*FIN_OPEN*	Chinn-Ito index of financial openness (Chinn and Ito, 2006)	plus/minus
European integration variables (*EUINT*)			
EU membership	*EU*	dummy	minus
Schengen membership	*SCHEN*	dummy	minus
Economic and Monetary Union member.	*EMU*	dummy	minus
European single market integration	*EU_TRADE*	Intra-European exports and imports of goods as a share of total exports and imports in percent (AMECO database)	minus
EU budget	*EUEXP*	EU budget expenditure in percent of EU general government expenditure, DG Budget, Eurostat	minus
Control variables (*Other*)			
Population size	*POP*	log of average population, Eurostat	minus
Social protection expenditure	*SPE*	percent of GDP, COFOG, EUROSTAT	minus
Level of economic development	*GDPPC*	log of GDP per capita, constant 2010 USD, World Bank database	minus
Rate of unemployment	*UNEMP*	percentage of labor force, AMECO, EUROSTAT	plus

Source: own compilation

Appendix 2: Descriptive statistics of variables

Variable	Mean	Median	Maximum	Minimum	Std. Dev.	Observations
GCE_C	48.38	47.11	97.77	9.85	21.89	684
GCCE_C	49.38	49.16	97.80	11.48	20.88	684
GFCF_C	54.79	56.08	98.07	2.83	18.88	683
TR_OPEN	78.70	67.35	180.15	26.69	36.52	686
FIN_OPEN	1.77	2.36	2.36	-1.91	1.09	630
EU_TRADE	69.23	69.00	95.96	48.09	8.34	585
EUEXP	1.60	1.95	2.25	0.00	0.81	644
POP	16981266	8171069	82685827	377419.0	21874091	690
GDPPC	33364	29464	111968	3757	23080	690
SPE	15.91	15.44	25.57	7.12	4.00	680
UNEMP	8.45	7.67	25.25	1.86	4.09	683

Source: own calculation based on data sources from appendix 1.

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Are the Tax and Social Policies a Key to Higher Fertility? Definition of Variables for the Czech Republic

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Abstract. The objective of this paper is to contribute to the discussion about effective family policy and tax policy. The paper focuses on the definition of variables that are used as a family and tax policy tools and which aim to support families with children and promote prenatal behavior. This paper analyzes the development and main characteristics of selected variables. The data come from the Czech Statistical Office and from the Czech legislation. The data cover period 1993 – 2016. The described variables will be used for further research.

Keywords: family policy, fertility, social benefits, tax credits, average wage, parental allowance, maternity benefit

JEL Classification: J13, D69

Introduction

Population growth in the EU countries has been slowing down in recent years, which is partly consequence of the drop in the fertility rates. In 2017, the total fertility rate in the EU-28 was 1.59 live births per woman, ranging from 1.26 in Malta to 1.90 in France. To maintain the population, the total fertility rate must be at least 2.1 live birth per woman – this rate ensures a broadly stable population (OECD, 2019). The drop in the fertility rate is definitely one of the challenges on demography not only for the Czech Republic. But there has been some other demography changes in recent years, such as decrease in mortality, extending life expectancy, aging population, and so on. An aging population, together with a fall in birth rates, can be a problem, for example, in financing the pension system, health care, etc.

One of the ways to support families (and fertility) is through family policy. According to Ministry of Labour and Social Affair (MoLSA), family policy is: "*…a summary of activities and measures to support the family; is focused on supporting families in the performance of their natural functions, not on taking over these roles and interfering with the inner life of families, dividing social roles in the family, etc. It should remember all developmental phases of families as well as their needs in specific situations."* (MoLSA, 2015)

Financial state support of families in the Czech Republic is realized through two main mechanisms, which is tax measures and social security schemes. Benefits from social security schemes are divided into social insurance benefits (specifically sickness insurance benefits), state social support benefits and social assistance benefits. *Tax advantages for dependent children* and *the tax relief for a spouse* are considered as the main tax policy instruments to support families.

In the literature, we found that some tax and social policy tools are used to influence fertility. For example, Whittington, Alm and Peters (1990), who examined the effect of personal exemptions on birth rates in the United States between 1913 and 1984, are widely cited. In all six versions of the estimated econometric model, there is a statistical significance of the impact of the personal exemption to birth rates. Zhang, Quan and Van Meerbergen (1994) examined the impact of social benefit and tax instruments on birth rates in Canada between 1921 and 1988. As independent variables authors chose personal exemptions, child tax credit, family allowance, maternity leave benefits. Variables found as statistically significant: personal exemptions, child tax credit and family allowance. Abiry, Reuss, and Stichnoth (2014) estimated a model for assessing family policy measures in Germany, focusing on women's fertility and employment. Instruments that have had a significant impact on birth rates include parental leave benefits, child benefits and subsidized childcare, without these instruments the birth rate would be 6% - 10% lower.

The objective of this paper is to identify and describe tax and social policy tools that are relevant for family policy. This knowledge is also important for the correct setting of the state's tax and social policies. It can be assumed that a well-designed system will contribute to the objectives of family policy and the efficiency of public spending.

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Definition of Variables

In this section we describe relevant variables (tools) that are used to support families with children. To cover the main goal for family policy in the Czech Republic, the system uses three types of tools: tax instruments (also known as indirect tools), social benefits (also known as direct tools) and services for the family (Krebs, 2015). In this paper, we only analyze indirect and direct tools.

Indirect Tools

In the Czech Republic, there are currently these types of indirect (tax) tools:

- child benefit,
- the tax relief for a spouse,
- child preschool education tax benefit.

Another variable that is also included between indirect tools is *joint taxation of spouses*, which was first introduced in 2005 and lasted only three years.

Child Benefit

Child benefit is classified as indirect financial support of families and it has undergone many changes since 1993. Until 2004, the amount of tax deduction was deductible from the tax base. You can see the total amount of child benefit in Table 1. To calculate the real savings in absolute value, the total amount of child benefit was multiplied by a 15% tax rate. It ought to be mentioned, that there was a progressive taxation system until 2007. We use linear 15% tax rate to simplify and unify the data. We expressed child benefit also as a percentage of average gross wage (AGW) in order to show the development of its real value.

Table 1: Development of Child Benefit as tax deduction (1993 – 2004) and its relation to AGW

Year	1993	1994	1995	1996	1997	1998	1999-2000	2001-2003	2004
Child Benefit (in CZK)	9 000	10 800	12 000	13 200	14 000	18 000	21 600	23 520	25 560
Saving (in CZK)	1 350	1 620	1 800	1 980	2 100	2 700	3 240	3528	3 834
% of AGW	22.87	23.13	21.69	20.15	19.44	22.88	25.32	24.54	21.95

Source: the author, based on Act No. 586/1992 Coll., on Income Taxes

In 2005, child benefit was transformed from tax deduction to tax allowance (deductible from tax itself). At the same year, the tax bonus was also introduced. That means that child benefit can be transformed into tax bonus in case a calculated tax (after using other tax allowances) is lower than the child benefit. Those changes are more advantageous for low-income individuals.

Table 2: Development of Child Benefit as tax allowance (2005 – 2018) and its relation to AGW

Year	2005	2008	2010	2012	2018
Child Benefit (in CZK)	6 000	10 680	11 604	13 404	15 204
% of AGW	22.87	23.13	21.69	20.15	19.44

Source: the author, based on Act No. 586/1992 Coll., on Income Taxes

It should be noted, that in 2008 the super gross salary was first used as tax base and that the tax rate was unified to flat rate 15 %. In 2013 a solidarity tax (7 % for incomes above a certain amount) was added. We again use linear 15% tax rate in all years to simplify and unify the data.

Tax Relief for a Spouse

The tax relief for a spouse had a similar development as a child tax benefit. It was used as a tax deduction (deducible form a tax base) in the years 1993-2005. Since 2006 it has been used as a tax credit (deductible form tax itself). Currently a tax relief for a spouse is *"...CZK 24,840 on a husband living with a taxpayer in a joint household if he / she does not have his own income exceeding CZK 68,000 for the taxable period*"[2.] Tables 3 and 4 show the development of the Tax Relief for a spouse.

Table 3: Development of Tax Relief for a Spouse as tax deduction (1993 – 2005) and its relation to AGW

Year	**1993 - 1996**	**1997**	**1998**	**1999 - 2000**	**2001 - 2005**
Tax Relief for a Spouse (in CZK)	12 000	16 800	18 240	19 884	21 720
Saving (in CZK)	1 800	2 520	2 736	2 983	3 258
% of AGW	30.49	23.33	23.18	23.31	22.66

Source: the author, based on Act No. 586/1992 Coll., on Income Taxes

Table 4: Development of Tax Relief for a Spouse as tax allowance (2006 - 2018) and its relation to AGW

Year	**2006**	**2007**	**2008**	**2018**
Tax Relief for a Spouse (in CZK)	4 200	4 200	24 840	24 840
% of AGW	21.49	20.04	109.95	77.90

Source: the author, based on Act No. 586/1992 Coll., on Income Taxes

Child Preschool Education Tax Benefit

This tax benefit can be applied by one of the parents when they place a child in a pre-school facility. The amount of child preschool education tax *"...corresponds to the amount of expenditure demonstrably paid by the taxpayer for the placement of a dependent child in the pre-school facility for the given tax period.*"[3] The maximum possible discount is the minimum wage for the year (2019 = CZK 13,250).

Table 5: Development of Child Preschool Education Tax Benefit (2014 - 2018) and its relation to AGW

Year	**2014**	**2015**	**2016**	**2017**	**2018**
Child Preschool Education Tax Benefit (in CZK)	8 500	9 200	9 900	11 000	12 200
% of AGW	32.99	34.60	35.66	37.29	38.26

Source: the author, based on Act No. 586/1992 Coll., on Income Taxes

[2] Act. No. 586/1992 Coll. On Income Tax
[3] Act. No. 586/1992 Coll. On Income Tax

Direct Tools

The second group of variables that we consider as tools to support families are following social benefits:

- birth grant,
- parental benefit,
- maternity leave benefit,

Below we briefly specify only these, as they represent financial support of family that is related to fertility. However, the length of maternity leave and parental leave could be included among these direct tools as well.

Birth Grant

This is a one-time benefit that is currently provided to low-income families. There has been several changes in the examined years 1993 - 2018. Until 2007, the birth grant was counted as a X-multiple (the coefficient has changed during the years) of the household's subsistence minimum. Since 2008, the amount has been set at CZK 13,000. In 2011, the group of beneficiaries who were entitled to a benefit was restricted by the fact that only low-income families were now eligible.

Table 6: Development of Birth Grant (1993 – now) and its relation to AGW

Year	1993	1994	1995	1996	1997	1998	1999 - 2000	2001	2002 - 2004	2005	2006	2007	2008 - 2018
Birth Grant (in CZK)	3 000	4 000	4 500	5 280	5 640	5 920	6 240	6 400	8 450	8 600	8 750	17 760	13 000
% of AGW	50.81	57.11	54.17	53.74	52.21	50.17	48.76 – 45.83	43.26	53.25 – 46.83	45.28	43.27	81.86	55.22 – 40.71

Source: the author, based on Act No. 382/1990 Coll., on Parental Benefit, Act No. 117/1995 Coll., on State Social Support, Act. No. 112/2006 Coll., amending certain acts in connection with the acceptance of the Act on Living and Subsistence Minimum and the Law on Assistance in Material Need

Maternity Leave Benefit

This benefit serves as compensation for loss of income when a woman is on maternity leave (usually starts 6-8 weeks before the specified date of birth). The condition for entitlement to a benefit is participation in sickness insurance at the time of taking up maternity leave and the duration of participation for at least 270 calendar days in the last two years before the date of commencement of maternity leave. The amount of maternity leave benefit is 70% of the reduced daily assessment base per calendar day.

Parental Leave Benefit

The entitlement to this benefit belongs to the parent, who personally and properly cares all day for the child who is the youngest in the family throughout the calendar month.[4] There are currently three options for drawing the parental leave benefit (faster, classic, and slower) - its determination depends on the amount of the daily assessment base for sickness insurance. The maximum amount to which the parent is entitled is set at an absolute amount of up to CZK 220,000 (CZK 330,000 for twins, triplets, ets.) and up to the age of 4 years of a child.

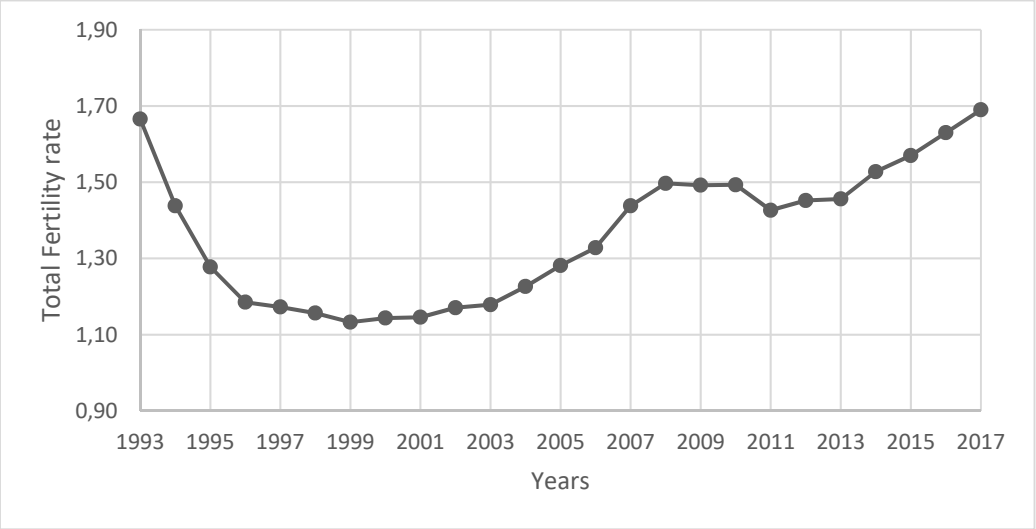
Other Variables

The third group of variables that will be used in the model to describe growth/decline of the fertility are:

- unemployment rate that describes economic situation on the labor market in the country;
- year that represents the independent trend;
- fertility rate that was chosen as dependent variable. The fertility rate is the number of live births per 1 woman aged 15-49 (Figure1).

[4] Act. No. 117/1995 Coll. On State Social Support

Figure 1: Total Fertility Rate in the Czech Republic (1993 – 2017)



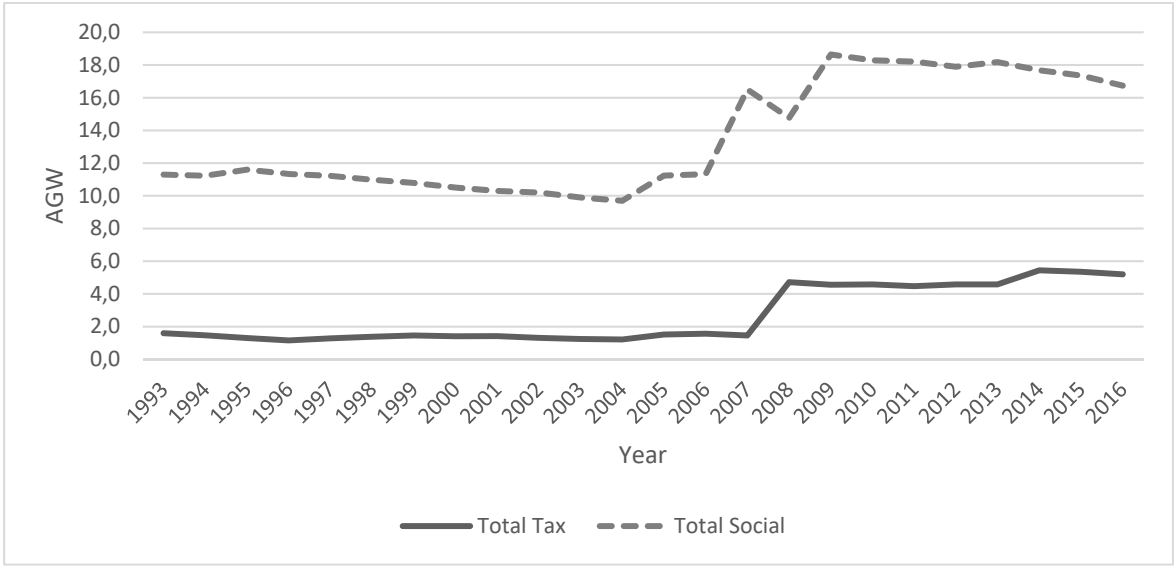
Source: Czech Statistical Office, 2019

The Figure 1 looks at the development in the fertility rates in the Czech Republic. The fertility rate steadily declined from the 1993, but begun to rise again at 1999, followed with a slight decline at 2011. In 2017, the fertility rate was 1,69 live birth per woman, which is slightly higher than the EU-28 (1,59 live birth per woman). One of the main changes in the last 30 years is the age of the woman when having a first child. More women appear to be having their first child in their late 20s´or early 30s´. In the EU-28, the highest fertility rate of 2017 was the one of women aged 30-34. (Eurostat, 2019)

Data

The data of all variables can be obtained from the Czech Statistical Office and from the Czech legislation. The data cover the period 1993 – 2016. In order to compare monetary data from various years, we normalized the data by monthly average gross wage. Figure 1 shows total tax and social policy benefits received by a family in the first three years expressed as AGW.

Figure 2: Total of Tax and Social Policy Tools as AGW (1993–2016)



Source: the author, based on Czech legislation, Czech Statistical Office, own calculation

Conclusion

In this contribution we identified and described variables that can affect the level of fertility in the Czech Republic. In following research, the effect of tax and social policy variables will be estimated by multiple linear regression.

Currently, an interesting discussion has been going on in recent months (Spring 2019) among the politicians and academics in the Czech Republic. On the political level, the main focus was on increasing parental leave benefit, which has been the same amount for about the last 12 years. The monthly amount of the parental leave benefit is considered as insufficient and leaves most of the women either dependent on their spouses, forced to work part-time or living on the poverty line (this is especially true for single mothers). This is one of many examples why there is a need to even think about tax and social policies as tools to support families and what is the main goal behind those measures.

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Large taxpayers handling in Russian Federation: example of Russian Railways

Anna Kireenko* – Denis Alekseev**

Abstract. The article deals with the history and current trends of tax administration of large taxpayers in the Russian Federation. Particular attention was paid to the first results of the introduction of tax monitoring. The stages of development of tax administration in developed countries and the Russian Federation are highlighted. It was concluded that the tendencies in the administration of large taxpayers in the Russian Federation are centralization, the introduction of information systems and a system of agreements, which generally corresponds to global practice. The main difference of the Russian practice of tax administration of large taxpayers, consisting in granting them preferences in exchange for access to their information and management, is highlighted. The analysis of the indicators confirmed the special tax status of the largest taxpayers, as it showed the absence of a direct relationship between the performance indicators of the largest taxpayers and their tax liabilities. It was shown that subjective factors determine about 20% of the variation of the tax liabilities of a large taxpayer.

Keywords: large taxpayers, tax administration, tax risks, co-operative compliance, tax monitoring.

JEL Classification: H30

Introduction

The business environment is not homogeneous. Large business mainly determines the economic and technical power of the country. With a view to self-preservation and development, it is tied to integration, absorbing or controlling smaller partners, on the one hand, and, on the other hand, joining international structures, losing some of its independence and falling under the influence of stronger partners.

In terms of taxation, different segments of taxpayers generate fundamentally different risks for state revenues. Therefore, they require different tax control strategies. First of all, large taxpayers (LT) playing a key role in budget formation require special attention. In most countries, especially in developing and transition countries, a small number of LT generate a high percentage of all tax revenues. See for example Baer and others (2012).

Recognizing that large business taxpayers (also referred to as large taxpayers) are different from other groups of taxpayers, many tax administrations have instituted specific organizational and management arrangements as well as special compliance programs and initiatives as part of a strategy to deal effectively with this segment of taxpayers (for example, clarification of legislation, taxpayer training, improved service quality, more targeted audits).

The article discusses current trends in tax administration, which correspond to the unique characteristics of this segment of taxpayers, and also analyzes the results of tax administration of LT in Russia.

The first section of the article presents the current trends in the LT handling. The development of LT handling in RF is analyzed in the second section. The third section presents the results of LT handling. The fourth section discusses the relationship of taxation and economic indicators on the example of a single large taxpayer - Russian Railways. The final section presents the findings.

Co-operative compliance in large taxpayers handling

The trend to establish LTUs (Large Taxpayers Units) or organizational arrangements based on large taxpayers starts in the early 80s of the 20th century, then special subdivisions began to be created within tax administrations

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in pioneer countries (Australia, the Netherlands, New Zealand, the United Kingdom, the United States). The structure of such units has evolved significantly over the past 30-40 years. Initially, countries created tax-specific units.

However, this was not a very good solution. In modern approach tax administrations structured the compliance operations of their large taxpayers division or unit on an industry segment, which for a number reflected the main business activities of their economy. In addition to being organized along certain industry lines, some tax administrations have special units to perform risk analysis and intelligence gathering, provide technical advice, and to monitor and evaluate performance.

The trend of recent years is to move from audits after filing a tax return to risk assessment and resolution of problems in real time. A number of countries have introduced various programs to ensure certainty for LT and early identification and resolution of controversial compliance issues. This approach is implemented on the basis of the so-called concept of co-operative compliance.

Cooperative compliance is "a relationship with revenue bodies based on cooperation and trust, with both parties going beyond their statutory obligations" OECD (2017). Cooperative compliance is a way of voluntarily chosen cooperation between a taxpayer and a tax administration which is based on mutual trust and transparency (and goes in that respect beyond statutory obligations) with the aim to assure that the taxpayer is compliant with existing tax laws in exchange for receiving early certainty in tax manners and a problem-solving attitude from the Tax Administration. One of the principles of introducing this concept is that it should not lead to deterioration or improvement for taxpayers participating in it.

History of large taxpayers handling in Russian Federation

In Russia, particular attention was paid to large taxpayers, starting in 1998, when departments for work with large taxpayers were organized within the structure of the Ministry of Taxes and Duties of the Russian Federation. The main reasons for their creation was the need to increase tax collection and reduce debt on payments to the budget, primarily for large enterprises. Initially, the largest category included more than 23 thousand payers. Subsequently, this number was significantly reduced. Natural monopolies and enterprises of the fuel and energy complex — 35 organizations of OAO Gazprom's system, 92 organizations of RAO UES of Russia and 95 organizations of the oil complex, as well as 18 railways occupied a special place among the LT in Russia. They formed a third part of all cash receipts of the federal budget in 1999.

In the early 2000s, the assignment of taxpayers to the largest category was made only on the basis of financial and economic indicators of their activities. The "largest" category included the so-called "natural monopolies" and other companies that meet several criteria based on payed taxes, turnover and assets.

The introduction the system of LT handling allowed to carry out tax reform, based on the redistribution the tax burden to the resource extractive sector. With a decrease in tax rates (personal income tax, income tax and VAT), the abolition of a number of taxes (road user tax, sales tax, etc.), tax revenues increased due to an increase in excise taxes, mineral extraction tax and export customs duties. Tax control over the largest taxpayers also gave the state additional leverage over corporations and their shareholders. In 2000, for example, tax evasion and financial manipulations on a particularly large scale were the reason for initiating criminal proceedings against the leadership of NK LUKoil, Tyumen Oil Company, AvtoVAZ and Yukos.

Other criteria were gradually added to the financial criteria for classifying taxpayers as large ones. (tab.1).

Table 1: History of LT handling in Russia

Period	The level of LT administration	Criteria
1998-2000	Regional	Financial (taxes, turnover, assets)
2001- 2003	Three levels	Financial (total turnover)
2004 - 2018	Industry division of administration at Federal level	Financial (total turnover) + • related persons (2004) • participation in Consolidated Group of Taxpayers (2012) • special permit (license) and other reasons (2014) • participation in tax monitoring (2016)
since 2019	Concentration at the Federal level	Financial (total turnover) and others

Source: the Tax Code of Russian Federation and the author's analyses

Other criteria for handling the LT at federal level (at least one):
Group criteria (related persons with LT or Consolidated Group of Taxpayers);

Participation in Tax monitoring;

Organizations in certain sectors of economy (military-industrial complex; strategic organizations; banks, insurance, broker mediators, pension funds).

We can resume that the trends in development the LT handling in Russian Federation replicate the general trends in other countries (establishment the special units for LT handling organized along certain industry, and introducing the new forms of interaction between large taxpayers and tax authorities).

As for new forms of interaction with large taxpayers in the Russian Federation, tax monitoring can be considered an analogue of the "co-operative compliance" of the OECD countries or the Thousand Groups project in China.

Tax monitoring as new form of large taxpayers handling

Tax monitoring was introduced in Russia from January 1, 2016. It is the strategic direction of tax control development in Russia. Tax monitoring suggests the outlying access of Tax Services to the taxpayer's information systems and its accounting and tax reporting. Traditional audit is replaced by online interaction between LT and the tax authority. Drill-down (i.e. decryption) before each operation and viewing scans of the primary document in the "showcase" allow to radically transform the process of tax control and refuse to get documents.

The monitoring involved the largest companies that provide 12.25% of tax revenues to the federal budget (half of the participants are in the oil and gas sector) among them: members of the Rosneft, Gazpromneft, Lukoil, Novatek, and Norilsk Nickel groups , Aeroflot, InterRAO, National Clearing Center Bank, Megafon, MTS, Gazprom Export, etc.

According to Federal Tax Service of Russia the three years of applying of tax monitoring in Russia brings the following results:

- the duration of tax audits has decreased four times. The companies' expenditure on tax audit was reduced by 30%;
- the volume of documents received from taxpayers annually decreased by 9.4 million sheets, or 12 thousand files;
- the average number of documents submitted by the taxpayer at the request of the tax authority decreased by 77%;
- the amount of fine compared with previous periods decreased by 93%;
- the average number of adjusted tax returns decreased by 9%;
- the number of tax authorities' claims for the taxpayer to provide explanations and documents decreased by 54%

It shows, that the tax monitoring benefits not only to budget but also to large taxpayers. The taxpayers using tax monitoring receive the reduction of documents turnover and reduction in court costs and fines. Generally it leads to LT tax compliance costs reduction.

Results of large taxpayers handling in Russian Federation

Currently, tax revenues account for almost 70% of the revenues of the consolidated budget of the Russian Federation. The rest of the budget is formed by customs duties, which in the Russian statistics do not relate to tax revenues.

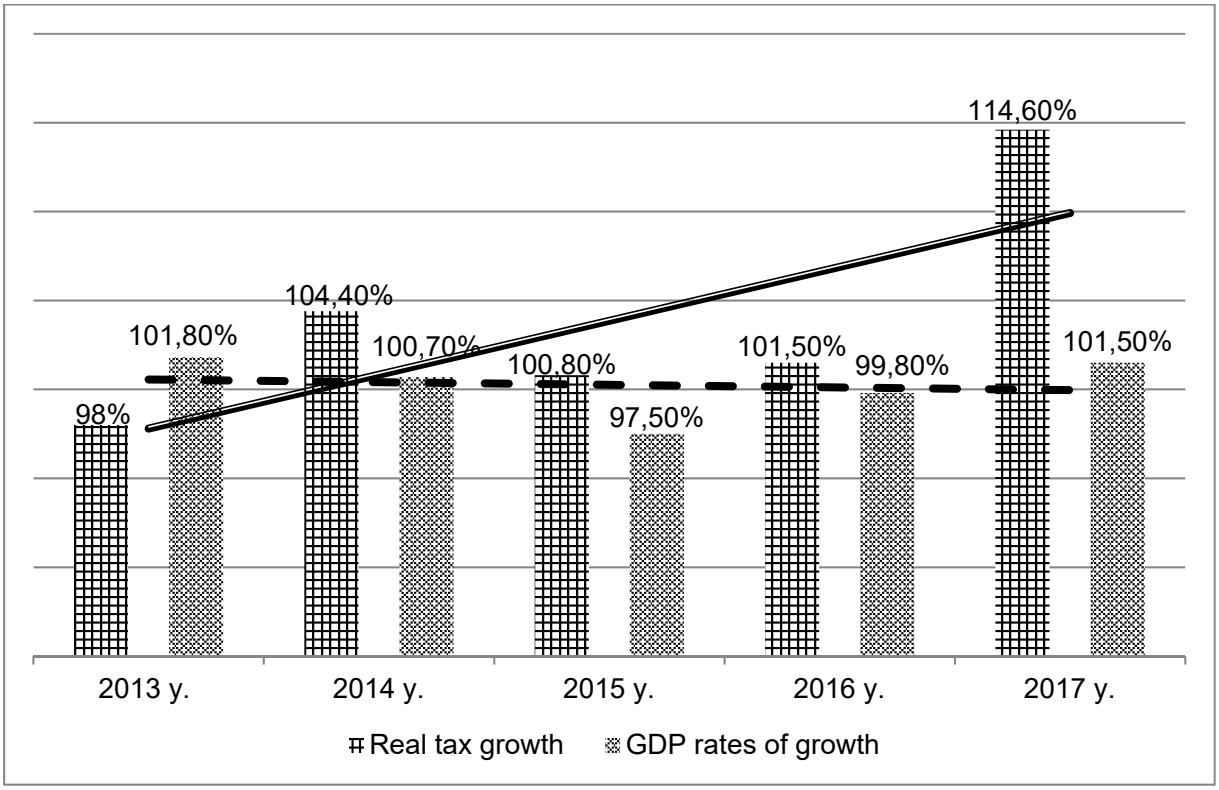
At the same time, over the past 5 years (2013–2017) taxes in the consolidated budget of the Russian Federation showed steady growth and increased almost 1.6 times (by 58.6%), while the rates on basic taxes – companies income tax, VAT, personal income tax - have not changed.

The growth of tax revenues was formed under conditions of extremely volatile market conditions for basic commodity exports, the introduction of external restrictions and a general slowdown in the economy: in real terms (i.e., taking inflation into account), it was 19.9%, while as accumulated over 5 years, GDP growth is only 1.2% (fig.1).

According to economic evaluation, the total contribution of macroeconomic factors to the dynamics of tax revenues is about 3.9%, or 554 billion rubles. The share of changes in tax legislation (primarily, it is about limiting the write-off of losses on corporate income tax and the annual indexation of excise rates) accounts for about 5%, or 725 billion rubles. The remaining 2.7% increase in revenues, or about 390 billion rubles, was secured by high-quality tax administration. These results were achieved with a significant decrease in the number of audit conducted by tax authorities and an increase in the result from each control measure. Special mechanisms of LT handling give tax authorities the opportunity to focus on a relatively small group of taxpayers. As a result, tax control indicators are steadily growing.

The largest share in the tax revenues of the federal budget (almost 30%) comes from transnational companies; about 10% of the federal budget revenues comes from the largest taxpayers in the wholesale and retail trade, production and (or) sales of food, beverages and tobacco products, crop production and livestock; 7% - from the extraction of oil and gas, the production of transportation of petroleum products, wholesale trade in oil, petroleum products and gas; 3% - from the largest taxpayers in the financial and credit and insurance sphere; 4% from organizations in the field of information and communications, Internet technologies and the production of machinery, vehicles, equipment, equipment, organizations of the military-industrial complex.

Figure1: GDP and taxes growth in RF



Source: author's calculation on the base of the Tax Statistics of Federal Tax Service of Russia and the Government Statistic Comity of Russia

The share of LT administered by interregional inspections at the federal level is less than 0.05%, but the of tax returns audit of this category of taxpayers give about 3% of all additional taxes, and the on-site audit of these taxpayers give a tenth of additional charges. Even more significant results are provided by the work of tax authorities within the framework of industry projects, which encourages taxpayers to clarify their tax obligations - almost 16% of all specified obligations - obligations of large taxpayers administered by interregional inspections at the federal level. But disputes with major taxpayers are not infrequent as well - the amount of additional charges for large taxpayers canceled in court is slightly less than the amount of taxes assessed in field checks. This once again confirms the need to introduce new methods to avoid field checks in the administration of this group of taxpayers.

The relationship of taxation and economic measures: an example of large taxpayer – Russian Railways

To investigate an impact of tax collection process on the behavior of large taxpayers we analyze the relationship of taxation and economic measures for a given large taxpayer. As an example of such large taxpayer we use Russian Railways (JSC "RZD").

The impact of economic measures of a taxpayer on his tax liabilities may be determined using the analysis of the relationship between accrued taxes and economic measures which constitute the tax base of these taxes. The traditional measure of tax base is GDP. The dynamics of tax liabilities strongly correlates with GDP fluctuations. This correlation may be explained with the fact that there is a close relationship between GDP and the tax base of main taxes. Therefore, we can use real GDP as a main factor influencing the dynamics of tax proceedings. Moreover, we can use fixed assets, investments in tangible assets, profits and other measures as the complimentary factors which determine tax base.

In this research we use the data on taxes accrued and collected into the consolidated budget of Russian Federation in total and separately for the "railway transport" industry. The data is collected from the database of Federal Tax Service of Russia for the period 2006-2016[5]. The correlation coefficients between accrued taxes and economic variables of interest are shown in the table 2. To extract a share of GDP attributed to the railway transport industry, we use gross value added measure instead of GDP.

Table 2 Correlation between taxes accrued into consolidated budget of Russian Federation and economic measures

Measure	Russian Federation, total	Railway transport only
Gross value added	0.959	0.703
Sales of firms	0.970	0.795
Profits of firms	0.960	0.224
Gross value of property plant and equipment	0.968	0.687
Investments in tangible assets	0.921	0.502

As we can observe in the table 2, on the country-level tax accruals have strong correlation with all economic measures, while for railway transport industry the correlation is moderate or even weak.

We can suggest that tax accruals of railway industry companies are affected by some other measures. Because of this we expanded the list of economic variables with the following measures:

- quantitative measures of transport services: freight turnover (bln tons x kilometers), passenger turnover (bln passengers x kilometers), the average number of loaded railway carriages per day;
- price indexes of freight and passenger transport services, %
- average number of employees, in thousands
- annual average exchange rate RUR to USD (exchange rate fluctuations may influence the liabilities denoted in the foreign currency and produce foreign exchange gains or losses which can significantly affect the income tax base)

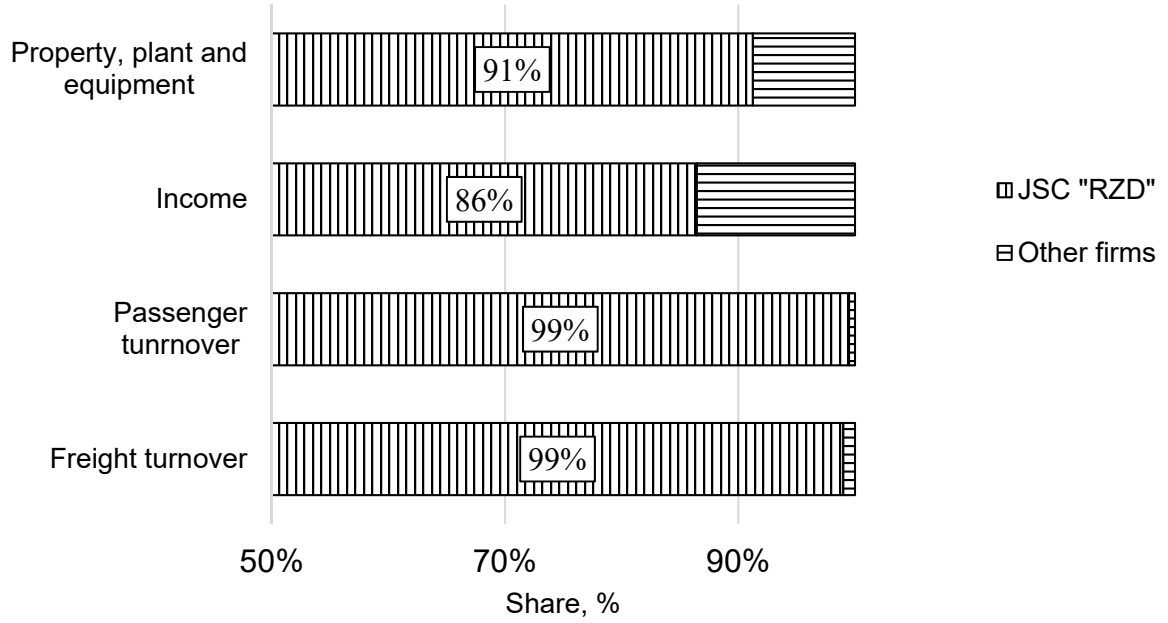
Due to the limitations of the official statistical data, we used also some economic measures of the largest tax payer in the transportation industry – JSC "RZD":

- Sales and other income,
- Cost of goods sold and other expenditures,
- Net value of property, plant and equipment (in particular, it connected with property tax and, through depreciation, with income tax).

In the period 2006-2016 JSC "RZD" constituted 85-99% of the total transportation industry in Russia in terms of different measures (see figure 4), thus, we believe that it is possible to use economic variables of this company as proxies for the whole industry.

[5] The report of tax collection to the consolidated budget of Russian Federation from different tipes of economic activity №1-НОМ // URL:www.nalog.ru/rn38/related_activities/statistics_and_analytics/forms/

Figure 2: Share of JSC "RZD" in economic measures of railway transportation industry, 2006-2016



Source: based on the data of JSC "RZD" // URL:http://ir.rzd.ru/static

The correlation coefficients between tax revenue of the consolidated budget of Russian Federation from the railway industry and proposed measures of economic activities are presented in the table 3.

Table 3 Correlation coefficients of taxes accrued to the consolidated budget of Russian Federation from the railway industry and measures of economic activity

Measure	Nota-tion	Correlation coefficient
Total income (sales and other income) *	x_1	0.821
Wages and salaries*	x_2	0.799
Railway industry turnover (sales)	x_3	0.795
Net value of property, plant and equipment *	x_4	0.781
Total expenditures (cost of sales and other expenditures)*	x_5	0.770
Gross value added of ground transportation industry	x_6	0.703
Gross value of property plant and equipment	x_7	0.687
Average annual exchange rate RUR to USD	x_8	0.640
Operating income*	x_9	0.564
Freight turnover	x_{10}	0.541
The average number of loaded railway carriages per day	x_{11}	0.508
Investments in tangible assets	x_{12}	0.502
Total profit of railway industry	x_{13}	0.224
Price indexes of freight transport services	x_{14}	-0.047
Price indexes of passenger transport services	x_{15}	-0.592
Passenger turnover	x_{16}	-0.796
Average number of employees	x_{17}	-0.822

Source: based on the data of JSC "RZD" // URL:http://ir.rzd.ru/static; financial statements of JSC "RZD" // URL:http://ir.rzd.ru/static/public/ru?STRUCTURE_ID=32#2

The analysis shows that for the last 11 years, taxes collected from the railway industry are closely correlated with the total income of firms and with the amount of salary and wages. These measures are related to the tax base

of the main taxes: corporate profit tax, personal income tax, value added tax. The decline in passenger turnover (and subsequent decline in the average number of employees) is substituted with the growth in income from freight turnover and from the other activities.

It is worth noting, that the results are affected by the limits and preciseness of the data, together with the changes in the methodology of calculation of some variables. Moreover, our calculations do not account for tax exemptions and reduced tax rates applied to the railway industry, because the official tax statistics do not disclose this data. For example, the average corporate profit tax rate of JSC "RZD" is lower than 20% because some of Russian regions implemented reduced tax rate in that part of corporate profit tax which is paid to the regional budgets. In 2016 the average corporate income tax rate of JSC "RZD" was 19.62% because Moscow, Vladimir and Astrakhan oblasts set the rate on the level of 15.5%, Perm oblast – on 17% and Khanty-Mansiysk Autonomous Okrug – 16%.

Based on the data we build a multifactor regression model. On the first step, to support the final results and to prevent a multicollinearity issue, we want to exclude factors which are highly correlated (table 4).

Table 4. Correlation matrix of economic measures

	x_1	x_2	x_3	x_4	x_5	x_6	x_7	x_8	x_9	x_{10}	x_{11}	x_{12}	x_{13}	x_{14}	x_{15}	x_{16}	x_{17}
x_1	1																
x_2	0,95	1															
x_3	0,96	0,95	1														
x_4	0,87	0,89	0,95	1													
x_5	0,99	0,95	0,97	0,89	1												
x_6	0,90	0,89	0,97	0,98	0,92	1											
x_7	0,92	0,95	0,97	0,93	0,95	0,95	1										
x_8	0,65	0,59	0,72	0,86	0,66	0,83	0,66	1									
x_9	0,24	0,27	0,24	0,39	0,16	0,30	0,11	0,52	1								
x_{10}	0,81	0,75	0,86	0,82	0,83	0,89	0,80	0,67	0,25	1							
x_{11}	0,83	0,86	0,84	0,84	0,85	0,87	0,83	0,50	0,04	0,90	1						
x_{12}	0,64	0,64	0,52	0,29	0,61	0,32	0,53	-0,13	-0,19	0,27	0,57	1					
x_{13}	-0,08	-0,08	-0,20	-0,28	-0,21	-0,33	-0,34	-0,31	0,42	-0,23	-0,15	0,17	1				
x_{14}	-0,19	-0,38	-0,28	-0,25	-0,21	-0,28	-0,35	-0,04	0,07	-0,21	-0,50	-0,07	-0,08	1			
x_{15}	-0,61	-0,68	-0,61	-0,60	-0,61	-0,58	-0,59	-0,46	-0,27	-0,47	-0,70	-0,23	-0,10	0,72	1		
x_{16}	-0,90	-0,94	-0,89	-0,89	-0,90	-0,88	-0,91	-0,73	-0,33	-0,65	-0,74	-0,45	0,14	0,39	0,76	1	
x_{17}	-0,94	-0,96	-0,96	-0,95	-0,94	-0,94	-0,96	-0,76	-0,31	-0,74	-0,78	-0,48	0,17	0,32	0,69	0,98	1

On the next step we select factors through the exclusion of statistically insignificant variables. As a result, we obtain two-factor model with statistically significant coefficients on 5% confidence level. The model reads:

$Y = -80{,}73 + 0{,}09 \times X_1 + 0{,}65 \times X_9$,

Where:

X_1 – Total income,

X_9 – Operating profit.

Regression statistics is shown in the table 5.

Table 5. Regression results for the model

Variable	Coefficient	Standard error	t-value	p-value
Intercept	-80.73	31.27	-2.58	0.033
Total Income	0.09	0.02	4.63	0.001
Operating profit	0.65	0.26	2.47	0.039

All coefficient estimates are significant at 5% level. The quality and precision of the model is supported by the regression statistics. R-squared equals 0.81 which means that 81% of the variation in the dependent variable (accrued taxes) is explained by these two factors. Multiple R-squared (0.90) shows a high level of dependence between the outcome variable and two independent variables included in the model. t-statistic for each factor is larger than the critical values. F-statistic equals 17.59, which means a statistical significance of the model on 5% confidence level. The p-value of Shapiro-Wilk test for the normality of residuals is 0.5, which supports the assumption of normally distributed residuals.

Since we use time-series in the model, we run additional tests to prevent autocorrelation of dependent or independent variables. P-value for the Durbin-Watson test is 0.38 which means that there is no autocorrelation in residuals. We run the Kwiatkowski-Phillips-Schmidt-Shin (KPSS) test to test for trend and level stationarity of model variables and Ljung-Box (LB) test for autocorrelation of model variables in 1 to 3 lags. The null hypotheses of the KPSS test states that variable has level or trend stationarity. The null hypothesis of the LB test is the absence of autocorrelation in a given lag. The results of these tests are in table 6.

Table 6. Tests for stationarity and autocorrelation of model variables

Variable	KPSS (Trend)	KPSS (Level)	LB (lag=1)	LB((lag=2)	LB (lag=3)
Accrued taxes	>0.1	0.077	0.127	0.300	0.428
Total Income	0.036	0.048	0.017	0.023	0.035
Operating profit	>0.1	>0.1	0.859	0.575	0.601

Considering the results of KPSS test we reject the null only for Total Income, meaning that this variable is neither trend, nor level stationary. LB test suggests high autocorrelation if this variable, which is reasonable because Sales of the company tend to be correlated. Nevertheless, the dependent variable, accrued taxes, is stationary and is does not have autocorrelation, together with the operating profit variable. This suggests that the regression results are valid.

The company income determines the VAT and personal income tax liabilities because of high dependence with salaries. The operating income is a main factor affecting the corporate profit tax. The poor statistical significance of the measures connected with the corporate assets (property plant and equipment, investments into tangible assets) may be explained by the long period of tax exemptions given to the railway industry for the corporate property tax for the common railways and connected constructions. Only from 2013 this property became a subject to the corporate property tax, but with the reduced rate. While the usual rate is 2.2%, in 2013 the reduced rate was 0.4%, in 2014 – 0.7% and in 2015 – 1.0%. We also note that this analysis accepts a special status of large taxpayers, because the unobservable factors amount to 19% of the variation in tax liabilities.

Conclusions

Analyzing the experience and results of the administration of large taxpayers in Russia, we can draw some conclusions. Trends in the administration of large taxpayers in the Russian Federation are centralization, the introduction of information systems and a system of agreements, which generally corresponds to global practice.

Formally, the largest taxpayers - TNCs and natural monopolies pay taxes more than the average Russian enterprise. However, this uneven tax payments are not evidence of overloading the energy sector and monopolies. The real payers of taxes transferred to the budget by enterprises of natural monopolies are consumers.

Suppliers of gas, electricity and heat, transport workers are only intermediaries between individuals, small and medium enterprises and the budget. Excise taxes and other indirect taxes are rising, prices are rising after them, and the share of payment for goods and services in the expenses of the population is increasing. There are a lot of individuals, it is difficult to collect taxes from them, and there are few enterprises in the fuel and energy complex and monopolies, and you can enter into a tax agreement with everyone and collect taxes.

Special mechanisms of control over the activities of large taxpayers give tax authorities the opportunity to focus on a relatively small group of taxpayers. As a result, tax control indicators are growing, and the tax discipline of most taxpayers remains at the same low level. Such an organization of tax control can effectively operate in the conditions of the existence of a large sector of the shadow economy.

Large taxpayers receive preferences and can save on tax approval costs in exchange for access to their information and management. The analysis confirmed the special tax status of the largest taxpayers, since there is no direct relationship between the performance of the largest taxpayers and their tax liabilities, subjective factors determine about 20% of the variation of tax liabilities.

Tax control over major taxpayers gives the state additional leverage over corporations and their shareholders. It can be said that the introduction of new forms of control in the form of tax monitoring is an effective way of government influence on major companies and a way to ensure predictable social policy.

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Aggressive Tax Planning and Balance of Payments

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Abstract. Aggressive tax planning reduces the tax burden through formally legal measures which are contrary to the intention (meaning) of the law. Aggressive tax planning involves numerous tools, such as interest and/or royalty payments and/or dividends or strategic transfer pricing. The structures used for (international) aggressive tax planning often include target entities (with a reduced tax base), lower tax entities (taxation of the tax base by a lower rate) and conduit entities (with a reduction of the withholding taxes). This paper deals with the question of how to describe and measure aggressive tax planning via balance of payments (BoP). The data from the EU's BoPs related to transfer pricing, debt financing, royalty payments and triple structures for the period 2015–2017 were analysed. The results show that with respect to the selected indicators, the most affected countries by aggressive tax planning are Luxemburg, the Netherlands, Cyprus, Ireland and Malta.

Keywords: aggressive tax planning, BEPS, EU.

JEL Classification: H25, H26

Introduction and literature review

The issue of international tax planning is at the heart of both the European Union's and the OECD's tax policies over the past decade, although this debate has been more or less permanent. There are several reasons for the intensifying debate on this subject. Firstly, it is the long-term trend of globalisation and interconnection of economies (through international trade in goods and services, capital flows and business interconnection), which has implications for international tax planning options. This global effect is impacted by the ease of movement of capital and the associated payments among different tax jurisdictions. The second reason is the chronically deficit state of public finances in almost all developed countries. Persistent deficits and mounting public debts have been difficult to tackle for decades. Moreover, as a result of the strong global recession in 2009–2010, fiscal imbalances in all countries have markedly worsened. The decline in tax revenues and growth in expenditures was not the same in all developed countries, and therefore the volume of the deficit or the change in the public debt, respectively, has varied. Nevertheless, at the beginning of the twentieth century the vast majority of countries supported the BEPS initiative, i.e. international coordination effort to prevent erosion of the corporate tax base.

The theory of economic crime or the theory of tax evasion (the distinction between tax avoidance and tax evasion is a difficult problem to solve), respectively, describes the basic motivation and demotivation factors affecting the tax base or the effective tax rate reduction, respectively. These factors include, in particular, expected revenues from tax evasion (determined by the change in the tax base and the size of the tax rate), the likelihood of detecting and punishing tax evasion and effective enforcement of tax arrears or the size of penalties for tax evasion. Different types of sanctions (monetary or criminal) have different effects on taxpayers, and in the literature (for discussion see for example Cooster and Ulen 2016 or Posner 2014) predominates opinion that increasing the likelihood of their detection is more effective in deterring tax evasion. This is, of course, a more complicated and longer-term goal than a relatively simple increase in sanctions.

In tax systems, there are various tools for limiting tax evasion. For the Czech Republic, according to Pavel and Tepperová (2018), this is for example preference of the content over the form, the real nature of business transactions (business purpose test), place of residence of the actual corporate management, transfer pricing rules, low capitalisation rules, international cooperation among countries, provisions against abuse of double taxation treaties. In spite of the efforts of countries to tackle national solutions, international tax planning practices persist (i.e. optimising of international tax payments to avoid illegal activities while minimising global tax liability). The next level is in turn aggressive tax planning, which already borders with tax evasion. According to the European Commission (2017), aggressive tax planning (ATP) consists in reducing the tax burden through measures that may be legal but at the same time are contrary to the intention of the law. Aggressive tax planning generally exploits

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mismatches, gaps or intentions in tax systems and poor coordination among countries. Ultimately, this may lead to double non-taxation or double deduction.

Strategies used in international tax planning are of a different nature. For example, according to the OECD (2013) these include minimisation of the tax paid in a foreign or source country (a shift of gross profits through the use of business structures or the reduction of net profit by maximising deductions), low or no withholding tax in the source country, low taxation at the level of a final beneficiary (countries with low taxes, preferential regimes, or through hybrid mismatches), low taxation of profits at the level of the ultimate parent company.

According to the European Commission (2015, 2017), there are three types of countries used for aggressive tax planning: target country, lower tax country, and conduit country. Aggressive tax planning proceeds mainly through schemes such as transfer pricing, debt financing (offshore loans, hybrid mismatches, interest-free loans, conduit companies), payments for the use of intellectual property rights and intangible assets (royalties, patent box), dividends, double taxation treaties (Klein and Žídek (2002): triple structures, "treaty shopping"), special tax regimes (holding structures, preferential tax regimes). The first three groups of schemes transfer profits to low-taxing countries and costs to high-taxing states. The remaining schemes take advantage of the particular benefits of national tax systems and do not seek to benefit only from the lower national tax rate of the given country.

International (aggressive) tax planning, respectively, tax evasion is not an issue only because of the tax revenue cuts. Eluding taxation is necessarily selective and therefore has distortive effects and generally favours international entities over the domestic ones. Tax evasion also changes the redistributive effects of taxation and thus affects the overall distribution of wealth in societies.

Basic review literature on this issue is the European Commission (2015, 2017) and the OECD (2013). Systematically with the issue of base erosion and profit shifting deals also UNCTAD (2015a), which examines the FDI flows and the links to offshore tax jurisdictions. Technical study by UNCTAD (2015b) presents "Offshore Investment Matrix" and estimates the tax revenues losses in developing countries due to profit shifting between USD 330–450 billion. The International Monetary Fund (2014) examines the excessively large volume of FDI in relation to FDI. Haberly and Wojcik (2014) examine FDI into/from offshore jurisdictions. Tax Justice Network (2015) also focuses on the linkage of tax havens and aggressive tax planning. This focus analytically follows also UNCTAD (2015c).

Other studies include Clausing (2003) and Bernard et al. (2006) who investigate for the USA the effects of changes in tax rates on prices of internal business transaction, and Heckemeyer and Overesch (2013) who focused on the use of debt financing for tax planning. Other authors who have dealt with (international) tax planning include Grubert and Slemrod (1998) and Lipsey (2010) for intangible assets, Grubert (2003) in relation to R&D, Desai et al. (2003), Weyzig (2013) and Van't Riet and Lejour (2014) for triple structures. Fuest and Riedel (2009) review empirical estimates of tax revenue losses in developing countries. The most recent studies include Crivelli et al. (2016), Buettner et al. (2018), Vítek (2018), Tepperová and Pavel (2018), Anarfi and Nerudová (2018), Jansky (2018), Cobham and Jansky (2018, 2019) or Moravec et al. (2019).

Using the balance of payments data recorded by Eurostat for the period 2013–2017, the presented paper aims to identify the EU Member States which are probably exploit to tax optimising through international tax schemes. Following this introductory chapter, the paper further contains a section on methodology and data. The subsequent part presents the results of the analysis. The final section concludes the paper.

Data a methodology

Capture of aggressive tax planning in the balance of payments

In the balance of payments, aggressive tax planning can be captured in several places using different items. These include, in particular, foreign direct investments for triple structures (included in the financial account), balance of services for transfer pricing issues and royalty payments (included in the current account), balance of investment (capital) income for detecting the use of interest and dividends for purposeful shifting in profits (included in the current account).

Profit shifting and aggressive tax planning will be reflected in the balance of payments in that the affected items will, ceteris paribus, record excessive values when compared to other countries (IMF, 2019, Tørsløv, 2018). The question remains how to separate the impact of aggressive tax planning on the balance of payments' indicators from the impact of other factors, such as the different economic structure (e.g. the traditional emphasis on the banking or generally financial sector), geographic location and the resulting impacts, size of the economy, different historical-cultural factors, etc. In general, however, within the analysis of the impact of aggressive tax planning it is assumed that greater inflow of foreign direct investments, volume of payments for services, investment returns

flowing away from the country, outflows of foreign direct investments, volume of payments for services or investment returns flowing into the country indicate an ongoing or likely aggressive tax planning. Another indicator is the stability or fluctuation of these indicators, on the basis of which the long-term structural differences in the economy or the long- or short-term aggressive tax planning can be inferred.

Record of transfer pricing in the balance of payments is based on the assumption of price billing for the provision of services that are difficult to value or services, which may not have been actually provided. It is usually assumed that these are advisory, managerial, marketing or ICT services (captured in the balance of services as revenue and expenditure for professional and management consulting services). The balance of payments may be affected on both the credit and debit side (high prices to increase costs or low prices to reduce revenues).

Debt financing (credit, loan, debt security) is in the case of a transfer from abroad recorded on the credit side of the debt instrument balance and in the case of a transfer (borrowing) to abroad on the debit side of the same balance. The transfer of profits does not take place through the acceptance/delivery of debt, but only through interest on it. This interest is recorded in the balance of investment revenue of the current account. Interest expense is recognised on the debit side in the country of the borrowing (loan accepting) subject, interest received in the country of the beneficiary subject is recorded on the current account's credit side. Even this optimisation is affected by transfer pricing, as it usually takes place within interrelated persons.

Payments for the use of intellectual property rights and intangible assets are payments for services recorded in the balance of services of the current account (fees for the use of intellectual property). Optimisation procedures are signalled by high values on the debit side of the paying country's balance of payments (or on the credit side of the beneficiary country).

In the case of so-called **triple structures**, where companies are ownership-linked and the middle company serves only as a conduit, there are of particular interest data on the FDI flow (part of the financial account) for countries with conduit companies (large and similarly sized inflows and outflows of foreign direct investments on both the credit and debit side signal the presence of conduit schemes in the given country). These schemes are used in particular to reduce the withholding tax on dividend payments and to pay interest or royalties abroad. As such, these can be apart from the high FDI credit and debit values detected also by the debit side of the balance of investment revenue (interest and dividends) or the debit side of payments for intellectual property rights.

Possibilities of detecting the above-mentioned schemes in the balance of payments can be summarised in the following table.

Table 1: Capture of optimisation schemes in the balance of payments

Optimisation scheme	Account of the balance of payments	Component balance	Item of the balance of payments
Transfer pricing	Current account	Balance of services	- Services - Professional and management consulting services
Debt financing	Current account	Balance of investment revenues	- Interest - Interest among related parties
	Financial account	Balance of foreign direct investments	- Debt instruments - Debt instruments among related parties
Intellectual property	Current account	Balance of services	- Payments for the use of intellectual property
Triple structures	Financial account	Balance of foreign direct investments	- Incoming foreign direct investments (stocks) - Outgoing foreign direct investments (stocks)
	Current account	Balance of investment revenues	- Dividends - Interest
		Balance of service	- Payments for the use of intellectual property

Source: Košťálová (2018).

Data

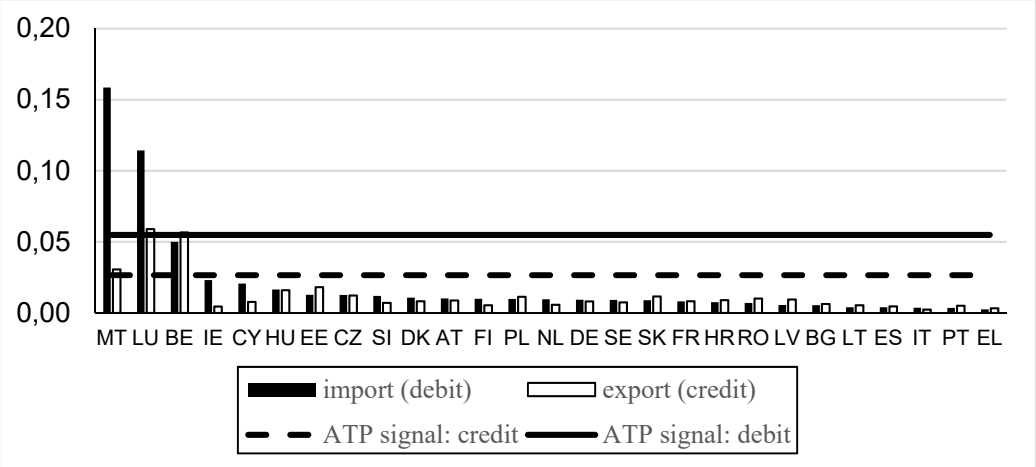
Into the analysis were included the EU Member States. Data are drawn from Eurostat (2018), Balance of Payments and International Investment Position (6th edition, the so-called BPM6). Data cover the period 2013–2017, newer data were not available. The length of the period under review is limited by the issue of one-off fluctuations, respectively, remote observations, and the beginning of the examined period is not directly affected by the recession of the years 2009–2010. The indicators' values are given relative as % of GDP. Data on GDP were also taken from the current Eurostat database. Indicators of the balance of payments of the given countries are expressed as the position of their economies towards all other economies of the world.

For the identification of the high indicators' values across the individual EU Member States, a standard deviation was adopted. The EU Member States affected by ATP are those whose average value of the assessed indicators (unweighted arithmetic mean) for the period 2013–2017 is at least one standard deviation higher than the unweighted arithmetic mean of all the EU Member States for the period under review. This frontier is in turn indicated in the charts.

Results

For assessment of schemes which exploit **transfer prices**, there were examined data on the credit and debit side of the balance of payments for professional, managerial and advisory services. There no data available for the UK; data for the debit side in 2014, 2016 and 2017 are missing for Cyprus.

Figure 1: Professional and management consulting services (% of GDP)

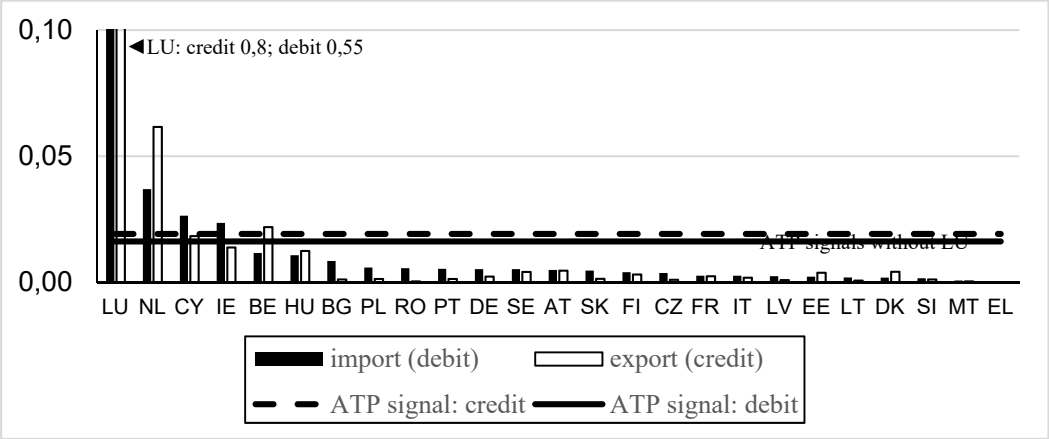


Source: data Eurostat (2018), Košťálová (2018), own processing.

The credit side of the balance of professional and management consulting services is affected by aggressive tax planning and profit shifting through billing low prices for services and therefore in this country there are reported lower revenues. Most professional and management consulting service payments flow to Luxembourg, Belgium and Malta, while Estonia and Hungary have also higher credit values. High value of the debit side of the balance of professional services is influenced by aggressive tax planning and profit shifting through billing high prices for services and points towards the transfer of profits from this country through reporting high service costs. Also with regard to this indicator are Malta, Luxembourg and Belgium among the most affected.

For assessment of structures that exploit **debt financing**, it is significant that data from the current account of the balance of payments related to investment revenues are not available for all countries in the structure which records only interconnected (related) parties. Therefore, data on interest recorded on the current account are used. There are no data available for the UK and Spain, and data for 2013 are missing for Austria. For Croatia, there are no debit entries for the whole period under review and its credit item data are missing for the years 2015–2017.

Figure 2: Balance of investment revenues – interest (% of GDP)

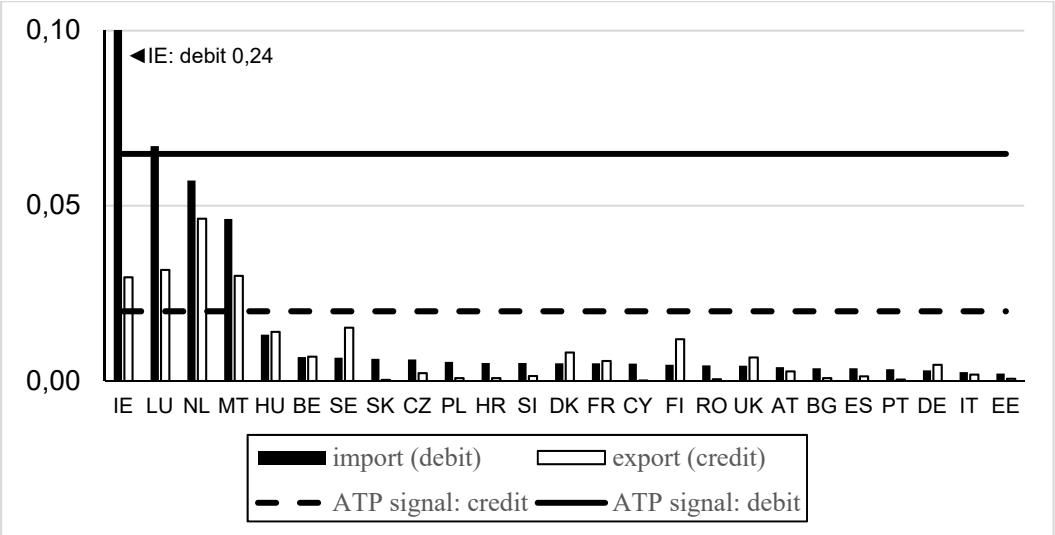


Source: data Eurostat (2018), Košťálová (2018), own processing

High credit values of investment revenues in the current account signal their higher inflow from abroad (compared to the other EU countries). These are mainly Luxembourg and the Netherlands, as well as Belgium, Cyprus, Ireland and Hungary. On the debit side, high interest flows are in turn recorded in Luxembourg, the Netherlands, Cyprus and Ireland.

Involvement of **payments for the use of intellectual property rights** (royalty payments) in transfer pricing and profit shifting can be reflected in items of the balance of payments for the use of intellectual property rights (balance of services of the current account). The Eurostat database does not contain credit data for Cyprus.

Figure 3: Payments for the use of intellectual property (% of GDP)



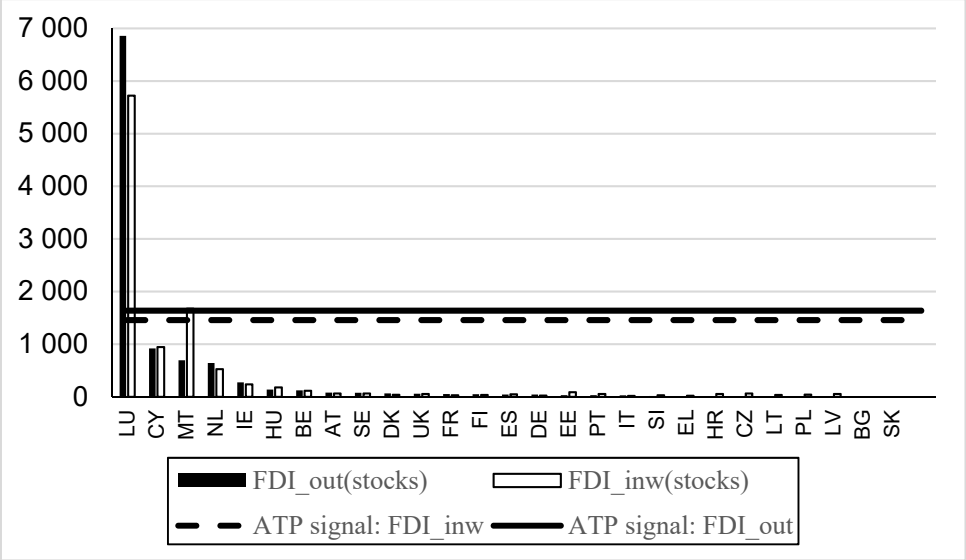
Source: data Eurostat (2018), Košťálová (2018), own processing

Credit (accepted) license fees are relatively highest in the Netherlands, followed by Luxembourg, Malta and Ireland. These countries are therefore the seats of owners of the rights, provided to other countries and subsequently paid for, which method is considered as a usual tool of aggressive tax planning. On the debit side, royalties are high (and thus reduce the tax base through their size) in Ireland, Luxembourg, the Netherlands and Malta. In this analysis, it is not explored where the fees (or other payments) from these countries go – whether to the EU or other countries (e.g. tax havens).

Triple structures are considered as a tool to reduce the withholding taxes when paying interest or royalties or dividends abroad. Equally high (and excessive) values on both the credit and debit side of the balance of payments items may thus signal the presence of this optimisation scheme. Here we used the data on (incoming and outgoing)

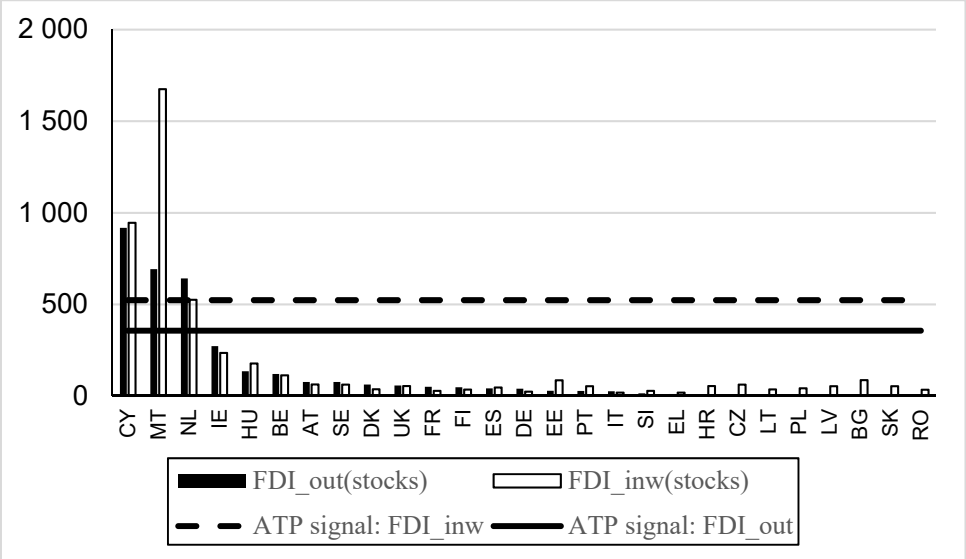
flows of foreign direct investments from the financial account of the balance of payments. Processed were data for the period 2013–2016.

Figure 4: Flows of direct foreign investments (% of GDP)



Source: data Eurostat (2018), Košťálová (2018), own processing.

Figure 5: Flows of direct foreign investments (% of GDP): without Luxemburg

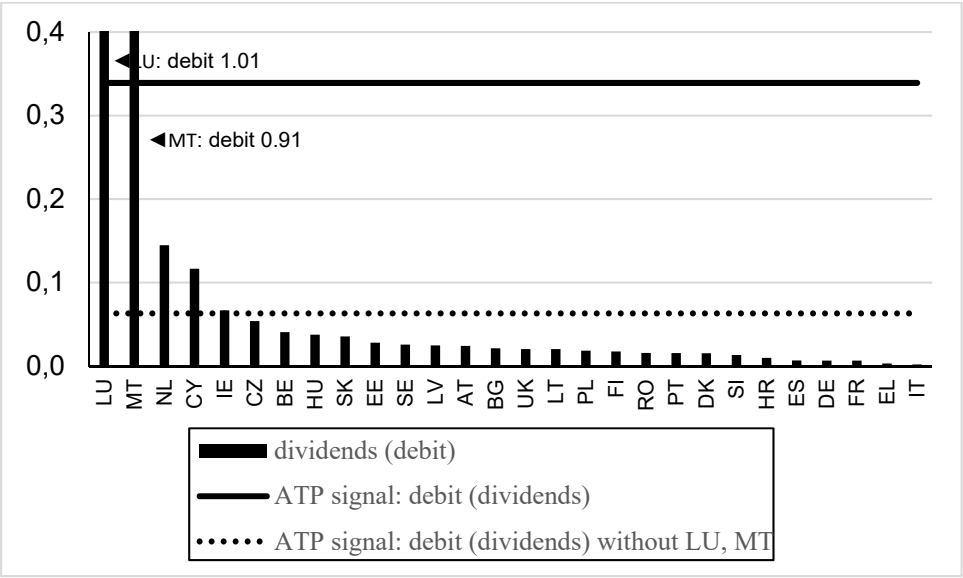


Source: data Eurostat (2018), Košťálová (2018), own processing.

The resulting picture is similar to the previous indicators: high values of both the incoming and outgoing FDI flows are recorded by Luxembourg, Malta, Cyprus, the Netherlands, followed by Ireland and Hungary. The difference between the other EU countries is significant and particularly difficult to explain by other than tax optimisation factors, especially for the first four countries.

Another indicator for identifying triple structures (since they relate to reducing the withholding taxes) is the amount of the outgoing interest, royalty and dividend payments. High values of remitted dividend payments to abroad are characteristic of Luxembourg, Malta, the Netherlands, Cyprus and Ireland.

Figure 6: Balance of investment revenues – dividends - debit (outgoing dividends) (% of GDP)



Source: data Eurostat (2018), Košťálová (2018), own processing.

With respect to the outgoing royalties, dividends and interest payments, the above-mentioned indicators for triple structures point at four countries: Luxembourg, the Netherlands, Cyprus and Ireland. These countries also record unusually high foreign direct investment values, while values of both investment directions are at the same time similar. Malta does not report a similar volume of incoming and outgoing investments. Another indicator that could support the issue under investigation would be the newly established or existing relative number of supra-national holdings, or firms controlled by foreign owners (see data for the Czech Republic, e.g. Bisnode (2018)).

Discussion and conclusions

With regard to the actually existing tax competition and mobility of corporate tax bases, companies are open to national or international tax planning. This is done through various schemes and instruments, some of which are reflected in the balance of payments. In particular, this relates to payments for professional and management consulting services, interest payments, dividends, royalties, whose excessive amount signals the possibility of aggressive tax planning in the given country. This is often accompanied by the volume or FDI flows that, if not corresponding to the size of the economy, may also be indicative of the base erosion and profit shifting.

The analysis performed in this paper showed that among countries affected by aggressive tax planning the most are primarily Luxembourg, the Netherlands, Cyprus, Ireland and Malta. This conclusion relates to the debt financing, royalties payments, and triple structures (as well as outgoing dividends). For transfer pricing, the results are less clear cut. It is also interesting to note that in these countries there likely comes to a combination of different schemes, since their rating using the specific indicators is almost exclusively above-average.

This result is in line with e.g. Vítek (2018), Tepperová, Pavel (2018), who come to similar conclusions regarding both the volume of capital flows and the individual ways of profit shifting. All these analyses are based on the macroeconomic perspective and statistics of the balance of payments. It can therefore be assumed that these countries are used by multinational groups for international transfer of profits, double non-taxation, etc.

An open question remains, whether it is possible to remove also the impact of other factors that may affect deviations of the assessed indicators. These are mainly structural differences in economies per se (i.e. not caused by tax distortions).

Although this analysis did not specifically focus on the Czech Republic, based on Bisnode (2018) the data allow to deduce that the key countries in terms of setting international planning schemes include for tax subjects from the Czech Republic the Netherlands, Luxembourg and Cyprus, from where comes most of the foreign capital.

In the future, it will be interesting to see whether efforts of some countries to curb international aggressive tax planning, e.g. using completely new taxes (CCCTB, digital taxation), will succeed, or whether a more gradual evolution of tax rules will be more acceptable to most participants. Existing experience from tax debates in the domain of income taxation in the EU has so far supported rather the second variant.

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Share of direct and indirect taxation as a reflection of public choice

Yvona Legierská*

Abstract. Taxation of consumption has been increasingly given preference by countries in the recent decades to taxation of income and assets. In the view of tax theory, the reason why is easier collection of indirect taxes and lower administrative costs. In terms of tax policy, indirect taxes have regressive nature and reduce the solidarity in the society. At the same time, however, they represent a more even distribution of the tax burden. Setting the share of direct and indirect taxation may also have an economic impact. The paper deals with the year-on-year change of this trend in the Czech Republic in an international comparison of the EU countries in the years 2004 and 2016. The goal is, based on the analysis of the observed phenomenon, to propose possible recommendations on the tax policy of the Czech Republic.

Keywords: direct taxes, indirect taxes, optimal taxation, tax revenues, tax policy.

JEL Classification: E600, H200

Introduction

The share of direct and indirect taxation under the tax system of the country reflects on what taxes prevail in their selection, how the tax burden is allocated to different income population groups, or companies, as the case may be. This fact is affected by individual governments through their policy statement that they seek to fulfil during the term of office through amendments to relevant laws. Policies in the parliament and political parties with their electoral programmes, which also contain tax issues, are elected by voters. Given that this area is a very sensitive issue, one could make various academic recommendations on tax changes, but public choice has a totally decisive influence. So it is just a matter of how politicians handle tax issues and how those are explained to the electorate of a particular country.

The paper deals with the change in the share of direct and indirect taxation in the years 2004 to 2016 in the Czech Republic and in EU countries. This is the period of our EU membership. The goal is, based on the analysis of the observed phenomenon, to propose possible recommendations on the tax policy of the Czech Republic. This will be carried out using the method of comparison, incl. the time series analysis with the use of mathematical and statistical methods. The data source is the EC Data database on taxation (2018). The data is monitored accordingly with the ESA 2010 methodology, as well as data from the tax collection monitored by the Financial Administration of the Czech Republic (2018), the main macro-economic indicators of the Czech Republic from the database of the Czech Statistical Office (2019).

Development and Current Status of Investigation of Optimal Taxation

In connection with the basic classification of taxes to direct and indirect, "*wide controversy unleashed"* at the turn of the 19th and 20th century "*regarding the share of direct and indirect taxes in tax revenues*." (Široký, 2008). Whether to tax more pensions and assets on one hand, or consumption on the other hand, is the still an unsolved question.

One of the first who began to deal with the problem of optimal taxation was British mathematician Ramsey (1927). The essence of his investigation is, according to Watrin and Ullman (2008), that the optimal tax structure does not deform the structure of demand.

Since the mid- 1980s an opinion had been held in some countries that the greater part of the tax burden should be transferred to consumption, which would allow relief in incomes. This view has its supporters as well as opponents (Kubátová, 2018). For example, according to Musgrave and Musgrave (1989), consumption taxes increase saving of a portion of the national income. This then leads to greater capital formation and higher economic growth. On the other hand, Saez (2004) opts rather for taxation of income as a better instrument of redistribution among different income groups.

The question of the proportion of direct and indirect taxation in the tax mix is related to the issue of tax fairness, i.e. to what extent each entity contributes to common needs through taxes. It should match both its possibilities and also its benefits that it receives from the consumption of services provided by the state (Vančurová, Láchová, 2018). In terms of the tax theory by Kubátová (2018), in direct taxation the aspect of mobility the tax base, which

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is in the context of progressing globalisation more and more obvious, needs to be taken into account. The result is that the tax base or, more precisely profits, are moving to where their tax rates are lowest or zero. This affects the level of tax revenues, which have been in the recent years significantly influenced by the increasingly aggressive tax planning with an extensive use of tax havens. On the other hand, if taxation of consumption prevails, a rise in prices and a short-term higher inflation occur, which reduces the fair value of net income and simultaneously reinforces the substitution effect of these taxes. This means that consumers are looking for cheaper replacement, which is associated either with the purchases of goods of inferior quality or purchase abroad, where taxes on consumption, and hence also prices, are lower. According to some economic theories, indirect taxes distort the market causing losses in the economy. Their headlong growth will be reflected in lower consumption, which may have an impact not only on lower collection of taxes, but also on the decline in GDP. It therefore depends only on the particular government which path it chooses.

Impacts of Tax Policy in the Czech Republic

Since 2004 when we joined the EU until now, there have been many governments the programme declarations of which dealt differently with the tax issues. Those were then promoted during the election period with more or less success. Perhaps the most significant change during this period occurred in 2008, and it can clearly be classified as a neoliberal change. Progressive taxation of individuals in particular was removed that had been used by the advanced European economies, among other things, to slow down the growth rate of wealth concentration among fewer and fewer population of the country. Introduced was proportional taxation, which in combination with "shielded" premium for social security and public health insurance over four times the average wage represented a rather regressive taxation, i.e. with increasing income the tax burden declined. This fundamental flaw in terms of the tax theory was at least partially mitigated by the 2013 introduction of the so-called solidarity taxation of income from employment and independent activities over four times the average wage. Also, mainly due to the need for increased health financing, the "shielding" of premiums for public health insurance was cancelled. The tax rate on corporate income gradually reduced since the early 1990s in order to attract foreign capital. Since 2008 the outage of direct taxation was replaced with an increase in tax rates on consumption. Therefore, throughout the monitored period, the simple tax quota ranged at the level of up to 20% of GDP, the lowest was in the years 2008 to 2010, which was during the global financial crisis, which culminated in the Czech Republic in 2009 by the drop in GDP. Once the neoliberals stopped ruling once and for all in 2013, no major changes in the tax mix have been made ever since. Raising of tax revenues was secured rather by the economic growth and the introduction of certain more modern forms of combating tax evasion, for example by inspection reports to VAT on a monthly basis, electronic records of sales (hereinafter referred to as the EET). The result is gradual straightening of the conditions for business on the one hand, whilst indirect administrative costs of business entities are rising on the other hand. Especially in individuals with an annual turnover of up to two million Czech Crowns the introduction of EET is questionable, when since 2005 they have been able to use a very generous flat rate expenditures from 30% to 80%, while, according to the internal information provided by the Financial Administration of the Czech Republic, about two thirds of individuals submitting tax returns have zero or negative tax liability. Negative tax relates to tax discounts on children that were introduced in 2005 to support families with children and have been in force ever since.

Already on joining of the Czech republic the EU, the proportion of tax revenue from indirect taxes reached the absolute amount of the total tax revenues (excluding social security contributions), i.e. 55.3%, and up to 2016 increased to 62.3% (see Table 1). The reason is the gradual increase in VAT rates, excise taxes, as well as the introduction of new environmental taxes in 2008 in accordance with the relevant EU directives, by which taxes on consumption are significantly harmonised. If changes in indirect taxes were spread over time, inflation remained within the inflation band delineated by the CNB Bank Board in the context of the change to the monetary policy regime introduced in 1998. In 2008, however, the concentration of the changes in taxes, which were reflected in the prices of goods and services, caused a growth in inflation above the permitted range from 1% to 3%. That year, the inflation amounted to 6.3%, which was mainly affected by the change in the lower VAT rate from 5% to 9%, which principally includes food, and by further rise in excise taxes. It can be therefore stated that this was a very significant failure of the government. Since 2010, the basic and the reduced VAT rate have increased gradually to 15% and 21%. Neither the introduction of the second reduced VAT rate of 10% in 2015 significantly reduced the partial tax burden related to VAT. In 2016, that tax burden rose from 7.3% in 2015 to 7.4% of GDP. The implicit tax rate on consumption increased from 20.9% in 2004 to 24.7% in 2016. Throughout the reporting period the VAT revenues therefore grew except for a slight decline in 2009, which was caused by the reduction of the consumption of the population due to the aforementioned crisis. In contrast, VAT revenues growth in recent years was significantly supported by the economic growth, low unemployment, and hence the rise in the consumption of the population.

Computing the share of indirect taxation to 100% indicates an opposite trend in the revenues from direct taxation. The Income Tax Act underwent a number of fundamental changes affecting the reduction in tax revenues.

This concerned especially the gradual reduction of the tax rate on corporate income. In 2004, the rate was still 28% and since 2010 it has stabilised at 19%. The effective tax rate as of this year is 16.7%. Until 2008, these tax revenues had grown in absolute terms, but in 2009 they abruptly dropped by more than a third. The effect of reducing the rate in the previous year, and the annual decline in GDP, was the main reason for this development.

The income of individuals from independent activities reported the first significant drop in revenues in 2006, after the introduction of the exceptionally favourable flat-rate expenses in 2005 that were supposed to simplify business of individuals. The result was an annual decrease of those revenues by a third to 17.9 billion CZK. The second significant decline in those tax revenues by almost 70% occurred in 2009 as a reaction to the abolition of the progressive taxation replaced with a single rate and further favouring of flat-rate expenses in 2008. The already mentioned economic downturn had an impact, too. Tax revenues of individuals on income from independent activities gradually stabilised at 1to3 billion CZK. Due to the economic growth in 2016 they rose annually to nearly 7 billion CZK.

Taxation of income of individuals from employment has been affected since 2008 by a unified 15% rate, with the gross wage increased by premiums paid by the employer for the employee becoming the tax base. In total, this is a gross wage increase of 34%. Such anomaly is neither introduced anywhere in the European country, nor in other countries worldwide. Drop in the annual revenues was reported immediately in the year of the introduction, i.e. in 2008, as well as in the year of the economic downturn, i.e. 2009. Only since 2013, the selection of these taxes has reached the level of 2007 and since then revenues, and thus wages, have been rising due to the growth in GDP.

If we compare the partial tax quotas of natural persons and legal entities throughout the monitored period, the tax burden on individuals is higher than that on legal entities. Exceptions are the years 2006 to 2008, when it was the opposite, and in 2009 the two partial tax quotas were equal.

Property taxes included in direct taxes are very low in the Czech Republic and throughout the monitored period the partial tax quota represented about 0.2 to 0.3% of GDP. The abolition of inheritance and gift taxes, and its transfer to the Income Tax Act on January 1, 2004, had no impact on tax revenues, since the principle of taxation remained.

Table 1: Trend of direct and indirect taxation in the Czech Republic in the years 2004 to 2016

Indicators	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
A. Structure by type of tax	**as % of GDP**												
Indirect taxes	**11,0**	**11,0**	**10,5**	**10,7**	**10,5**	**11,0**	**11,3**	**12,1**	**12,5**	**12,9**	**12,0**	**12,4**	**12,5**
VAT	6,7	6,6	6,1	6,0	6,5	6,6	6,6	6,9	7,0	7,4	7,4	7,3	7,4
Taxes and duties on imports excluding VAT	1,1	1,0	1,0	1,2	1,0	1,3	1,4	1,8	1,8	1,7	1,4	1,7	1,7
Taxes on products, except VAT and import duties	2,7	2,9	2,9	3,1	2,7	2,7	2,7	2,9	3,1	3,2	2,7	2,9	2,8
Other taxes on production	0,5	0,5	0,4	0,4	0,4	0,4	0,5	0,6	0,6	0,5	0,5	0,5	0,5
Direct taxes	**8,9**	**8,6**	**8,6**	**8,8**	**7,8**	**7,1**	**6,8**	**7,0**	**7,0**	**7,2**	**7,3**	**7,2**	**7,6**
Personal income taxes	4,5	4,2	3,9	4,1	3,5	3,4	3,3	3,5	3,6	3,7	3,7	3,6	3,8
Corporate income taxes	4,2	4,1	4,4	4,5	4,0	3,4	3,2	3,2	3,1	3,2	3,3	3,4	3,5
Other	0,2	0,2	0,3	0,3	0,3	0,3	0,3	0,3	0,3	0,3	0,2	0,2	0,2
Simple tax quota	**19,9**	**19,5**	**19,0**	**19,5**	**18,3**	**18,0**	**18,1**	**19,1**	**19,5**	**20,0**	**19,3**	**19,6**	**20,0**
B. Structure by type of tax	**as % of total taxation without social contributions**												
Indirect taxes	55,3	56,1	54,9	55,0	57,5	60,7	62,5	63,4	64,3	64,3	62,2	63,2	62,3
Direct taxes	44,7	43,9	45,1	45,0	42,5	39,3	37,5	36,6	35,7	35,7	37,8	36,8	37,7
C. Tax rates	**%**												
Implicit tax rates - consumption	20,9	21,1	20,4	21,4	20,7	21,0	21,4	22,9	23,7	24,3	23,3	24,7	24,7
Implicit tax rates - labour	41,5	41,2	41,0	41,7	39,9	37,5	38,4	39,0	38,6	39,1	39,4	39,2	39,8
Effective average tax rates	.	.	.	21,0	18,4	17,5	16,7	16,7	16,7	16,7	16,7	16,7	16,7
Rates of VAT - standard	22,0	19,0	19,0	19,0	19,0	19,0	20,0	20,0	20,0	21,0	21,0	21,0	21,0
- reduced (first)	5,0	5,0	5,0	5,0	9,0	10,0	10,0	14,0	15,0	15,0	15,0	15,0	15,0
- reduced (second)	x	x	x	x	x	x	x	x	x	x	x	10,0	10,0
Personal income taxes	15,0 - 32,0		12,0 - 32,0		15,0	15,0	15,0	15,0	15,0	15,0	15,0	15,0	15,0
Corporate income taxes	28,0	26,0	24,0	24,0	21,0	20,0	19,0	19,0	19,0	19,0	19,0	19,0	19,0
D. Macroeconomic indicators													
GDP (y/y, real terms) %	4,9	6,5	6,9	5,6	2,7	-4,8	2,3	1,8	-0,8	-0,5	2,7	5,3	2,5
The Rate of Inflation (yearly average) %	2,8	1,9	2,5	2,8	6,3	1,0	1,5	1,9	3,3	1,4	0,4	0,3	0,7

Source: own elaborations from EC(2018).

The tax policy in the period from 2004 to 2016 represents a very high correlation between GDP and VAT, as well as GDP and taxes on income of individuals from employment, as shown in Table 2. In contrast, the corporate taxation correlates very little to GDP. The result of the correlation of the data between GDP and taxes on personal

income submitting tax returns is the fact that they do not correlate at all, which means that the legislative changes made in the monitored period significantly favoured this group of economically active people versus employees.

Table 2: Correlation coefficient between GDP and tax revenues (2004 – 2016)

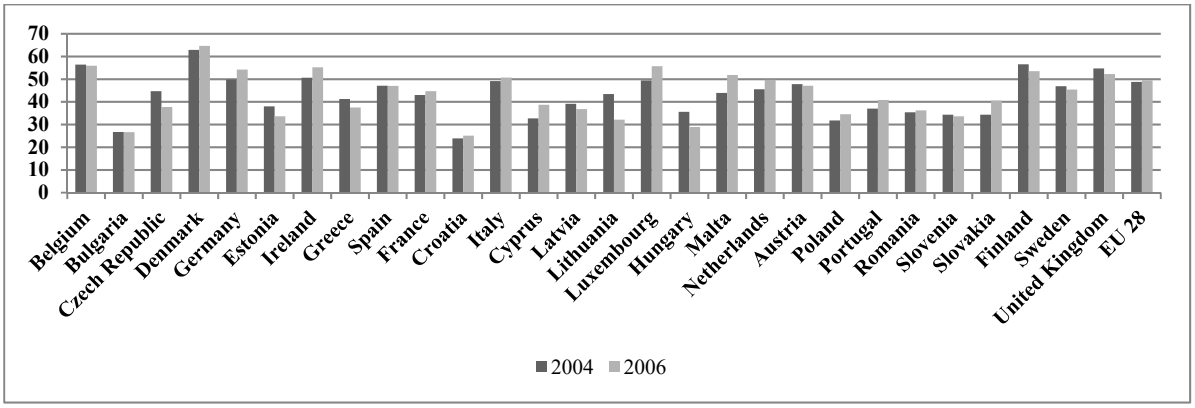
Tax	The correl. coef.
VAT	0,964
Corporate income taxes	0,296
Personal income taxes from tax returns	-0,793
Personal income taxes from employment	0,875

Source: own elaborations from ČSÚ (2019).

International Comparison of Direct and Indirect Taxation in the EU Countries

In the individual EU Member States, the development in the area of the share of direct taxation and calculation of up to 100% share of indirect taxation is very different, as is obvious from Graph 1. While in 2004 the proportion of total direct taxation tax revenues without premium was higher than 50% only in Belgium, Denmark, Ireland, Finland and the UK, in 2016 these countries were joined, in contradiction to the trend of "a departure from direct taxation to indirect" by yet more countries, namely Germany, Italy and Luxembourg. In Denmark, the share of direct taxes in both limit years is the highest of all EU Member States, specifically high solidarity dominates in the society.

Figure 1: Share of direct taxation in total tax revenues in the EU countries in the years 2004 and 2016 in %



Source: own elaborations from EC (2018).

If we focus on the neighbouring Germany, there is a trend obvious from the above graph. While in 2004 indirect taxes prevailed (50.2%), in 2016 it was higher direct taxation (54.2%). Direct taxes increased, although from 2007 the effective average tax base decreased from 35.5% to 28.8% in 2016 (EC, 2018). Linear progressive taxation was applied to personal income taxes in five income brackets with a marginal rate of 45%. The tax rate on corporate income taxes has decreased from 25% in 2004 to 15% since 2008. Besides that, since 1991 individuals and legal entities have been paying solidarity tax, legal entities in addition business tax (Široký, 2018). As concerns the solidarity tax, it is a surcharge levied in the former West Germany countries. Its purpose is to promote the restructuring of the federal states of the former East Germany and overcome their backwardness behind the western states. The implicit tax rate on consumption has increased only slightly, from 18.4% in 2004 to 20.5% in 2016 (EC, 2018). This means that no significant changes in the rates of indirect taxes have been implemented. For example, the basic VAT rate in 2006 was only 16%, and since 2007 it has increased to 19%; the reduced rate remained the entire period at 7% (Široký, 2018). The VAT rate applicable particular to foods is significantly lower than in the Czech Republic, where it is more than doubled. The result is that the citizens of the Czech Republic around since 2011 have been far more buying groceries in neighbouring Germany, which means that they contribute to the public finances of that country. The substitution effect of tax resulting from the difference in taxation in both countries is obvious. A fundamental change in the trend of direct and indirect taxation in Germany is also supported by growing revenues in the form of dividends from countries that joined the EU in 2004. This significantly touches the Czech Republic, where German companies have invested heavily since the 1990s.

In the monitored period, Luxembourg was a country with the lowest 15% basic VAT rate and even lower decreased tariffs in the EU. The implicit tax rate on consumption is however higher than in the Czech Republic and Germany (24.4% in 2004 and 27.7% in 2016). This indicates that particularly high are excise tax rates of

selected products. Italy increased the standard VAT rate in 2012 from 20% to 21%, and in 2014 to 22%. The implicit tax rate on consumption is the lowest, compared with the Czech Republic, Germany and Luxembourg (17.1% in 2004 and 18.4% in 2016). The effective income tax rates in Luxembourg and Italy are, however, significantly higher than in the Czech Republic, even though both countries recorded a decline in those. In all countries, where direct taxation still prevailed in 2016, progressive taxation of natural persons has been applied (EC, 2018).

All member countries that joined the EU in 2004 or later, have a share of excise taxes in excess of 60%, and three of them (Croatia, Bulgaria and Hungary) even higher than 70%. The level of solidarity is thus lowest in those countries. The statistical data shows that the tax system of the Slovak Republic is more cohesive than that of the Czech Republic. The share of indirect taxation reached 59.5%, while in the Czech Republic it was 62.3%. The tax rate on corporate income is 21%; progressive taxation on individuals has two rates: 19% and 25%. VAT rates are only two, specifically 10% and 20% (Široký, 2018).

Conclusions

In its policy statement (2018), the current government lists a number of changes in the area of direct and indirect taxation, among others there will be a shift of some items to the lower VAT rates, super-gross wage is to be abolished while maintaining a very slight progressivity of taxation through the two rates, with the lower rate being relieving to individuals even some more, comparing to the present situation. The reduction of administrative costs should be realised by extending the possibility of applying flat tax, the complexity of tax laws should be reduced through a reassessment of various exceptions. The main emphasis is on combating tax evasion and aggressive tax planning. A summary of these changes in the context of the economic development, however, says nothing about whether the tax mix will be shifted towards greater solidarity or more even distribution of the tax burden, which is the eternal conflict between the Keynesians and neoliberals. The government has not performed any major tax changes so far, and is already addressing the issue of anticipated reduction in tax revenue within the preparation of the draft Act on State Budget for 2020, incl. social security contributions in connection with the anticipated slowdown in the economic growth.

The brief analysis over time and in the international comparison presented in this paper show that basic parameters of taxation should be established in the Czech Republic. Recommended can be setting a goal of changes in the area of the tax mix so that the current share of indirect taxation declined from 62.3% at least below 60%, which is a value that is not exceeded by the 16 EU member states, i.e. the majority. A wide range of topics to support direct taxation can be listed. For example, the one that is being discussed by the current government coalition – the introduction of sectoral taxation, bank tax. On the other hand, we can recommend the introduction of a single reduced VAT rate instead of the today's two, in the amount of 10% so as to avoid undesirable substitution effects in relation to neighbouring countries, the reduced VAT rate of which is at that level or lower. This would also mean that the Czech Republic would not lose the tax revenue.

In connection with the recent Eurostat data (2019) stating that Prague is the seventh richest region in the EU, a thought can be considered here to introduce a similar solidarity contribution for legal entities based in Prague as the one they have in Germany, instead of the sectoral taxation and the bank tax. That would be redistributed in the Czech Republic in favour of poorer regions. Addressing the growing inequalities between regions is recommended to the Czech government also by the European Commission. This could solve a whole range of other problems – reducing the volume of profit after tax, which leaves the Czech Republic, stopping the depopulation of other regions and increase the standard of living in them, and reducing the pressure on the growth of housing construction, parking lots, etc., in Prague. On the other hand, firms having their registered office purposefully in Prague, although their premises are in other regions, would voluntarily change their place of business. There are other positive effects that would be found, for sure.

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The Russian Financial Market Security: Criteria and Framework of Assessment

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Abstract. Current trends in the development of world financial markets indicate the further integration of national economies into the single global economic system, which improves the efficiency of financial institutions and the use of modern financial instruments, reduces the cost of capital and transaction costs. Globalization of financial markets has an obvious positive impact on the development of the Russian financial market. At the same time, the ongoing globalization significantly increases the vulnerability of the Russian financial market both to the consequences of the global financial and economic crises, and to various kinds of geopolitical influences from other countries, which makes it important to develop methods for the financial security assessment.
This article attempts to suggest principles and framework for assessment of the Russian financial market security, which could be used for further development of integrated quantitative methods of public finance and financial market regulation.

Keywords: financial market, financial market security, financial security, stability, public finance

JEL Classification: O16, G7, G38, H11

Introduction

In the current conditions of globalization, when the Russian financial system is becoming increasingly integrated into the world economic system, and the violent breaking of international financial and economic ties can be used as a means of geopolitical influence, the problem of assessing and ensuring the financial security of Russia becomes especially acute. The subject of the paper is a methodology for Russia's financial market security assessment. In order to develop a methodology for financial security assessment of Russia's financial market, the concept of financial market security was described and clarified. Methodological principles of a comprehensive assessment of the financial market security of a country were suggested, the necessity of development of financial security quantitative indicators was justified and a framework for the Russian financial market security assessment was proposed.

The development of financial market security assessment methods is necessary for the progress of public financial management, since it provides the government with new tools for more efficient public expenditures on the improvement of the country's financial system.

Basic theoretical and practical points

In the works of A. L. Vedev (Vedev, 2015). A. M. Logvina (Abalkin, Logvina et al., 2004), B. V. Gubin (Gubin, Senchagov, 2015) there are different approaches to the definition of the concept of “financial security”. The most comprehensive, in our opinion, is the approach outlined by V.K. Senchagov (Senchagov, 2005). It defines financial security as a level of development of the financial system, which creates the necessary conditions for a socio-economic financial stability of a country, preserving the integrity and unity of the financial system (including monetary, budget, credit, tax and currency systems) to be able to cope with the country's internal and external economic threats.

According to this approach, financial security covers the security of the tax system, the security of the banking system, the security of the monetary system, and the security of the stock market. As shown by O.B. Ivanova and T.F. Romanova (Ivanova, Romanova, 2017), S.V. Kazantsev (Ivanov, Kazantsev et al., 2015), Maltseva I.G. (Frenkel', Mal'tseva, 2012), Semenova N. (Semenova, 2016), Shabalin A.O. (Andrjushin, Shabalin, 2011), the leading role in ensuring the financial security of Russia is traditionally assigned to the tax system. However, in the current conditions of geopolitical instability and the emergence of such new challenges and threats to the Russian economic security as strengthening structural imbalances in the global economy and financial system, restricting

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access to foreign financial resources, increasing volatility in global financial markets, the exposure of the Russian financial system to global risks and so on, the security of the Russian financial market has become the key element of the national financial security.

Improving the Russian financial security through developing the infrastructure of the national financial market, developing domestic sources of long-term financing, improving the mechanisms and tools for attracting savings of individuals and legal entities into financial market helps ensure the Russian economic growth. Since the economic security of a country in general can be defined as a state of the economy in which stable and efficient functioning of all socio-economic institutions results in stable positive dynamics of the country's main macroeconomic indicators, as well as in ensuring the independence of its national economy, it can be stated that security of financial markets helps ensure the national economic security.

In recent decades, the role of financial markets in ensuring the national economic security has increased significantly. One of the main reasons for this situation is the global financial system's institutional structure development and the emergence of new financial market instruments (options, futures, swaps, structured financial products, etc.). The ongoing structural and functional changes in the world financial system contribute to:

1. The growth rate of the world financial market exceeds the global economic growth rate. One of the indicators confirming this dynamic is the indicator of the market capitalization of the world stock market to the global GDP. According to the World Bank, the value of this indicator from 1975 to 2016 increased more than 3 times (from 28.5% in 1975 to 98.6% in 2016). In the period from 1975 to 1981, the value of the indicator did not exceed 30%, however, over the next eight years, the capitalization of the global stock market to the global GDP increased 2.5 times. In the periods from 1999 to 2000 and from 2005 to 2007 value of the indicator exceeded 100%.

2. The growth in investor activity in the global stock market, accompanied by an increase in volume of trade. According to the World Bank, the volume of trade on the global financial market from 1975 to 1982 did not exceed 9.7% of the global GDP. From 1983 to 1987, thanks to the emergence and development of new financial market instruments, the volume of trade increased almost 5 times and reached 47% of the global GDP. The highest values of the indicator were in 2000, 2007 and 2015, reaching 146%, 162% and 165% respectively. In 2016, the volume of trade on the global financial market amounted to 126% of the world GDP.

3. The increase in complexity of the world and national financial markets due to the appearance of new financial instruments.

The special role of the Russian financial market in ensuring the national economic security is based on its being a main investment source for the Russian energy industry. The Russian energy industry provides more than 60% of all export earnings and about 40% of the federal budget. There are strong relations between the Russian stock market and the Russian energy industry. On the one hand, the financial market supplies investment resource to the Russian energy industry development, thus making financial security very important issue. On the other hand, the Russian energy industry dominates the Russian stock market. According to the Russian National Association of Securities Market Participants, in 2017, seven of the ten biggest Russian companies were oil and gas companies. Their share in the Russian stock market capitalization was 41.4%, whereas, in 2006, the share was 66%. The Russian power generating companies make up another 10% of the stock market capitalization. This structure of the Russian stock market is very different from the world, where banks and technology companies dominate. In the new geopolitical conditions, such parameters as the dynamics of revenues and expenditures of the consolidated budget of Russia, currency fluctuations, stock market volatility, and the Russian energy industry development should be included in the risk analysis process of strategic threats to the Russian financial security. High sensitivity of financial markets to ongoing internal and external changes, which is confirmed by the high volatility of stock prices (Table 1), makes it important to analyze the features of the Russian economy functioning when considering issues of ensuring financial security.

Table 1: Stock price volatility, %

	2000	2007	2009	2011	2013	2015
Great Britain	17,1	13,4	33,6	17,7	14,1	12,6
Germany	22,6	15,5	36,1	20,4	18,6	18,3
China	27,8	27,7	41	22,1	18,3	26,5
Russia	58,6	33,7	68	24,5	19,8	22,5
USA	20,4	11,5	39,6	18,6	13,9	12,6
Japan	21,6	18,4	38,2	20,8	20,2	18,2
World	22,6	18	35,6	17,7	14,8	14,7

Source: authoring with data use of The World Bank

The financial market security can be defined as a state of stable and effective functioning of the banking sector, insurance and stock markets of the country, in which free movement of financial flows in the economy happen.

As shown in the work of D. Baur and N. Schulz (Baur, Schulze, 2009), the concept of financial security is closely related to the concept of financial system sustainability, which implies the ability of the financial system to withstand shocks of different nature, while maintaining its integrity and not allowing the stresses to damage investment process in economy. Thus, the main purpose of ensuring the financial security is to prevent financial crises that disrupt the financial system functioning (Il'ina, 2015).

In general, there are two types of financial crises. Financial crises of the first type often arise due to the cyclical nature of economic development. The sharp increase in economic activity can lead to an unreasonable increase in prices for financial assets, creating of financial bubble, which is doomed to collapse. An example of this kind of financial and economic crisis is the global financial and economic crisis of 1929-1933, which marked the beginning of the Great Depression. Despite the fact that financial crises of this type pose a serious threat to the financial security of a country, their emergence and development can be avoided by implementing effective state financial and economic policies.

The national financial crises of the second type arise from financial crises in other regions of the world and from international sanctions against a country's financial sector. In this case, a soundly functioning financial system of the country is under stressful influence from other financial markets through international economic and financial connections. The most significant example of this type of financial crisis is the crisis of 2008 that arose in the US mortgage lending market and then spread to the European and Asian financial markets. No less a vivid example is the financial and economic crisis that began in Iran in 2012 due to the introduction of international economic sanctions against the country.

Criteria and framework of the financial market security assessment

Despite the important role of financial security in ensuring national economic growth, methods of it assessment that take into account the specifics of the Russian financial sector have not been sufficiently developed. At the same time, the issues of sustainable development of the Russian financial markets are considered in the studies of many researchers, among which the works of A. K. Bekryashev and I. P. Belozerov (Bekrjashev, Belozerov, 2012), I. N. Judina (Judina, Betmakaev, 2016), R. Bakchetta (Aghion, Bacchetta, Banerjee, 2004), L. Carp (Carp, 2012), D. Grechina (Ductor, Grechyna, 2015), R. Levine (Levine, 1996), L. V. Tatarinova (Tatarinova, 2013), L. N. Usenko (Zolotareva, Usenko, 2015), as well as the work of B. Diallo (Diallo, Al-Mansour, 2017), which reveals the role of the major insurance companies to ensure financial market stability.

In order to develop a method for the integrated assessment of the Russian financial market security, methodological principles for such method should be developed. Analysis of the Russian financial sector allows to identify the following principles that must be considered when assessing the level of the Russian financial security:

The assessment of the Russian financial market should be carried out in order to increase the resilience of the national financial market to the effects of external and internal challenges and threats.

The security assessment should be carried out taking into account the specifics of the Russian financial sector, such as structure of the financial sector, the model of financial market regulation, tax legislation, etc.

The security of the country's financial market is based on its resistance to stressful events. Thus, in order to ensure the security of the financial sector, it is necessary to increase the robustness of its segments, taking into account the interrelationships existing between them.

Financial market security should be ensured not only by its robustness to the effects of external and internal challenges and threats, but also by its adaptability to strategic threats. The financial market adaptability is the ability of financial market to change its structural and other characteristics in response to emerging challenges and threats in order to maintain the optimal state necessary for its effective functioning.

It is necessary to distinguish between sudden stressful situations and strategic challenges and threats, since the assessment of their likelihood should be based on different methodological approaches. Strategic threats can be determined by expert methods by research the existing long-term trends of social and economic development, but sudden stressful events can be determined by analysis of the national and global financial markets indicators.

The final security assessment of a country's financial market should be based on the level of sustainability of the weakest of its elements ("the principle of the weak link"). The financial market can ensure the national financial security only if all its main elements fulfill their functions effectively. If any of the elements is failed, the load will shift to other elements of the financial system, and then to the economy as a whole. Therefore, the level of a country's financial security is determined by the level of stress tolerance of its most vulnerable element.

A framework for the Russian financial market security assessment could be proposed. The framework contains the following stages.

At the first stage, the structure of each element of the financial market is described and the interrelationships existing between them are studied. It allows making assessment of the flexibility and resilience of the financial

market elements to external and internal disturbances, uncovering mechanisms for spreading possible financial crises, finding the weakest and most vulnerable elements.

At the second stage, the main threats to the security of the country's financial market are analyzed. It is necessary to distinguish between sudden stressful events and strategic challenges and threats to the security of the financial market. Sudden stressful events are unpredictable or poorly predictable situations that can adversely affect the functioning of the financial market. Sudden stressful events can lead to a significant decrease in the efficiency of the country's financial market. Strategic challenges and threats to the security of the financial market usually happen over a long period and contribute to the development of systemic crises. It should be noted that the main task at this stage is not only to identify possible external and internal strategic challenges and threats to the financial security, but also to determine their importance.

At the third stage, possible reactions of the national financial market to stressful events are analyzed.

At the fourth stage, the impact assessment of the identified threats is carried out. At this stage, quantitative indicators are used for assessment of the consequences of the identified threats implementation to the financial market security and both economic and national security. The list of indicators should include both standard indicators used for measuring economic development of the country as a whole and the financial market in particular, as well as special indicators determined by the objectives of the assessment and the specifics of the analyzed challenges and threats. Also at this stage, the cumulative effect of stressful events on different elements of the financial market is estimated.

At the fifth stage, the most vulnerable elements of the national financial market are identified.

At the sixth stage, a final assessment of the country's financial security level is made. The final assessment of the financial security level should be based on the fact that the principle of averaging is unacceptable in development of effective measures to increase the financial market stability. The overall level of financial market security should be determined by the level of stability of its least sustainable element.

Conclusion

The development of methods for a country's financial market security assessment is significant not only to improve and develop mechanisms for monitoring and assessing the level of the Russian financial market security, but also to identify its “weak points”. This will further allow government to develop efficient state measures aimed at increasing the reliability and flexibility of the national financial system and the country’s financial market. It is very difficult to predict the sudden stressful events and assess its consequences. Therefore, to ensure the high level of financial security, the national financial market should have a high level of resilience. The timely recognition of threats and challenges to the financial market security and the implementation of measures aimed at adapting it to the new conditions will increase the soundness of the state financial and economic policies.

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Czech sickness insurance: the benefits' structure and the character of coverage

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Abstract. The paper deals with Czech sickness insurance, which is built on principles of social insurance but utilizes a few additional concepts and covers short-term inability to work. The reasons for this inability however differ and recently new covered situations arose. At the same time, the discussion about the replacement ratios and the parametric setting of sickness insurance's waiting period took place, also in public discourse. The paper, albeit selectively given its length, focuses on those issues and explains their consequences for the participants and the coverage of social situations. Also, it points out the benefits' sense and emphasizes the importance of social sickness insurance approach within public finance and social administration, as well as its principal features and factors that influence its balance and performance.

Keywords: sickness insurance, social insurance, public finance.

JEL Classification: D10, H51, J20

Introduction

Sickness insurance is one of the very useful advancements in social security. It provides income's replacement in randomly occurring situations such as sickness or maternity (Tomeš, 2012). In the form of social insurance has first emerged in Germany during the Bismarck administration (Lehmann-Hasemeyer & Streb, 2017) and has expanded since then to many social systems in developed countries. In current market economy based on money flows and elastic money (Hülsmann, 2013), maintaining adequate financial flows and effective demand even in time of sickness is even more important than it has been when social insurance was invented.

Of course, as every social subsystem, there is a lot of controversies around sickness insurance, whether they regard its character – social, compulsory or private, voluntary (Vostatek, 2000), covered social situations and benefits level, the position within public budgets and the role of the employers in the sickness insurance of employees. Also the motivation to work and possible moral hazard avoidance strategies have been discussed, while maintaining the protective function of sickness insurance (Røed, 2012) (Markussen, Mykletun, & Røed, 2012). So, every system is searching for a compromise, and unfortunately also politicians more than often make suggestions how this system could be changed and why.

In Czechia, we are also witnessing this development. Just for example, during the last economic crisis (2008-2010), waiting period of 3 days has been introduced (Legierská, 2012) and the protection period after the end of employment has been reduced to just 7 days. And last year (2018), two new benefits have been introduced and the waiting period was abandoned again. It might be an oversimplification, but from Czech public discourse we can get the impression that the right-wing parties would like either to keep social insurance mainly for serious illnesses with longer incapacity (strong conservative approach), or replace it with private insurance where possible (neoliberal approach), and the left-wing parties try to expand the coverage so that even lower income social group have decent protection level and do not struggle with missing household income at the end of the month when they fall sick (combined universalistic + conservative approach). And in social policy, we must find a compromise between those approaches, that provides both adequate protection and does not shift the social situations to other segments of social policy like social support or social assistance, if they could have been very well resolved and covered within social insurance. In this sense, we ought to see social insurance as the top level of social security that builds on performance of the workers and based on this provides them adequate protection.

This paper aims to show the benefits' structure and financing of Czech social sickness insurance and demonstrate the consequences of system's component settings. It utilizes latest data from social administration and makes a survey analysis of system's significant properties. Methodologically it points out when one of the basic models and principles of social policy (universalistic, conservative, liberal and neoliberal) is or could be used (Krebs, 2015) (Titmuss, 1974), makes classification of the benefits according to the social situations they cover, calculates the effect of reduction levels at different level of income and makes overall synthesis of the situation in this important segment of social security. We sometimes, also because the length of the paper, simplify issues or point out just the principal facts and statistics, not exceptions or rare cases.

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The paper will seek answers especially for the following research questions:

- What is the structure of sickness benefits, including the recent changes?
- Which social situations are covered in sickness insurance?
- How do the parametric settings of the system influence its equivalency and solidarity (Krebs, 2009)?
- What is the overall balance of the system?

Sickness benefits' structure and coverage

Sickness insurance's elementary logic is as follows: when a person can't work because of illness or injury, and this can be proven by objective medical assessment, he is excused from work and receives benefits based on his contributions as a percentage of his regular work income. Thankfully, it is almost universally accepted that being unable to work because of health conditions is a social event that should be covered within social security. In case of employees it must be accepted by employers as a reason for excused absence with no (direct) negative consequences for the employee who can't be blamed for getting sick or injured. Only extreme liberals can argue, that the employee should compensate the employer (and get coverage "freely" on his own), because the employee's absence caused the situation that is unfavourable for the business. Almost universally, the opposite takes place, and, in some cases, part of the sickness benefits is paid as a wage replacement, directly from employers.

There are two types of sickness insurance: social and private (Lehmann-Hasemeyer & Streb, 2017). In this paper, we shall focus only on the social one, not only because the conference is focused on public finance, but also because for standard scenarios, private insurance has several limitations for more widespread usage and social sickness insurance seems to be optimal for common households (Rochet, 1991). The main obstacles are medical underwriting and pre-existing conditions, whose existence makes private sickness insurance very expensive or even unavailable for older or chronically ill people. And, in case of private insurance, the coverage is based on the ability to pay and the content of the contract, which would leave lower income social groups underinsured, because they would exclude more expensive risks from their contracts or even abandon coverage at all when they need money for something else. Last but not least, social insurance has lower administrative and no marketing costs, and is automatically tied to the economic activity, whereas private insurance must be administered and marketed independently which can be inconvenient for many common participants. In this context it is worth to remind, that the reduction of protection period in social sickness insurance to just 7 days after quitting a job in 2008 (from the previous 42 days) is very debatable step – that length does not cover even the incubation period of common illnesses, thus when a citizen does not find a new job quickly and falls sick e.g. 10 days after, he receives just the unemployment benefits. Thus, reconsidering this protection period's length e.g. to 14 or 21 days would be worth doing.

It is very important attribute of social insurance, that it is autonomous, and the government just "runs" the system with its own incomes and expenditures, based on insurance math that can give the borders for required insurance premiums and benefits level. This is different to social support and social assistance that are paid from general taxation and thus are far more subject to fiscal and budget disputes and are not connected with the wage level the way social insurance is. While this is perfectly defined in theory (Vostatek, 2000), in practice of the public choice this sometimes isn't understood, let alone emphasized and fully utilized, enough.

As an extension of already stated elementary logic, additional benefits were introduced into the sickness insurance. The package of four benefits was run since the 1990s, and two more benefits were added in 2018. To make brief characteristics of those benefits, we can sum up them in the following table 1.

Table 1: Sickness insurance's benefits and their specification

Benefit's name	**Benefit's description and purpose**
Sickness Benefit	Covers individual inability to work because of illness or injury
Maternity Benefit	Covers inability to work because of late pregnancy, child delivery, early infant care
Attendance Allowance	Covers inability to work because of care for short-time children's sickness
Compensatory Benefit in Pregnancy and Maternity	Covers decreased ability to work because of pregnancy and early motherhood
Paternity Benefit (Father's Post-Natal-Care Benefit) (since 1.2.2018)	Covers short-term inability to work because of father's participance on early infant care

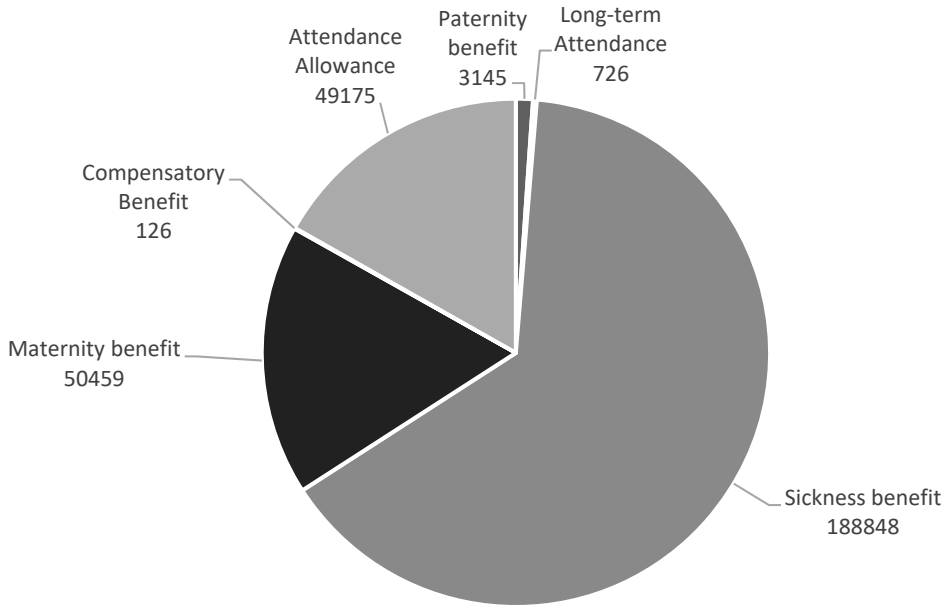
Long-term Attendance Allowance (since 1.6.2018)	Covers inability to work because of providing care to disabled family member

Source: author, part of data from (ČSSZ, Dávky, 2018)

When we explore those benefits, we can see that the original reason of individual incapacity to work has been to some degree expanded in those benefit structure – in two main directions. First one is the personal care for dependent persons that get sick – children (Attendance allowance), any family member (Long-term attendance allowance). The second one is the prenatal, new-born and early infant care by parents (Maternity and paternity benefit, Compensatory benefit). Of course, there is a question to what extent the childcare should be financed from sickness insurance and where it belongs to family policy financed from general taxation. We can emphasize, however, that especially during first 6-12 months of child's life, the relationship between mother and child is so tight, that we can't reduce the benefits evaluation just to the mother's ability or desire to work again (Rossin, 2011), but also the degree of dependency of the child and overall importance of early parenthood time for the child development and family life (Schulte, Durana, & Stout, 2017). Because of these reasons, tools based on social insurance that provide the mothers financial support so that they may take a break from work are very important. Paternity benefit and the role of the father during early infancy has also some merit as seen in the literature, (Kim, Kang, Yee, Shim, & Chung, 2016), the new Paternity benefit can be seen as a small step supporting the role of the fathers in child care. Generally, the government should not directly stimulate one form of parent roles' division, both parents should primarily decide by themselves what's the best way to care for the child, government just supports it and provides options they can utilize.

To see the proportions of the benefits' usage, we can draw a graph (Figure 1) of the number paid-out benefits in December 2018 (monthly benefits are approximately stable during the year based on the data available; so this provides good insight on the proportions, including the new benefits that were introduced during 2018).

Figure 1: Number of people receiving sickness insurance benefits, December 2018



Source: (ČSSZ, Otevřená data, 2018)

There is one more aspect about Czech sickness insurance and that is participation obligation. For employees, the participation is compulsory, one must pay the insurance automatically as he earns wage. This is essential attribute of social insurance for employees. For self-employed, the participation is voluntary, one needn't pay the insurance unless he specifically asks for participation. Then, self-employed have got only 4 benefits out of stated 6, they cannot utilize the Attendance allowance and Compensatory benefit. The logic behind this is given by the nature of self-employed business that decide themselves about the volume and character of their workload and also the results of the negotiations about the sickness insurance legislation, where the self-employed haven't wanted to make it compulsory.

As for the benefits level, they can be with a bit of simplification summed up into the following table 2.

Table 2: Amount and duration of benefits

Benefit's name	Benefit's amount	Benefit's length and time
Sickness Benefit	60% reduced basis first 30 days 66% reduced basis next 30 days 72% reduced basis further	From 15th day of sickness, maximum 1 year
Maternity Benefit	70% reduced basis	28 weeks, 37 weeks if multiple birth
Attendance Allowance	60% reduced basis	max 9 days, if carer lives alone 16 days
Compensatory Benefit in Pregnancy and Maternity	Part of difference between original and reduced income in different position	Number of days transfer to different position lasts
Paternity Benefit (Father's Post-Natal-Care Benefit) (since 1.2.2018)	70% reduced basis	7 days
Long-term Attendance Allowance (since 1.6.2018)	60% reduced basis	maximum 90 days

Source: author's compilation, data from (ČSSZ, Dávky, 2018)

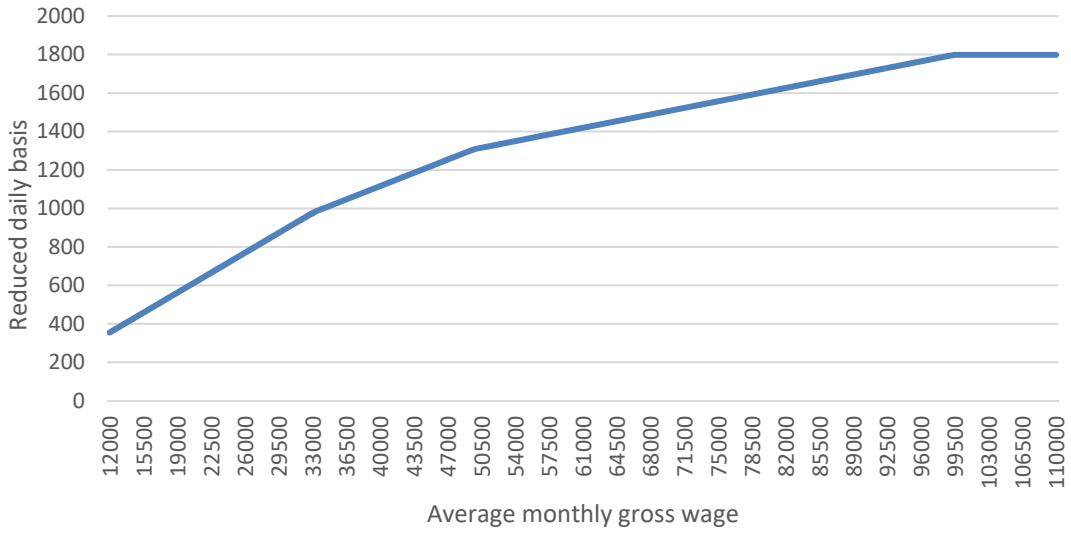
As for the "reduced basis" computation, it is worth emphasizing that there is a reduction of the basis mechanism in the Czech sickness insurance, which is not fully compliant with social insurance principle, which needn't have any reduction mechanism and instead typically utilizes pretty low ceilings on insurance payments (approx. 2 times average wage, whereas in the Czech Republic the ceiling is 4 times average wage). The mechanism of reduced basis's computation is as follows (with data for year 2019):

There are 3 reduction levels (daily amounts)

0 – CZK 1 090 – reduction 90%
CZK 1090 – CZK 1 635 – reduction 60%
CZK 1635 – CZK 3 270 – reduction 30%

We take the amount from which the social insurance premium is paid (usually gross wage, up to the ceiling) and we reduce it according to the specification above. Amounts higher than the third level (3270 CZK) do not apply. Maternity benefits have full amount up to the first reduction level (1090 CZK) 100% - without reduction. To briefly illustrate how this mechanism works for different income levels, we can draw the following graph (Figure 2) for 2019 parameters, it shows the reduced daily basis level for appropriate gross wage. This reduced basis is then used for calculation of actual benefits. When we multiply the daily basis by appropriate percentage from the Table 2 above, we get the actual benefit's level. For example, when a person has got gross wage 35 000 CZK, reduced daily basis is 1 018 CZK, the sickness benefit's level is 611 CZK per day for the first 30 days (60% of 1 018). But the shape of the curve doesn't significantly change, because the benefit's percentage is the same for all income categories, what is changed according to income is the reduced daily basis.

Figure 2: Reduced daily basis at different income level, CZK



Source: author's calculations

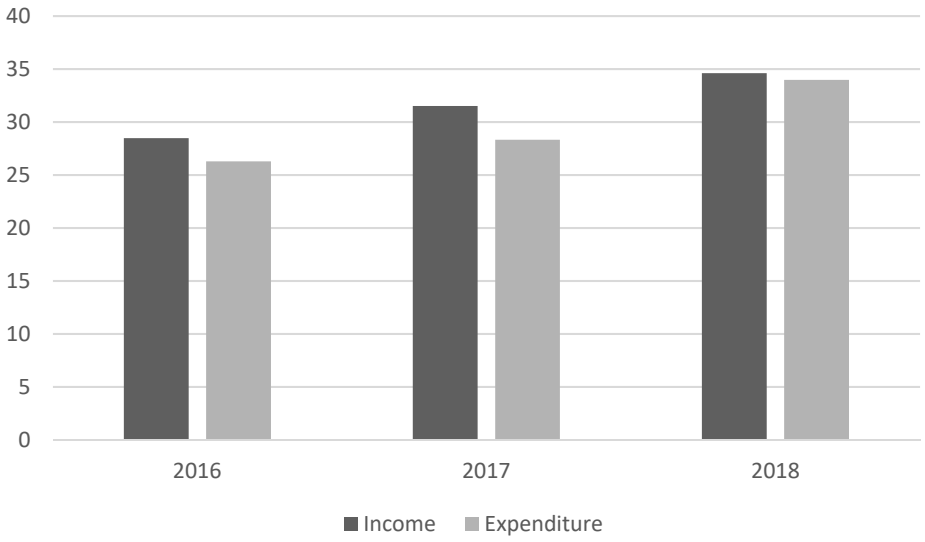
The purpose of this reduction mechanism and reduction level is to increase solidarity within the sickness insurance system and especially provide lower income group with relatively higher benefits than the higher income group, so technically it works, but it is debatable to what extent this principle should be applied (if at all). Conservative social model would probably suggest reducing the number (or even cancelling) of these reduction levels. On the other hand, if we ceteris paribus do it, the insurance premiums would probably have to be raised, since higher income people will then have higher benefits level that they have now, and the lower income would have approximately the same, or the increase of benefit level for the higher income groups could be done at the same insurance premium but with lower benefits for the lower income groups. But technically given the initial situation already described, it is possible e.g. to suggest that Czechia have just 1-2 reduction levels combined with lower insurance ceiling. When we think even more theoretically and technically, if we want to have more solidarity without reduction levels, we can similarly to the pension system reform suggestions (Vostatek, 2016) provide some "basic sickness benefit" equally for every participant (universalistic approach) and follow with pure social insurance as a percentage of full basis (gross wage that was subject to premium payment – performance based conservative approach), such a change would abandon the need for reduction levels but introduces new element of basic sickness benefit (that will be universal). Therefore, this solution remains a theoretical option, but in practice when we want to have more solidarity than pure social insurance gives, continuing with 1-2 reduction levels can be appropriate.

Overall system balance and expenditure

The current premium rate of social insurance is 2,3% from the base (gross wage), for employees it is a part of the labour costs, currently paid by employers. Self-employed pay this premium when they decide to participate in sickness insurance, and they set the base themselves within legally defined minimum and maximum amounts. When doing the changes in the system, usually this rate has not changed and the results were seen in the overall balance of the system, since changing this rate is more difficult to achieve in public choice than to change more subtle benefits' settings. As stated in the insurance statistics, the current premium rate is a little bit higher than necessary premium rate in recent years (which is convenient because changing it too often would be cumbersome) but has been getting closer to it. The necessary premium rate for sickness insurance is computed with several equations that is described in the literature (MPSV, 2017). The balance of the system doesn't directly depend on the number of participants, but mainly on the benefit level, insurance rate (modified with the success rate of premium collection and administration costs), and the rate of insured events, e.g. sicknesses.

Therefore, from the analytical point of view, bigger changes in insured events and/or benefit levels should be reflected in the insurance rates based on social insurance math. Also, macroeconomic environment should be considered, for example in recent years, when the economic development has been favourable, the overall balance has been positive, but when the economic cycle falls into recession, the system can get into the deficit. This can be emphasized with the recent legislation changes, that have changed the parameters of waiting period and decrease the premium rate to 2,1% since 1.7.2019. This has been meant as a compensation for employers for increased expenditures connected with the changes (more wage replacement expenditure), but threatens the overall sickness insurance balance, since it is based again primarily on the current surplus of the system as a whole.

Figure 3: Income and expenditure of sickness insurance as a whole, 2016-2018, billion CZK



Source: graph author, data from (ČSSZ, Přehled vybraných statistických a ekonomických ukazatelů, 2018)

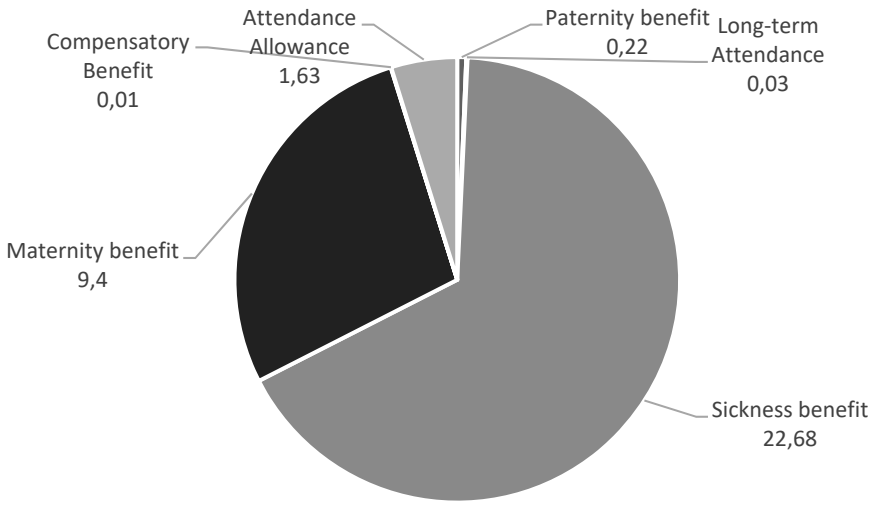
This is related to the aspect that we have not discussed yet. As seen in the table 2 above, actual sickness insurance benefits are paid from the fifteenth day of sickness. So technically, there is 15 days of waiting period to get coverage from sickness insurance (and the self-employed really wait this period), but there is additional mechanism paid by employers called the wage replacement. Current setting of this wage replacement is 60% of reduced basis for working days during first two weeks, however there is 3 days of waiting period when employee receives nothing. This waiting period will have disappeared since 1.7.2019, as already stated. As for the situation of employers, from their point of view we can see the (whole) sickness insurance expenditure as the part of the labour force costs. So the payment of replacement wage is, again from their point of view, a shift between paying "full insurance premium" and therefore having no obligation to pay money to the sick employees (since the social insurance will pay them), and partial payments of money without the insurance, potentially lowering insurance premiums but paying part of employee's sickness benefits directly. Of course, there are more variations between bigger and smaller employers, but they are beyond the scope of this paper.

As for the sense of the waiting period, here we come into conflict of the approaches. If we want to achieve that common sicknesses will not significantly decrease the household's income during the month when they occur, we ought not have waiting period since it obviously decreases the benefits level during those events. If we take sickness insurance as a protection for more serious (and far less frequently occurring) sicknesses, and we want to pay less insurance premiums, the waiting period can make sense. The problem is, that in this case we must find other mechanisms to cover for common sicknesses and for most lower income participants it cannot be the individual savings, as it is often suggested, because they usually spend most of their wage during the month. Moreover, there can be a phenomenon of "transitioning sicknesses", which is bad both for the individual (risk of complication) and the colleagues (spreading diseases in the case it is contagious). Therefore, abandoning of the waiting period can be seen as positive move (Klesla, 2017), even if it can slightly increase the number of shorter paid-out benefits.

While fiscally some of the benefits are significant (such as Sickness benefit and Maternity benefit) and others very small; this does not correlate with the importance and sense of the social situation they solve. For example, the Long-time attendance benefit solves the onset of tough situation of caring for the relative who falls sick and can't care for himself which has been more important to be covered than in the past (Tiefenbachová, 2016). Therefore, the settings for sickness insurance benefit coverage should always outcome from the consensual evaluation and real assessment of the situation that it covers, including case studies of individual people and socioeconomic research (Koštuříková, 2016), not just by the fiscal volume of the benefit or the number of people that receives it. That said, we should also explore ways to integrate the system components with other social subsystems, most prominent being the invalidity pensions and family policy in general, because they closely follow the social situations that are covered by sickness insurance (sickness, pregnancy/early maternity).

As for the overview of expenditure on individual benefits, the following graph (Figure 4) can be useful which show the structure of expenditure in 2018. Methodologically, we must notice that data for the two new benefits cover just part of the year and they will be probably higher in 2019, but the overall volume of these benefits is such low (cumulatively just 25 million CZK in 2018) that it does not change the overall picture much.

Figure 4: Expenditure on sickness benefits, billion CZK, 2018



Source: graph author, data from (ČSSZ, Přehled vybraných statistických a ekonomických ukazatelů, 2018)

Conclusions

Structure of sickness benefits covers the spectrum of social situations that are caused by short-time sickness, pregnancy and early infant care. Most frequent and fiscally intensive are Sickness and Maternity benefit, while the Attendance benefit is fiscally smaller but also frequent. Of course, the actual benefit level and length can be subject to many debates, analyses and opinions, that's why they differ to some degree among developed countries. Since the sickness insurance benefits replace to some extent work income and during the social situations that they cover the beneficiaries can't or even mustn't work, they should stay social insurance based and the relationship to wage should be maintained.

In addition to basic sickness benefit, there are two directions where we can see expansion of coverage happening: maternity and care for dependent relatives. This has rationality and can be implemented into social insurance mechanisms, but we should respect the logic between benefit level, probability of events' occurrence of events and necessary (total) premium percentage as a share of gross wage. That ensures stability and good annual balance of the system.

As for the degree of equivalency and solidarity in the system, it is important to sum up that by design automatically, social insurance provides important solidarity elements such as no medical underwriting (everybody gets insured at the same community rating), no differences between people with children and childless and between types of job, protection according to Labour Code and some others. If there is need for even higher degree of solidarity that is within social insurance "by design", reduction levels can be utilized which has been taking place extensively in Czech Republic. Abandoning them would be probably too radical, but thinking to the future about reducing their number, together with decreasing the ceiling on premium payments may be appealing to some public opinion makers and parties. Again, this operation can be done neutrally (with existing premium percentage) or combined with adjusting the premiums so that the new benefits' level be flawlessly financed.

When doing changes in invalidity pensions and especially family policy, the policymakers should carefully monitor the "contact points" with sickness insurance and if necessary, adjust both systems so that there is smooth cooperation and transition between them. Although this paper focuses on sickness insurance only, we emphasize this in the conclusions because this is often forgotten.

For the future research it would be interesting to monitor how will the changes in waiting period and insurance premium rate effective since 1.7.2019 influence the balance of the system and number of sickness events. And also, how will first "full year" with two new (albeit small) benefits go, as it can be seen from partial 2018 data contained in this paper, they won't change the overall situation much, but since they are new their functioning should be carefully monitored.

Acknowledgements

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Willigness of individual to voluntarily pay for public services: Community development project

Beáta Mikušová Meričková* – Nikoleta Muthová**

Abstract. The concept of behavior rationality promoted by the classical economy loses general validity in confrontation with the reality of human action. Addressing the issue of predicting and influencing the behavior of individuals in modern public economics extends the concept of neoclassical economics to a psychological dimension in order to respond more adequately to public needs, increasing the efficiency of public service provision. The aim of the paper is to examine, in the context of the theoretical basis, the consumer's collective consumption and rationality in neoclassical and behavioral economics, the factors of willingness to pay voluntarily to services of general interest and to address the issue of accepting the charging of these services. There are different factors that affect individuals from all sides (television, internet, acquaintances, family, friends, etc.) that consciously or unconsciously interfere with their decision-making. If we are aware of all these factors that enter and influence the decision-making of an individual, it is possible to "control and influence" their decision making.

Keywords: consumer preferences, experimental survey, factors, willingness to pay.

JEL Classification: C91, D12, D64, H41.

Introduction

How much would we ask for the distribution of leaflets? How much are we willing to pay for a cup of coffee? The answer to these questions does not take long. Let's say we're willing to pay a maximum of € 1 for a cup of coffee. It is likely that most people will respond roughly the same way. Does that mean we all like coffee the same? Do we all have the same disposable income? Are we all considering the same alternatives? So what process are we going through when deciding when we are all about to give € 1 for a cup of coffee (Ariely, Kreisler, 2018).

In order to gain a better understanding of human behavior, Economics seeks to work with other disciplines such as Psychology, Sociology, or Anthropology (Behavioral Economics). Unlike neoclassical economic theory, behavioral economics does not assume a rational individual. On the contrary, it focuses on an irrational individual while revealing what really influences his decision and his actions. Behavioral economics focuses on factors that may result in someone saying "yes" to someone, while "no" may respond to the same requirement (Cialdini, 2016). Diamond and Vartiainen (2007) emphasize the positive efforts of behavioral economics, which extend the standard economic theory to new approaches that take into account the psychological motives behind acting of individuals.

If we do not perceive the individual as purely rational (homo oeconomicus), i.e. a person who is driven exclusively by "economic" motives in order to achieve the greatest possible material or monetary gain who would choose the free-rider strategy, but perceive their bounded rationality, bounded willpower and bounded self-interest, then it is possible to achieve desirable results by means of suitable settings of the conditions in which an individual decides.

Bounded rationality (Mullainathan, Thaler, 2000) reflects the limited cognitive abilities that constrain human problem solving. Within bounded rationality, we identified several factors acting on individuals (Dolan et al., 2009): messenger, incentives, norms, defaults, salience, priming, affect, commitments and ego.

Demographic and behavioural similarities between the individual asking for help and recipient can improve the effectiveness of the request (messenger) (Cialdini, 2009; Dolan et al., 2009; Greitemeyer, 2009)

Incentives such as fear, fiscal policy, the size of the public sector and information can affect how individuals respond to incentives. Crowdsourcing uses positively tuned instructions, which, as it were, force the "altruism" or highlight the benefits of collaboration on the individual and thus achieve a higher degree of voluntary engagement, as well as public policy-making experiments with negatively tuned instructions by means of sanctions. Regarding the perception of risk (Dolan et al., 2009), also suggests that it is important for individuals to have an overview or know what their money was used for, or when their money was used. Individuals want to know what they can do

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rather than what prevents them from doing so. Campaigns set through crowdsourcing are time-limited, and those involved are always informed about the results.

Also, social and cultural norms such as social rules, moral duty, religious duty, conscience and relationship to the recipient beneficiary affect in positive or negative way the willingness of people to voluntarily pay or help. People often take their understanding of social norms from the behaviour of others, which means that they can develop and spread rapidly (Dolan et al., 2009, Larkin et al., 2018).

The situation where we can encounter the effects of this factor is, for example, when contributing to a "charity" collection. For example, if a given NGO has a set, or default monthly amount of voluntary payment, it may happen that individuals will not increase their payment retrospectively (Dolan et al., 2009).

Salience explains why unusual or extreme experiences are more prominent than less constant experiences (Dolan et al., 2009). Peak moments or final impression can influence whole events. In other words, individuals prefer three hours of steady discomfort in dentist over the one who gave us sharp pang of pain, because that pain is particularly salient (Dolan et al., 2009).

According to (Dolan et al., 2009), the questions if an individual is ultimately influenced by a particular behaviour depends on the environment – priming (Aarts, Dijksterhuis, 2003; Greitemeyer, 2009), where the individual is influenced by, what the individual sees, hears or feels when it comes to spreading the message or, in the sense that an individual imitates what they see or hear (Dijksterhuis, Bargh, 2001). The reason for this behaviour, imitation, is that the individual has a "need to belong" (Baumeister, Leary, 2000; Caporael et al., 1989, Leary, Baumeister, 2000), i.e. does not want to be alone, wants to be accepted by society. Social networks make this largely possible, crowdsourcing also contributes to community building.

Affection is a powerful force in decision-making. People in good mood make unrealistically optimistic conclusion, whilst those in bad mood make unrealistically pessimistic conclusion. Research even proves that appropriately chosen words for success such as winning, succeeding, overcoming, mastering, and others lead to better results than the use of aggressive words such as defeating competition, and reaching the goal (Cialdini, 2009; Dijksterhuis, Bargh, 2001).

The individuals seek to be consisted with their public promises and reciprocated acts. If the promise is linked to financial or social costs (damage to reputation), an individual is more willing to fulfil his obligations (Dolan et al., 2009)

Individual behaviour is also limited by selfish interests. Bounded self-interest incorporates the comforting fact that people are often willing to sacrifice their own interests to help others (Mullainathan, Thaler, 2000). The individual acts in order to have the best possible feeling about themselves (ego). Individuals tend to behave in a way that supports the impression of positive and consistent self-image (Dolan et al., 2009).

According to Dolan et al. (2009) states should seek to use these factors affecting the actions of individuals for their benefit, e.g. by finding out how individuals respond to stimuli and which of these stimuli (factors) are significant to the individual. The assumption is that individuals, when deciding, analyze information in the form of countless stimuli (DellaVigna, 2009), available from politicians, the state, municipalities and the market, resulting in decisions that reflect their best interests in view of these incentives (Dolan et al., 2009).

Methodology

The aim of the paper is to examine, in the context of the theoretical basis of the consumer's collective consumption and rationality in neoclassical and behavioral economics, the factors of willingness to pay voluntarily to services of general interest and to address the issue of accepting the charging of these services.

We assumed that individuals are willing to pay to community services, and their willingness is conditional on factors affecting them during their decision-making.

The priority of every city, state, should be to support and develop community planning, to promote community activities and civic participation. And why? Because each of us lives in a community in which he does everyday activities, where there are social ties between the members of the community, where people live and work together in interaction. It is not a homogeneous group of people, who can have a certain degree of disadvantage, different age, different income levels, different interests, strengths, skills and experiences.

The possibility and opportunity of towns and villages is to establish or support the emergence of such community initiatives that support the active participation of citizens in the public decision-making process. Despite the fact that cities and municipalities have the opportunity to build community centers in their town or municipality, the problem is usually the lack of a leader in the community to run such a facility, or a lack of financial resources to finance community development in the city.

Topic The community published on the website www.dobrakrajina.sk connects projects which, despite being small, are very important in their community. The aim of these projects is to improve community life and help in

different locations in Slovakia. Therefore, in the experimental survey, we set up a community development project as a community service.

A frequent problem of experiments is a non-representative selected sample that does not allow generalisation of the achieved results. The experiments usually focus on testing the responses and behaviours of university students. The reason for the use of students is the low-cost of setting up the test group and the assumption of greater interest and motivation when testing students (Mutz, 2011). In contrast, the advantage of the survey experiment is that the experiment is administered to a representative population sample (Guterbock, 2010, Mutz, 2011). A survey experiment involves the (random) manipulation of one or more features of the survey instrument (vignette), such as the phrasing of question prompts (voluntary and involuntary payment), the ordering of response categories, or the informational content of a hypothetical scenario (highlighting the positive effects of implementing the project). Although survey experiments are extremely useful tools, they are not a panacea for the major challenges to causal inference (Dafoe et al., 2015). This is because manipulation of one feature of the scenario will generally change subjects' beliefs about other features of the scenario (Dafoe et al., 2015).

At the beginning of the experimental survey, we introduced the project published on the crowdsourcing platform www.dobrakrajina.sk called "Community".

The role of the respondents was to evaluate the benefit of establishing of the community centre and the services which the centre provides. Respondents were therefore required to set a prize for the services provided by a community centre. In our contingency scenario, we introduced the community centre as a centre that encourages active citizen participation in public decision-making, helps to formulate and defend their natural interests, creates space for effective co-operation between citizens, self-government and business communities (with a goal of development of such communities) in order to develop communities. We have informed them that from the city's point of view, the main problem is the lack of a leaders and financial resources. At the same time we have highlighted the positives, respectively qualitative changes that could occur in case of support for community development by individuals. We used the CVM (contingent valuation method) using the WTP method to evaluate the benefits. We asked respondents whether they are willing to voluntarily support such community-based projects from their own net monthly income, or whether they are willing to support the type of projects in form of a local fee if the city or municipality chooses to do so, or if they would be willing to pay in case the state would have used a coercion in form of taxes. We then asked them what would be the time interval for which they would be willing to pay and also what total amount would they pay to such a project. In pivotal valuation, we used open survey questions. We tried to investigate how many individuals would be willing to pay to the project, for which we asked a set of auction inquiry questions. At the same time, we asked them about the factors that influenced their decision to support the project or not.

Finally, we asked respondents about the socio-demographic characteristics (gender, age category, the highest achieved education, economic activity, the average net monthly earnings, number of household members, and number of dependent children).

The basic sample, as a set of statistics, in this case, consists of residents of Slovakia who meet the required characteristics. The basic sample is very extensive, as it is comprised of 4,429,608.5 inhabitants; we, therefore, determined the selection sample that comprised of 368 Slovakia citizens. We obtained the selected sample using quota sampling according to the following statistical attributes: gender, age group and educational attainment, whereby its structure corresponds to the basic sample. We translated the obtained data using numerical codes and furthermore statistically processed the data using the following statistical methods

Chi-square test (tests the representativeness of the selected sample),
Spearman correlation coefficient and Cramer's V (verification of dependence of the characteristics of the consumers' gender, age, level of education, the average net monthly earnings, the number of members of the household, number of dependent children).
Multiple response analysis for evaluation the benefits of community centre for individuals.

For evaluation, we used IBM SPSS Statistics 19 statistical software, for testing, we considered the significance level of 0.05.

Results

We set the main research hypothesis in work and in this part we will try to verify it. The main research hypothesis: Individuals are willing to pay to utilities while their willingness to pay is conditional on factors affecting them during their decision-making.

We used the chi-square test to verify the selectivity of the sample in relation to the base file. We found that the selected sample is representative for all sorting characteristics, e. g. gender, age category and the highest achieved education (p-value 0.959; 0.973; 0.559). The results found in the survey can be generalised for all inhabitants of Slovakia.

Table 1: The selected sample for measuring willingness to pay for public goods.

Classification symbol		Selected sample %	Basic sample (%)
Gender	Men	48.91	48.78
	Woman	51.09	51.22
Age group	18-24	10.60	10.34
	25-34	19.29	18.85
	35-44	20.38	19.92
	45-54	16.85	16.26
	55+	32.88	34.63
Education	Elementary	15.49	18.39
	Secondary without final exams	29.35	28.29
	Secondary with final exams	37.50	36.31
	Tertiary	17.66	17.10
Economic activity	Student	8.77	-
	Employee	52.33	-
	Self-employed person	11.78	-
	Parental or family leave	2.47	-
	Age and invalid person	16.99	-
	Unemployed	7.67	-
	Guardian	0.55	-
Net earnings	To € 330	14.44	-
	€ 331 – 500	19.62	-
	€ 501 – 700 EU	22.62	-
	€ 700 – 1,000	15.80	-
	More than € 1,000	9.26	-
	I'm not interested in answering	18.26	-

Source: Results of own experimental survey, 2019, Statistical Office of the SR (2017, 2011).

At the beginning of the experimental survey, we asked respondents whether they have ever visited the community centre. Only 68 respondents of 368 answered positively, meaning they labelled answer “yes”. 48 respondents visited the community centre in consequence of someone's recommendation (for example, parents, friend / girlfriend, priest, and other acquaintances). Respondents most often visit the centre with their friends (48.5% of respondents), alone (29.4%) or with their child / children (11.8%). According to respondents' responses, we compiled the following table (Table 2), which shows the answers to the question "what did you get with this type of facility?".

Table 2: What respondents have obtained by visiting facility of community development?

What have you obtained?	Number of cases	% of respondents, who have chosen the reasons
Friends	29.0	55.9
Knowledge (work with a pc)	15.3	29.4
Skills (creative workshops)	9.9	19.1
Productive leisure time	16.8	32.4
I was not alone	7.6	14.7
Relax	13.0	25.0
I didn’t obtain anything	5.3	10.3
Other	3.1	5.9
Total	**100.0%**	**192.6%**

Source: Data source.

Alternatively, other respondents stated that they had gained knowledge of how such a facility works, who it was designed for, and how it contributes to community development. For individuals who expect more from a service or product (for example, assume that branded products are better) or gain more (e.g., knowledge, friends, skills) we can assume that they value the product and service more. By attributing a higher subjective value, they are willing to pay more for it (Ariely, Kreisler, 2018). On average, respondents who indicated that they had

received nothing were willing to pay € 20 on a voluntary basis, while individuals who did not mark this option were on average willing to pay € 157.47.

In the next part, we will focus on the willingness of individuals to adopt a certain rate of community service charge on community development projects. We noticed that respondents could voluntarily pay if rates of coercion changed. In the first case, the degree of coercion was the lowest. Respondents had to decide whether or not they would voluntarily pay for the services of the community centre in their municipality from their net monthly income. We assumed that if community development facilities exist in the municipality, individuals will act as a free rider, they will use goods they haven't paid for. In this case, there is no risk of a reduction in the utility of the consumption of a good of which the individual is not interested, because his consumption is not mandatory.

In the second case, the degree of coercion was higher. In this case, we asked respondents "Are you willing to support the project of community development in your municipality, if the municipality set a fee for community centre services?". Unlike the first case, it is assumed that an individual consumes only the goods he or she is genuinely interested in, respectively he shows preferences in the consumption of a public good. If he or she is interested in an event or an activity carried out by a community centre, they will have to pay for joining a community centre.

In the last, third, part the level of coercion was the highest. Individuals didn't have the option of avoiding paying for a community centre, because the state as a paternalist ordered individuals to pay to this project a certain amount of funds in the form of an increase in tax burden over a period of 5 years. With this mechanism, the value of an individual utility may fall because of the consumption of a good that individual isn't interested in.

The following table (Table 3) shows the willingness of individuals to voluntarily pay for community centre according to selected mechanism.

Table 3: The rate of acceptance of the charging of public goods

		Voluntarily	Partly voluntarily	Involuntarily
Willingness to pay	Pay	152	172	95
	Not pay	216	196	273
Interval of voluntary payment	Only once	27.63%	25.00%	
	Annually	30.26%	41.86%	
	Semi annually	18.42%	13.37%	
	Monthly	20.39%	18.02%	
	Others	3.29%	1.74%	

Source: Data source.

The results in the table show that the respondents most often chose the annual payment period (118 respondents in total). In the case of the last mechanism, we did not ask respondents how often they would like to pay regularly, because the regularity of the payment was given in the phrasing of the question itself (every month during the 5 years). For each mechanism, we asked respondents how much they are willing to pay for a community development project. The following table (Table 4) contains the basic descriptive statistics for selected mechanisms.

Table 4: Basic descriptive statistics for willingness to pay in €

Mechanism	Description	Average	Median	St. Error	Min	Max	Total
Voluntarily	Free rider	35.85	20.00	62.16	0.10	500.00	5342.00
Partly voluntarily	Utility maximization	**42.02**	15.00	126.66	0.05	1500.00	7228.05
Involuntarily	Forced consumption	41.22	20.00	67.97	0.05	500.00	3915.50

Source: Data source.

Significant correlations were observed between selected mechanisms (Table 5).

Table 5: Dependencies between individual mechanisms

	Voluntarily	Partly voluntarily	Involuntarily
Voluntarily	1.000		
Partly voluntarily	0.796*	1	
Involuntarily	0.617*	0.519*	1

Source: Data source.
Legend: Correlation is significant at the 0.01 level

If an individual decided to pay in the first case, e.g. if his decision was voluntary, it is highly likely that he did so in both the second and the third cases, with a lower voluntary rate with approximately the same payment

amount (p-value 0.000; 0.000; 0.000, rs = 0.763; 0.706; 0.781). The results of an experiment carried out by McCaffery and Baron (2006) confirmed that individuals are more willing to accept a higher rate of tax burden if it is in the form of a larger number of lower taxes, respectively fees, as if the change in tax burden would be in the form of a higher tax (disaggregation bias - McCaffery, Baron, 2006). Among others, individuals are willing to accept so-called. hidden taxes, resp. money in the form of taxes that individuals never saw because they are paid by the employer (levies, personal income tax). For these taxes, individuals do not feel afraid of loss (Kahneman, Tversky, 1979). Similar results were confirmed by our experimental research. If the state decides to increase the tax burden, whether in the form of a larger number of lower taxes or a change in the personal income tax rate, the individual's willingness to voluntarily pay would be higher (€ 41.22) as opposed to situation in which the individuals pay the fee themselves, from their net monthly income, resp. from the money they actually own (€ 35.85).

In an involuntary mechanism (an individual is forced by the state), we asked about the willingness of individuals to voluntarily pay in two ways. In the first way, we gave respondents the choice to choose the sum from the interval that they would pay to a "community development project" each month for the period of five years. In the case of a closed question, 41.5% of respondents inclined to the amount of € 10.01 to € 20. If we recalculated it for a 5 year period, the total amount collected from the respondent would be in the range of € 600.60 to € 1200. In the case of open question, the highest number of respondents (28.82% of respondents) is willing to pay voluntarily to the third interval, which was based on respondents' answers, with a range of € 10.00 to € 19.99. In this case, the respondents were to write the highest amount they were willing to pay to a "community development project" if the state ordered them to do so. Differently specified instructions (in other language) caused a diametrical difference in respondents' answers and their willingness to pay to the "community development project" (Ariely, Kreisler, 2018).

The following table (Table 6) shows the factors affecting the payment amount and the payment interval for each mechanism.

Table 6: The interdependence between the payment mechanism and the factors affecting the amount of the voluntary payment and the payment interval

	The amount of the payment			Interval		
	Factor	**p-value**	**rs**	**Factor**	**p-value**	**r_s**
Voluntarily	Sympathy	0.041	0.167	Empathy	0.035	-0.171
	Persuasion	0.050	0.161	Reciprocity	0.008	**-0.213**
	Persuasion	0.005	0.229	Relationship to the organization	0.040	-0.167
	Tax policy	0.012	-0.204	Feeling irreplaceable	0.017	-0.194
	Compassion	0.003	**0.244**			
	Ego	0.004	**-0.236**	Appreciation	0.049	-0.016
	Respect	0.003	0.140			
Partly voluntarily	The nature of the situation	0.004	-0.159	Feeling irreplaceable	0.003	-0.215
	Fundraising method	0.035	-0.162	Persuasion	0.040	-0.157
	Social rules	0.048	-0.158	Relationship to the organization	0.040	-0.157
	Tax policy	0.023	-0.017	Feeling irreplaceable	0.001	**-0.253**
	Tax policy	0.005	-0.022	Appreciation	0.001	-0.240
	Compassion	0.008	**0.204**			
	Ego	0.042	-0.016	Appreciation	0.020	-0.177
	Informations	0.000	**-0.302**			
Involuntarily	Relationship to the final recipient	0.029	0.224	-		
	Religious duty	0.010	-0.265			
	Reciprocity	0.044	-0.207			
	Tax policy	0.028	-0.226			
	Compassion	0.019	**0.240**			
	Feeling irreplaceable	0.007	-0.122			
	Appreciation	0.037	-0.214			
	Tax policy	0.007	**-0.277**			

Source: Data source.

In case the individuals can voluntarily decide whether or not to pay, there are factors influencing their decision from all groups except the ego group. For example, it is important for an individual to become a part of a certain group of people by contributing, resp. to help those with whom he somehow feels connected and does not need to gain power over them.

If we take a mechanism where the individual's decision is partially voluntary, that is, he can decide whether or not to use the goods, his decision is then affected in addition to a group of factors standard and ego by all groups of factors. This means, for example, that if there are certain activities that an individual has interest in, he does not necessarily need to pay to them, but does so arbitrarily, in his own interest.

In a situation where an individual is forced by a state to pay to an activity in the form of an increase in the tax burden, its decision is only influenced by the factors of the commitment group. Individuals were aware that if they did not meet their obligations to the state, there could incur additional financial costs. Even though the state would force them to pay to the community development project, the project itself and project activities should contribute to increasing the material, immaterial or other benefits for the individual.

If individuals agreed with the statement "only those who can afford it", the amount of their voluntary payment has increased. Conversely, as long as they did not agree with the statement "because I am sorry about others," their voluntary payment was lower. The same impact on the amount of the payment had also the information, e.g. if an individual did not find the activities he could pay to, the amount of his payment has decreased.

Individuals pay more regularly the more successful they are, respectively as long as their payment makes them feel irreplaceable.

Between socio-demographic factors and the willingness of individuals to voluntarily pay there is a dependency between the age category and the good feeling, e.g. for younger individuals, a satisfying feeling of providing a voluntary payment is important, while for older people a better quality and better life for their relatives is more important (p-values 0.050; 0.027; rs = -0.159; 0.180). Higher educated individuals will pay to the project as it solves the current problem, while lower educated individuals choose to pay because "if we don't help ourselves, no one will help us" (p-values 0.023; 0.028; rs = 0.184; -0.178). In a project with a voluntary payment, e.g. without the intervention of a city, municipality or state, it is important for individuals with a higher income whether the project solves the current problem, if it solves it, the willingness of individuals to pay voluntarily is higher (p-value 0.012, rs = 0.204).

As far as a community development interferes with the state, which sets down the regulation that every individual has to pay to a community development project for a period of five years, the topicality of the given problem is also relevant to individuals with higher incomes, while individuals with lower income see this as a systematic approach of the state for addressing the problem (p-value 0.037; 0.037; rs = 0.215; 0.215). In case that there is a number of dependent children it is important whether the act of voluntary pyment will cause an individual to feel good about himself, or the individual recognizes the need to help himself and to improve the lives of his relatives (p-value 0.001; 0.026; 0.016; rs = 0.270; -0.180; 0.184). We used the Spearman correlation coefficient for assessing socio-demographic factors. We used Cramer V for gender and economic activity factors. According to some experiments, women are more socially oriented than men (Einolf, 2011; Kamas et al., 2008; Willer et al., 2013) and therefore realize that the need for community development is a social problem that needs to be addressed (p-value 0.021; Cv = 0.176). The economic activity of the respondents who want a better quality of life for their loved ones influenced voluntary, respectively partly voluntary payment (p-values 0.040, 0.003; Cv = 0.277; 0.321).

The main reason why would individuals not pay to a community development project is that they do not see the reason why they should do the "work" for the state, city or community. In the case of socio-demographic factors, the decision whether the respondents would pay voluntarily or not was influenced by respondents' sex with a statement "I do not pay to such projects. I don't trust them." , respectively "I pay to other projects, activities" (p-values 0.041, 0.023, 0.019, Cv = 0.146, 0.163, 0.142). In particular, economic activity has mostly influenced the reasons stating "I pay to other projects", "I don't pay to such projects because I don't believe them" (p-values 0.026; 0.002; 0.001, Cv = 0.271; 0.276, 0.296). Younger individuals are willing to support the project if it interests them (p-value 0.021; rs = -0.165), while the older ones reported that the reason they did not pay was the fact that they already pay to other projects, activities (p-value 0.014, rs = 0.174). From the perspective of age, important factors for the individuals are the focus of the project, whether they do not already pay to some other projects which are relevant to them, whether they feel the need for community development, the amount of tax burden and the way the financial resources are being redistributed (p-values 0.0421, 0.035, 0.016, 0.007, 0.047, rs = 0.139, 0.144, 0.172, -0.191, 0.121). In the case of the socio-demographic feature – income, the individuals with higher income do not see the reason why should the state order them anything (p-value 0.011, rs = 0.114). For households with fewer members, the credibility of the project itself is important, as well as whether they do not already pay to other projects, activities (p-value 0.019; -0.168, rs = -0.168; -0.133).

Conclusion

The aim of the paper was to examine the factors of willingness to pay voluntarily to services of general interest and to address the question of accepting of the charging for these services in the context of the theoretical basis of the consumer's collective consumption and rationality in neoclassical and behavioral economics.

We assumed that individuals are willing to pay to community services, and their willingness is dependent on factors affecting them during their decision-making.

For the public service, for which we conducted a survey, we set up a community development project. In our case, we introduced three ways in which can individuals voluntarily pay for a community development project. The first mechanism allowed individuals to become free rider, e.g. the individual voluntarily decides whether or not to pay to the project. For the second mechanism, the city or municipality has set a fee for a public goods (a fee-paid goods). An individual will only pay for the goods he wants to consume. The third mechanism was a goods with the forced consumption. In this case, the state ordered individuals to pay to the community development project on a monthly basis for a period of five years. Individuals could only comment on the amount of payment they would be willing to pay for a public goods, public services.

In the paper, we have set a community development project for the public goods where we conducted our experimental research. We found that as long as the community development funding mechanism is set as the goods with a fee, the willingness of individuals to voluntarily pay is the highest (average payment of € 42.02, the number of respondents who decided to pay is 172). While individuals only pay for the goods (activity) they want to actually consume, e.g. they expressed a preference for the consumption of public goods.

The results of the investigation confirmed that there are factors that influence the willingness of individuals to pay voluntarily, respectively to volunteer. Altruistic factors such as affection and sympathy, empathy, conviction, compassion, regret, esteem, egoistic factors such as good feelings, commitment to society, valuation, situational factors such as invitations to participation, fundraising methods, and the economic factor the tax policy are all affecting individuals' willingness to pay voluntarily. These factors have influenced the willingness of individuals to pay voluntarily for almost all the decisions made regarding the willingness to pay voluntarily and the amount of voluntary payment granted.

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The impact of onshore and offshore tax havens on profit shifting: the case of Czech Republic

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Abstract. This paper is focused on the impact analysis of tax haven links on pre-tax profitability of Czech subsidiaries. The main scope is to investigate whether Czech subsidiaries' profit before tax income is affected when there are sister companies placed in onshore and offshore tax haven countries. Our paper researches the sensitivity of pre-tax profits to tax differences between Czech subsidiaries and their sister companies based in tax haven countries. The analysis is based on 50 worldwide tax havens. We expect that the pre-tax income of the Czech subsidiaries to be negatively affected when there are sisters companies based in tax haven countries.

Keywords: profit shifting, onshore tax havens, offshore tax havens, tax differential, corporate income tax.

JEL Classification: H25, H32

Introduction

The mobility and spread of Multinational Enterprises (MNE's) has increased due to globalization. There is an overall perception that the existence of tax havens leads to the erosion of corporate tax base. As a response the overall corporate income tax rates have decreased due to tax competition. Profit shifting issue represents a current topic due to increased globalization and mobility of the capital across the world countries. The MNE's can exploit different tax rules regarding the corporate income tax rates and avoid paying taxes on profits. Our objective is to assess the sensitivity of profits before taxation to different tax regimes in order to identify if profit shifting occurs in case of Czech subsidiaries. We use Ordinary Least Squares (OLS) regression to analyze the pre-tax profits sensitivity of Czech subsidiaries to different tax regimes faced by sister companies placed elsewhere in the world countries including tax havens. The adoption of Hine-Rice model to estimate the sensitivity of pre-tax profits to tax differential seeks to investigate whether Czech subsidiaries report less pre-tax income when their "sisters" companies based in tax havens face a lower corporate income tax (CIT) rate. The contribution of this paper to the literature arises from analyzing the sensitivity of pre-tax income to tax differentials between non-tax haven countries and tax havens. The paper is organized as follows. In the first section we present a short literature review regarding the concept of tax haven, the second section reviews the empirical literature that analyses profit shifting; in the third section we present the data used and the methodology of our empirical analysis; the fourth section presents the results obtained; the fifth section discusses the limitation of the study and the paper ends with concluding remarks.

Literature Review – the concept of tax haven

OECD (1998) defines tax havens as those countries that have zero or low taxes, countries that lack the effective exchange of information, lack of transparency and do not require any substantial economic activities for foreign subsidiaries. Also, OECD (1998) refers to tax havens as those countries that attract capital flows and foreign investment by granting low or no nominal taxation along with other preferential treatment and no administrative constraints. Moreover, because of strict bank secrecy rules, the economic activity of foreign companies is subject to no information exchange. OECD (1998) underline three main channels through which tax havens contribute to base erosion and profit shifting: tax haven represent an ideal location to hold passive investments or "money boxes"; a location to book "paper profits" and enable the bank accounts to be protected from the control of tax authorities from other countries. The literature also uses other labels for tax havens such as preferential tax regimes.

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Harmful preferential tax regimes are oriented in attracting mobile capital and other service activities, especially those economic activities that can be easily shifted in response to tax differentials. Another label for tax havens is the ring fencing regimes or those jurisdictions that grant a preferential treatment exclusively to foreign companies and deny the same treatment for domestic companies. In order to benefit from preferential tax regime in ring fenced jurisdictions, the foreign companies are required to have no access to domestic market.

Beside the already mentioned specifics of tax havens, OECD (1998) adds also additional features taking into account the substantial reductions of tax base due to: failures to adhere to international transfer pricing principles by incorporation different pricing arrangements; adopting a territorial tax system of income by exempting foreign income from taxation; negotiable tax base and secrecy provisions; access to a wide network of tax treaties; territories and jurisdictions that self-promote as tax minimization vehicles and offer purely tax-driven foreign subsidiary establishment.

Dharmapala and Hines (2006) underline that low tax rates are not the exclusive condition for a country to become tax haven and attract foreign investment. The foreign investment in-flow is also influenced by the quality of governance. Tax havens are attractive for foreign investment not only because the higher net-of-tax returns due to low or no-tax policy but also because activities in tax havens can be hidden which enhances tax avoidance practices. Dharmapala and Hines (2006) found that tax havens are small and affluent countries with high-quality governance institutions. These findings are in line with the previous study of Hines (2005) which shows that tax havens had a high and more rapid annual average growth than the rest of world countries. Beside their rapid growth, tax havens tend to have a more robust public finances even if they impose low or no-tax on foreign investment. GAO (2008) uses different sources (e.g., OECD (1998), Dharmapala and Hines (2006)) to list over 50 territories and countries as tax havens. GAO (2008) considers another reason to establish foreign subsidiaries is to avoid US tax system, especially by relocating to low or no-tax countries. GAO (2008) found that 83 out of 100 largest US corporations had subsidiaries in countries listed as tax havens. Four out of those 83 MNE's had more than 100 subsidiaries in tax haven countries. Henry (2012) notes that tax havens or offshore financial centers can be used to hide important amount of money from illicit arms deals, drug trade and corruption payments. The report of Henry (2012) estimate that a significant portion of global private financial wealth (e.g., between 21 and 32 trillion USD), has been invested through more than 80 tax-free offshore secrecy jurisdictions. Henry (2012) also underlines that the existence of offshore secrecy jurisdictions has a negative impact on source countries' tax base, where the global untaxed earning accumulated between 1970 and 2010 amount up to 3.7 trillion USD. Tobin and Walsh (2013) notes that the wide concept of tax haven country refers to those jurisdictions that offer favorable tax regimes to foreign investors. The first and most debated criteria are the low or no corporate income tax regime. The literature points the fact that there is no agreement in defining and establishing tax haven countries. Cobham, Jansky and Meinzer (2015) assess the concept of tax havens and its capacity to objectively include and represent those countries that exhibit a high financial secrecy that supports tax avoidance and tax evasion, money laundering and abuse of market regulations at the cost of other non-haven world countries. The author consider that the term of tax haven is too narrow, outdated and bears a stigmatizing label which needs to be replaced by a more neutral concept, such as offshore financial centers (OFC). Zoromé (2007) defines OFC as a country or a jurisdiction that provides financial services to nonresidents on a disproportionate scale with the size and the financing of its domestic economy. Murphy (2008) proposes another concept as an appropriate replacement for tax haven term – secrecy jurisdiction. This concept refers to the favorable terms granted to nonresident financial and economic activities, by offering high level of secrecy and thus protect them from the reach of tax authorities from other countries.

Cobham, Jansky and Meinzer (2015) argue that tax havens are traditionally associated with low or no tax jurisdictions. However, the authors use the lack of transparency to analyze the ability of tax havens to attract income and profits that arise from economic activities that take place elsewhere (e.g., usually in high-tax countries) and hide relevant financial information from the source countries. The financial transparency analyzed by Cobham, Jansky and Meinzer (2015) focuses on three main policy areas: the relevant information being made public in order to be easily accessed by all stakeholders; access to private financial data allowed to certain authorized authorities and collecting, analyzing and sharing financial data with foreign tax administrations. Cobham, Jansky and Meinzer (2015) found top 10 countries with highest Financial Secrecy Score, such as: Switzerland, Luxembourg, Hong Kong, Cayman Islands, Singapore, USA, Lebanon, Germany, Jersey and Japan.

Omar and Zolkaflil (2015) analyze the profit shifting of 100 MNE's listed on Bursa Malaysia. The authors found that the companies that have subsidiaries based in tax haven countries reported less profits and paid less taxes than the MNE's which do not have links to tax havens.

Jansky and Prats (2015) analyze the profit shifting of 1500 MNE's which operate in India. The authors compare the profits before taxation and taxes paid by companies with and without links to tax havens. Jansky and Prats (2015) found that the MNE's that have links to tax havens tend to report less profits and pay less taxes per unit of asset than their counterparts with no links to tax haven countries. On the same topic Jansky and Kokes (2015)

analyze the impact of MNE's ownership links to tax haven on the base erosion and profit shifting in Czech Republic. The authors found that the MNE's with links to tax haven countries have a higher debt to asset ratio, which indicate profit shifting through strategic use of debt. Jansky and Kokes (2016) analyze the profit shifting through the strategic use of debt by observing the MNE's ownership links with individual tax havens in Europe. The authors find that companies which have links with the Netherlands, Switzerland and Luxembourg show the highest debt ratio, which represents an indirect indication of profit shifting through debt financing.

Gumpert, Hines and Schnitzer (2016) found that an increase by 1% of corporate income tax rate leads to 2.3% increase of likelihood of manufacturing MNE's to establish a tax haven affiliate. Jones and Temouri (2016) assess that the use of tax havens by the MNE's will persist in future as long as there is a significant gap between world countries corporate tax rates. The authors underline that MNE's involved in high-technology manufacture and service sector where high level of intangible assets is present tend to use tax havens to avoid taxation. The issue of tax haven and their contribution to base erosion and profit shifting has been also Zucman (2014) which underlined that 31% of US corporations profits came from six tax havens: Netherlands, Bermuda, Luxembourg, Ireland, Singapore, and Switzerland. The author argues that only 20% of reported profits are repatriated to the USA, while the rest of 80% are kept in tax haven countries and continuously re-invested.

Alvarez-Martinez et al. (2018) estimate the effects and size of base erosion and profit shifting in the EU, USA and Japan through tax haven countries. The authors use a computational general equilibrium model (CGE). Alvarez-Martinez et al. (2018) found that BEPS leads to 36 billion EUR corporate tax losses in the EU each year. The US is losing 100.8 billion USD annually, from which 96.8 billion USD is due to links with tax havens. Japan is losing corporate income tax revenues of 24 billion EUR, from which 23.3 billion EUR are lost due to profit shifting to tax haven countries. Alvarez-Martinez et al. (2018) conclude that profit shifting from the EU countries to tax havens countries amounts up to 27.3 billion EUR annually. From the fiscal point of view the authors conclude that the tax losses due profit shifting are compensated by increase of consumption taxes, which leads to a 0.2% GDP net loss in welfare in the EU and 0.4% GDP net loss in the USA and Japan. Nerudova et al. (2018) found that companies which have links with tax haven countries tend to pay lower tax per unit of profit before taxation in comparison with companies that do not have links to tax haven countries. The authors select companies that operate in 5 individual EU member states (e.g., Spain, UK, Denmark, Cyprus and Germany) and have links to 6 tax haven countries, namely: British Virgin Islands, Panama, Bahamas, Seychelles, Samoa and British Anguilla.

Laffite and Toubal (2018) analyze the impact of tax haven as host countries for the USA owned subsidiaries on the organizational structure and trade of the MNE's. The authors show that the tax haven environment coupled with the lack of transparency and effective exchange of information between the US authorities and tax haven countries are the main determinants of foreign sales platform. The foreign sales platforms based in tax havens tend to shift profits in service industries while subsidiaries established in Switzerland and Ireland are specialized in concentrating the sales in manufacturing sector. Laffite and Toubal (2018) found that profit shifting based on the foreign sales platforms in tax havens amounted up to 83 billion USD for MNE's of USA origin.

Data and Methodology

Data

The empirical analysis is based on firm-level data derived from Orbis database regarding the Czech subsidiaries owned by foreign MNE's. Before analyzing the sensitivity of pre-tax income to tax differential, we impose several restrictions. Firstly we collect the data only for those Czech subsidiaries where least 51% of their shares are controlled by a foreign parent company. Secondly, the Czech subsidiaries should have at least one sister company owned by the same parent and placed elsewhere in the world countries including tax havens. Thirdly, we choose to analyze only the Czech subsidiaries that have reported profit at least one year in the analyzed time period. We exclude the non-profitable Czech subsidiaries or those subsidiaries that have no recent financial data. Taking into consideration these restrictions imposed for our empirical analysis, we were able to build a panel which contains financial data for 4,163 Czech subsidiaries.

In order to analyze the sensitivity of pre-tax income to tax differentials we adopt the list of 50 tax havens suggested by Gravelle (2013). However, our analysis is focused on two different groups of tax havens. Taking into consideration the lack of agreement in the literature regarding the current list of tax havens we use the OECD (1998) criteria and the Financial Secrecy Score by Cobham, Jansky and Meinzer (2015) to build two distinct groups of tax havens on which our empirical analysis will focus. The first group of tax havens is constructed using the OECD (1998) first criteria, namely we select those countries with low or no corporate income tax rate. In this first group we include: Anguilla, Antigua and Barbuda, Aruba, Bahamas, Barbados, British Virgin, Cayman Islands, Dominica, Grenada, Montserrat, Netherlands Antilles, St. Kitts and Nevis, St. Lucia, St. Vincent and Grenadines, Turks and Caicos, U.S. Virgin Islands, Belize, Costa Rica, Panama, Hong Kong, Macau, Singapore, Andorra, Channel Islands (Guernsey and Jersey), Cyprus, Gibraltar, Isle of Ireland, Liechtenstein, San Marino, Maldives,

Mauritius, Seychelles, Bahrain, Jordan, Lebanon, Bermuda, Cook Islands, Marshall Islands, Samoa, Nauru, Niue, Tonga, Vanuatu and Liberia.

The second group of tax havens or countries that bear some of the tax havens features includes: Luxembourg, Malta, Monaco and Switzerland. If we compare the average CIT rates in these four European countries, between 2009-2017, of 28.81% with the average CIT rate in the Czech Republic of only 19.11%, it is obvious that the second group of tax havens does not satisfy the first OECD (1998) criteria. However, these four countries are mentioned in several important studies (Dharmapala and Hines (2006), Zucman (2014) and Gravelle (2013)) due to their high financial secrecy index and also the complex network of tax treaties that these countries offer to foreign investors. The period on which observations are available is between 2009-2017.

The dependent variable used in our model is profit before taxation (Pbt) and the core independent variable is: and the tax differential (difftax). Following the Hines-Rice approach we also include in our model the capital and labor variables as a method to estimate the level of "true" profit. Consequently we use the fixed assets as a representative of capital and number of employees for labor costs. Beside these independent variables we choose to add control variables as GDP per capita (in PPP US Dollars), unemployment and Corruption Perception Index (CPI). The tax differential is constructed as the difference between corporate income tax rate of the subsidiary (i.e. CIT rate in the Czech Republic) and the unweighted average corporate income tax rate of affiliates from the same MNE group (i.e., the average corporate income tax rate of "sister" companies and parent company). We build the tax differential where we use statutory corporate income tax rates.

Table 1. Tax differential summary statistics

Variable	Obs.	Mean	Std. Dev.	Min	Max
Tax differential overall	37467	**-5.04**	5.04	-21.00	20.00
Tax differential offshore	13023	**2.75**	5.12	-16.00	20.00
Tax differential onshore	10071	**-4.04**	4.89	-16.00	1.23
CIT Czech Republic	37467	**19.11**	0.31	19.00	20.00
Average CIT sister companies	37467	**24.15**	5.03	0.00	40.00
Average CIT offshore	13023	**16.36**	5.12	0.00	35.00
Average CIT onshore	10071	**23.15**	4.89	17.77	35.00

Source: Authors' own compilation.

With regard to links to tax havens, we found that 1119 Czech subsidiaries have sister companies in onshore tax havens (i.e., sisters based in Luxembourg, Malta, Monaco and Switzerland) and 1447 Czech subsidiaries have sisters in offshore tax havens.

We construct three different tax differentials based on average CIT rates for each Czech subsidiary: the first tax differential is obtained from the difference between CIT rates in Czech Republic and the average CIT rates of her sister companies placed both in tax haven countries and non-tax haven countries; the second tax differential is based on the difference between CIT rates in Czech Republic and the average CIT rates of sister companies placed both in offshore tax haven countries, using the low or no-tax OECD (1998) criteria; and the third tax differential is obtained from the difference between CIT rates in Czech Republic and the average CIT rates of sister companies placed in onshore tax haven countries (i.e., Luxembourg, Malta, Monaco and Switzerland). Observing the summary statistics in Table no. 1, the tax differential for sisters in offshore tax havens is positive, which means that Czech subsidiaries face a higher CIT than their affiliates from offshore tax havens. On the opposite side, the tax differential between Czech subsidiaries and their sisters based in onshore tax havens is negative, which means that in average Czech subsidiaries are subject to lower CIT than their affiliates in Luxembourg, Malta, Monaco and Switzerland. The overall tax differential is also negative which shows that Czech subsidiaries are in a tax advantageous position compared with their sisters placed elsewhere.

The Econometric Approach

Our empirical analysis is based on the Hines-Rice approach. The model adopted follows the latest improvements of Hines-Rice method, namely the models proposed by Huizinga and Laeven (2008), Dischinger and Riedel (2011), Beer and Loeprick (2015) and Markle (2016). The presence of profit shifting behavior can be indirectly estimated by regressing profits before taxation to the tax differentials between the subsidiaries and affiliates from the same MNE group coupled with other independent variables. The tax incentives to shift profits from subsidiaries hosted in high tax countries to affiliates hosted low-tax jurisdictions can be captured by using tax differentials

while controlling for input factors (i.e., fixed assets and number of employees). The regression equations are as following:

$$logPbt_{i,t} = \beta_0 + \beta_1(difftax_{i,t}) + \beta_2(logfixassets_{i,t}) + \beta_3(logempl_{i,t}) + \beta_4(logGDPpercapita_{i,t}) + \beta_4(logUnemployment_{i,t}) + \beta_4(CPI_{i,t}) + \rho_t + \epsilon_{i,t} \quad (1)$$

In the Eq. 1 the dependent variable is profit before taxation (logPbt) expressed in natural logarithms. The core independent variable is the tax differential (difftax) between Czech subsidiaries and their sister companies from the same MNE group placed in other world countries, using the statutory corporate income tax rates. The logfix and logempl represent the capital and labor proxies for input factors all expressed in natural logarithms. ρ_t represents the time effects and ϵ represents the error term. The subscript i represent the observation for each Czech subsidiary, where i=1…n and t represent time period in yearly observations between 2009 – 2017. $GDPpercapita$ represents the GDP per capita in Czech Republic as a proxy for economic growth, $Unemployment$ represents a control variable that intends to proxy the labor market in Czech Republic and CPI is included as a measure of quality of governance. Besides the tax differential variable and CPI, we transform the dependent and the other independent variables to their natural logarithm equivalents in order to eliminate outliers and obtain stationary time series. When logarithms are used for both dependent and explanatory variables in a regression equation, the obtained estimates can be interpreted as elasticities. Due to the fact that tax differentials are negative, the estimated equation is a log-level regression; therefore the obtained estimates are interpreted as semi-elasticity results.

The tax differential included in Eq. 1 as main independent variable is expected to have a negative impact on pre-tax income. We estimate the Eq. 1 with three different tax differentials: the first model takes into account the tax differential from all sisters (i.e., based non-tax havens and tax havens countries), the second model estimates the impact of tax differential for offshore sister companies and the third model estimates the impact of the tax differential for onshore sister companies and Czech subsidiaries.

Results

Before running the regression equation no. 1 and no. 2, we test the panel data time series for stationarity. We use different unit root tests: the Liu-Lin-Chu test, the Harris-Tzavalis test and Im-Pesaran-Shin. All three tests show that the variables used in panel data analysis do not have a unit root. Moreover, before estimation the proposed Equations no. 1, we run the Hausman test (Hausman, 1978) in order to determine which of the fixed effect or random effects model is more appropriate for our analysis. According to the Hausman test results we were unable to reject the null hypothesis of systematic differences between fixed and random effects model, which means that fixed effects model should be pursued.

Table 2. The OLS estimation of profit before taxation sensitivity to tax differentials

	Model 1 Profit before tax	Model 2 Profit before tax	Model 3 Profit before tax
Tax differential overall	**-0.0249*****		
	(0.00425)		
Tax differential offshore		**-0.0138**	
		(0.00741)	
Tax differential onshore			**-0.0260*****
			(0.00875)
Fixed assets (log)	0.237***	0.198***	0.188***
	(0.00788)	(0.0109)	(0.0120)
Cost with Employees (log)	0.474***	0.556***	0.573***
	(0.0108)	(0.0185)	(0.0216)
GDP per capita (log)	-0.187	0.0938	0.0251
	(0.671)	(0.788)	(0.860)
Unemployment (log)	0.476	0.0104	0.104
	(0.996)	(1.167)	(1.273)
CPI	0.0741	0.0317	0.0394
	(0.101)	(0.119)	(0.130)
N	16270	6619	5345
r2_o	0.567	0.574	0.563

Note: Standard errors in parentheses; * p < 0.05, ** p < 0.01, *** p < 0.001. Source: Authors' calculation.

As showed in Table no. 2, the overall tax differential is statistically significant and represents the semi-elasticity of profits before taxation to tax differential between Czech subsidiaries and their affiliates based in both tax havens and non-tax haven countries. Since the regression between profits before taxation and tax differential is log-level estimation in the Eq. no. 1, the results obtained should be interpreted as a semi-elastic reaction of pre-tax income to tax differential. The interpretation of log-level estimation follows the rule if we change the "Tax differential all" by 1 (unit), we expect our Profit before taxation dependent variable to change by $100 \cdot \beta_1$ percent. Therefore a 1 unit increase in overall tax differential would decrease the pre-tax income reported by Czech subsidiaries by 2.49%. We found that the offshore tax differential is not statistically significant in this context, and the estimate is negative and statistically significant in case of onshore tax differential, where a 1 unit increase of the tax differential would reduce 2.6% the pre-tax profits reported by Czech subsidiaries. The impact of the other independent variables used in Eq. no. 1 should be assessed taking into consideration the log-log regression, where the estimates can be interpreted as elasticities. With respect to the firm-specific input factors, such as capital and labor, we find that both variables are statistically significant and have a positive impact on profits before taxation. Cost with employees has a higher impact on profitability than fixed assets. The difference in estimated impact of fixed assets versus cost with employees on the pre-tax profits shows that Czech subsidiaries are labor intensive and rely less on capital. The control variables GDP per capita, unemployment and CPI are found to be not statistically significant.

Analyzing the size of Czech subsidiaries in terms of Total Assets, we observe that large companies tend to have links to tax haven countries in comparison with small Czech subsidiaries that do not have sister companies placed in tax havens. 50% of the Czech subsidiaries that have Total Assets more than 1,335,956 million EUR tend to have at least one sister placed in onshore or offshore tax haven. Therefore we choose to re-estimate our above mentioned models by restricting the empirical analysis only to large Czech subsidiaries.

Table 3. The OLS estimation of profit before taxation sensitivity to tax differentials for large Czech subsidiaries

	Model 1 Profit before tax	Model 2 Profit before tax	Model 3 Profit before tax
Tax differential overall	**-0.0251*****		
	(0.00694)		
Tax differential offshore		**-0.0432*****	
		(0.0118)	
Tax differential onshore			**-0.0326*****
			(0.0140)
Fixed assets (log)	0.0921***	0.0375**	-0.0116**
	(0.0148)	(0.0249)	(0.0284)
Cost with Employees (log)	0.356***	0.370***	0.414***
	(0.0180)	(0.0383)	(0.0476)
GDP per capita (log)	-1.643	0.701	-0.315
	(1.512)	(2.341)	(2.575)
Unemployment (log)	3.017	-0.0856	1.341
	(2.246)	(3.464)	(3.807)
CPI	0.329	-0.0209	0.132
	(0.229)	(0.355)	(0.390)
N	4957	1220	896
r2_o	0.177	0.158	0.145

Note: Standard errors in parentheses; * p < 0.05, ** p < 0.01, *** p < 0.001. Source: Authors' calculation.

As shown in Table no. 3, we found a higher sensitivity of pre-tax profits to tax differentials in case of large Czech subsidiaries. Model 1 shows a similar reaction of pre-tax income to overall tax differential in line with the first estimation in Table no. 2. However, we found that profits before taxation of large Czech subsidiaries are highly sensitive to tax differential of sisters based in offshore tax havens. A 1 unit change of offshore tax differential would lead to 4.3% decrease of profits before taxation reported by Czech subsidiaries. In a slight lower degree, the pre-tax profits of Czech subsidiaries will decrease by 3.26% if the tax differential to sisters placed in onshore tax havens changes by 1 unit. Even if the CIT rate is lower in the Czech Republic than in onshore tax havens, we still identify profit shifting. This result offers a clue that high statutory CIT rate is not the only reason why profit shifting occurs. Onshore tax havens, such as Luxembourg offers other opportunities to shift profits such as preferential tax treaties which could outweigh the tax differences. The rest of independent variables have the same impact as shown in Table no. 1.

Concluding remarks

The aim of this paper was to estimate the sensitivity of profits before taxation to the tax differential between Czech subsidiaries and unweighted average CIT of the affiliates in the same MNE group and based in other world countries. We use the firm-level data for the Czech subsidiaries that have at least a sister company elsewhere and are owned by a foreign parent company. Taking into account that the profit shifting behavior is incentivized by corporate income tax rate differences between world countries, we run our model to estimate the sensitivity of pre-tax profits to corporate income taxation.

The empirical analysis performed in this paper adopts the Hines-Rice approach. We estimate a semi-elastic model, where the core exogenous factor is the tax differential between Czech subsidiaries and the unweighted average tax rate of sisters companies based in other world countries including tax havens. The overall tax differential shows that Czech subsidiaries will report on average 2.49% less profit if the average tax rate of their sister will decrease. The sensitivity of pre-tax profits reported by Czech subsidiaries is even higher in case of onshore and offshore tax havens tax differentials. The estimates show a high sensitivity of profits before taxation to tax onshore differential, where 1 unit increase in tax differential will lead to 2.6% decrease of pre-tax income. This result can be interpreted as the tax differential decreases, due to decrease of average effective CIT rate faced by sister companies placed in the onshore tax havens countries, the Czech subsidiaries will report less pre-tax income. Moreover, we estimate our model restricting the panel data only for large size Czech subsidiaries in terms of total assets. We found that large Czech subsidiaries are even more sensitive to tax differences faced by their sisters based in onshore and offshore tax havens. The results show that if onshore tax differential changes by 1 unit, the profits before taxation reported by Czech subsidiaries will decrease by 3.26% and respectively when the tax differential of sister companies based in offshore tax havens decreases by 1 unit the pre-tax profits of their Czech counterparts will decrease by 4.32%. The estimates regarding the semi-elasticity of pre-tax profits to tax differential are significantly higher than those obtained by Huizinga and Laeven (2008) or Beer and Loeprick (2015). The large differences can be justified due to the updated data used and also the particular selection of countries analyzed.

The overall results show that the profits before taxation are inversely related to the evolution of tax differentials as expected. Consequently, this negative reaction of pre-tax profits represents a proof of profit shifting. We also identified that the links with tax havens tend to have a negative effect on pre-tax income of the Czech subsidiaries. However, we consider necessary the use of alternative methods to analyze profit shifting behavior for comparative considerations. Instrumental variable model represents an appropriate method to verify and test the robustness of OLS estimates.

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FDI and Base erosion and profit shifting from the Czech Republic

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Abstract.
Structures used by multinational corporations to optimize tax liability by base erosion and profit shifting affect some items of the balance of payments. In this paper, we analyze the relationships of the tax system characteristics (such as effective tax rates) and parameters that make systems vulnerable to aggressive tax planning and outflows of dividends, interest, royalties and payments for consulting services. The results of the econometric analysis for the Czech Republic show that the payment of dividends is not affected by effective corporate tax rates, while interest, royalty and consulting service payments tend to flow to countries with lower effective taxation. FDI and portfolio interest in particular go in the same direction – to countries with high FDI allocated in the Czech Republic.

Keywords: tax planning, FDI, balance of payments, corporate taxation

JEL Classification: H26

Introduction

The balance of payments (BOP) is a monetary transaction statement capturing the relations between two countries' entities. Financial flows recorded in the BOP statistics can indicate the countries in which tax optimization occurs. Tax optimization structures often use passive income such as dividends, interest and royalties as well as advisory fees that may be overpriced or not entirely justified. Strategies pursued by multinational enterprises (MNEs) to optimize total tax liabilities are referred to as aggressive tax planning (ATP).

For ATP structures, a range of tax system parameters along with a framework of international tax rules set by double tax treaties and the EU directives implemented in national tax legislation of the EU member states (e.g. Council Directives 2003/49/EC and 2011/96/EU) are utilized.

The European Commission issued two comparative studies (in 2015 and 2017, respectively) of ATP parameters for the EU countries, addressing ATP structures. In the former study, 33 parameters are identified as indicators allowing MNEs to effectively implement different ATP structures. They are classified by the European Commission as active or passive ones, the lack of anti-abuse ATP indicators representing the third category. Active indicators directly promote ATP structures without any other parameters applied, making tax systems highly appealing for ATP strategies; examples are patent box regimes. Passive indicators themselves would not prompt ATP structures but are used to achieve tax optimization efficiency; an example is no withholding taxes on dividends, interest and royalties. The lack of anti-abuse provisions supports ATP structures by the absence of tax procedures that could hinder the ATP strategy; the absence of controlled foreign corporation (CFC) or thin-capitalization rules is an example (cf. European Commission, 2015, 2017).

Within ATP structures, there are high-tax countries from which taxable profits are shifted to low-tax ones through the so-called conduit countries. Data recorded in the balance of payments indicate the category by high outflows or inflows in the case of the two former countries, respectively, or both the out- and inflows of revenues in the case of conduit countries.

BOP data have been used for extensive research into ATP structures with the focus on foreign direct investment (FDI) – see, e.g. UNCTAD (2015), Desai et al. (2003) and Weyzig (2013) –, analyzing FDI in order to identify and quantify ATP. Clark (2008), on the other hand, examined the impact of corporate tax reforms on FDIs, discussing effective tax rates' implications considered by investors before making practical decisions.

The aim of the present paper is to identify the parameters of tax systems that lead to aggressive tax planning of multinational companies using data from the balance of payments. To define such parameters, we explore the relationship between tax system characteristics and indicators that make systems vulnerable – through ATP – to outflows of dividends, interest, royalties and payments for advisory services.

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Data and methodology

To investigate how certain types of payments recorded in the Czech Republic's BOP serve as identifiers of possible tax optimization structures, we have tested five regression models. Primary research data were extracted from the 2014–2017 balance of payments capturing outflows of dividends (DIVdeb), interest between related parties (INTofFDIdeb), interest on portfolio investments (INTofPORdeb), advisory service payments (SERdeb) and royalties (ROYdeb) flowing from the Czech Republic to other EU member states. These variables allow for the identification of potential optimization structures specified in models 1 (for dividend and interest flows between related parties), 2 (interest payments), 3 (advisory services) and 4 (royalties). For an overview and logic behind of all models, see Table 1; variables are explained in the text below the table.

Table 1: Parameters of ATP transactions and BOP data

No.	Type of ATP strategy	Possible indicator based on BOP data	Indicator of the recipient country	Parameter of international law allowing for such strategy
1	Profit shifting and base erosion through dividends and interest	Outward dividends Interest payment to related persons	for low-tax country - low personal income tax on dividends for conduit country – FDIratio* near 1	Limitation of rights to tax dividends and interest in double tax treaties and/or by the EU Directive
2	Base erosion through cost of interest	Interest payment to unrelated persons	for low-tax country - low EATR**	
3	Base erosion through cost of services	Import of Services	for low-tax country - low EATR	
4	Base erosion through royalties	Charges for the use of intellectual property	for low-tax country - low EATR	Limitation of rights to tax royalties in double tax treaties and/or by an EU directive

* - for an explanation of this indicator, see bellow

** - effective average corporate tax rate for the non-financial sector

Three types of explanatory variables are used. The first one is represented by two control variables (related to non-tax factors that may affect the above-mentioned payment flows), namely

FDIstock – the volume of funds invested by foreign entities in the Czech Republic
GDPtotal – the size of the recipient country's economy expressed in EUR

Another set of variables comprises indicators describing the tax system in the country of the recipient – specifically,
EATR – an effective average corporate tax rate for the non-financial sector; the figures were taken from the European Commission database (2018)
artificial variables P1-P33 that contain information on the lack of some tools for eliminating ATP; these variables were constructed using the data presented in the 2015 European Commission report

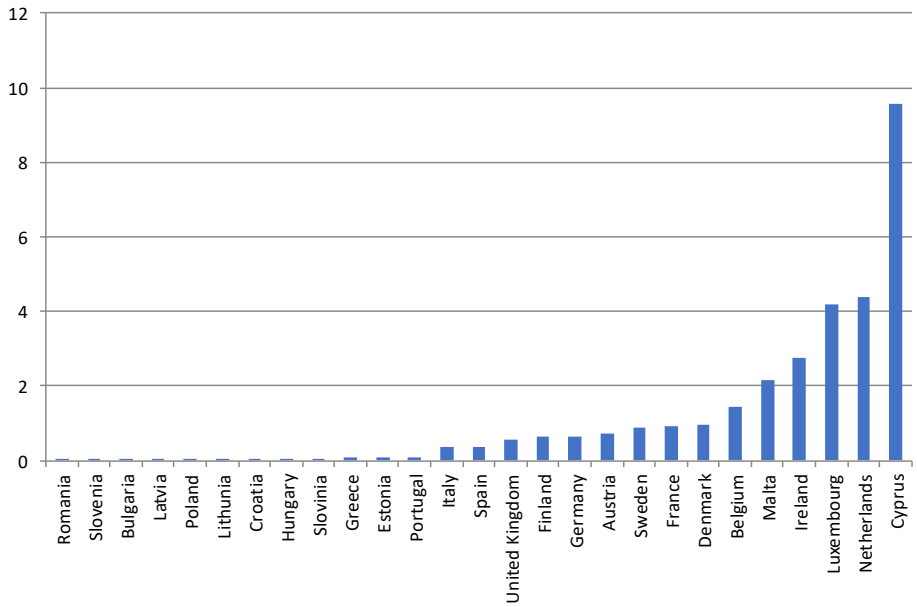
Finally, the third group of variables is represented only by one indicator calculated separately for each EU member state. It is based on the data on FDIs invested by the home country's entities (FDIout) and by foreign-owned ones in the respective country (FDIin). Both values are reported as a share of GDP. The FDI ratio indicator (FDIratio) is calculated as follows

$$FDIratio = \frac{FDIout}{FDIin} * FDIout, \quad (1)$$

This variable allows to distinguish the countries that are predominantly recipients of FDIs, net investors and those that can be used as conduit ones. For conduit countries, the FDI ratio indicator reaches the highest values, FDIout/FDIin oscillating around 1 and the value of FDIout often exceeding 100 percent.

FDIratio functionality is illustrated in Figure 1, ranking the states used in the analysis according to their size. The lowest values are reported by post-communist countries which are net beneficiaries of FDI schemes. Most of the old EU member countries with a significantly positive investment balance are in the middle of the scale. High values are reported by states which are often referred to as conduit ones through which revenues are transferred (e.g. Cyprus and the Netherlands).

Figure 1: EU member states ranked according to FDI ratio



Source: Czech National Bank, 2018; own calculations

We assume that dividend and interest payments between related parties are strongly connected with the volume of FDI but not dependent on the level of the effective average tax rate (EATR) as they are exempt from taxation based on EU directives. On the other hand, interest between non-related parties (portfolio investments), royalties and payments for consultancy services are supposed to flow predominantly to destinations with a lower effective tax rate. For the FDIratio variable, an impact on dividends and interest between related parties is presumed. This would be in line with the assumption of conduit countries.

Balance of payments 2014–2017 data for the Czech Republic are employed (cf. Czech National Bank, 2018). To eliminate annual fluctuations, we averaged the figures before using them in the regression analysis. Data for Estonia, Lithuania and Greece were omitted since negative values of some outflow variable were reported. A total of 24 observations were used. Table 2 displays descriptive statistics of variables.

Table 2: Descriptive statistics of non-binary variables

Variable	Mean value	Median	Minimum	Maximum	Std. dev.
DIVdeb	8 820.840	1 028.910	0.000	75 518.600	16 886.200
INTofFDIdeb	450.369	52.141	-4.577	4 639.900	1 032.430
INTofPORdeb	138.330	1.152	0.000	1738,100	346,420
ROYdeb	685.706	156.059	0.168	5 344.140	1 389.040
SERdeb	1 629.520	517.543	8.981	16 781.700	3 290.370
FDIstock	95 873.200	20 927.800	-27.548	698 158.000	168 196.000
GDPtotal	547 227.000	186 481.000	10 180.100	315 975 000 000.000	838 426.000
EATR	21.178	19.600	9.000	38.300	6.985
FDIratio	1.151	0.376	0.000	9.564	2.072

Source: own calculations

We have estimated five regression models. The results yielded are summarized in Tables 3 and 4 below. The models are presented in reduced form, showing only variables at the 10 percent level of statistical significance. For all the models, a logarithmic transformation was applied, so that the regression coefficients for non-binary variables can have the quantifiable character of elasticities. To eliminate the heteroskedasticity problem, robust standard deviations were used. In accordance with standard procedures defined, for example, in Wooldridge (2012), diagnostic tests (for, e.g. multicollinearity and normality of residuals) were performed, confirming that all the present models are in line with the assumptions.

Table 3: Regression model results for fund outflows from the Czech Republic – dividends and interest from related persons

	l_DIVdeb		l_INTofFDIdeb	
	Coefficient	Standard deviation	Coefficient	Standard deviation
Const	−7.806***	2.035	−2.66***	0.562
l_FDIstock	1.475***	0.176	0.743***	0.059
l_FDIratio	0.459***	0.129	0.248***	0.063
P4[1]	2.328***	0.490		
P29[2]			0.712**	0.280
Adjusted R2	0.91		0.89	

* p < 0.1; ** p < 0.05; *** p < 0.01.

[1] the absence of the beneficial-owner test for the reduction of a withholding tax on dividends

[2] locally incorporated companies are not tax-resident, if they are centrally managed and controlled outside these countries

Source: own calculations

Table 4: Regression model results for fund outflows from the Czech Republic – interest from unrelated persons, consulting services and royalties

	l_INTofPORdeb		l_SERdeb		l_ROYdeb	
	Coefficient	Std. dev.	Coefficient	Std. dev.	Coefficient	Std. dev.
Const	2.092	10.873	−4.928**	1.999	−1.876	2.415
l_FDIstock	1.911***	0.2850	0.528***	0.073	0.588***	0.184
l_GDPtotal			0.803***	0.157	0.812***	0.199
l_EATR	−8.247**	3.655	−1.496***	0.475	−2.950**	1.293
l_FDIratio			−0.133**	0.048		
P24[1]			1.090*	0.523		
P27[2]	4.878**	1.924				
Adjusted R2	0.61		0.86		0.67	

* p < 0.1; ** p < 0.05; *** p < 0.01.

[1] the absence of CFC rules

[2] no rule to counter the mismatch between one's own and foreign country as for the tax qualification of a domestic-based company

Source: own calculations

The results show that the flows of dividends and interest between related parties are not sensitive to the effective tax rate as assumed since the EU directives allow for their exemption from taxation. On the other hand, interest between non-related parties, payments for advisory services and royalties are directed to states with lower effective tax rates, which may be due to the use of optimization models 2, 3 or 4. In all the five models, relationship between FDI and the dependent variable was statistically significant. It is logical for dividend and interest flows between related parties. For other payments (i.e. interest between non-related parties, advisory services and royalties), this might indicate that there is another optimization mechanism involved. For service fees and royalties, the results also imply a significant relation to the economy size of the receiving state, the payments tending to flow to bigger economies.

There are interesting findings as to the FDIratio variable. In the case of dividends and interest between related parties, the volume of payments increases with the rise of the ratio of foreign direct investment, which means that higher payments flow to conduit countries. An opposite effect is observed for consultancy fees, conduit countries attracting the smallest amounts of payments.

Only a few parameters of tax systems approximated as dummy variables appeared as statistically significant. Dividends seem to go to countries with the absence of the beneficial-owner test for the reduction of a withholding tax on dividends (P4). As dividends between parent/daughter companies within the EU are non-taxable, countries which do not apply the beneficial-owner test can be used as conduit ones. This supports the results revealing the relation between dividends and the FDIratio variable.

An increased flow of interest between related parties is reported in countries where locally incorporated companies are not tax-resident, i.e. they are centrally managed and controlled outside these countries (P29), which was actually the case of just one country (Cyprus) within the research period. A similar approach to the tax residency of corporations was adopted in Ireland, where companies managed from overseas were not considered as Irish tax residents. In 2013, however, tax residency regulations were amended; an enterprise started to be taken for a tax resident entity in Ireland if the respective contracting headquarter state did not consider the company as its tax resident. Since 2014, after another change of regulations, all companies incorporated in Ireland have been considered as Irish tax residents.

Interest between unrelated parties variable reflects the fact that there is no rule to counter the mismatch between one's own and foreign country as for the tax qualification of a domestic-based company (P27). This indicator is related to ATP strategies mostly deployed by American multinational groups that apply the check-the-box rule (cf. European Commission, 2015), allowing non-US subsidiaries to be treated as tax-transparent entities, thus not being

taxable under US CFC rules. An EU member state, however, would not consider such a company to be tax transparent. This mismatch could lead to tax avoidance. In the past, this strategy was described in the so-called "Double Irish Dutch Sendwich" (see, e.g. Holtzblat, 2016, Darby, Lemaster, 2007).

For the service fee variable, the absence of CFC regulations (P24) proved statistically significant. Generally, CFC rules concern corporate income of offshore subsidiaries. If such income is not sufficiently taxed, the controlling company arranges for its effective taxation in the country where CFC regulations are in place. The efficiency of these rules is difficult to assess since they differ somewhat between countries. The absence of CFC rules was considered in most of the structures identified by the European Commission together with other tax system parameters. The lack of the rules itself, however, would not be effective for aggressive tax planning. Consultancy service fees directed to countries without CFC rules may indicate a more sophisticated ATP structure, not a specific tax strategy, the present analysis, however, not providing any evidence for the former indication. A more subtle scale of CFC rules' effectiveness – not a dummy one – may raise a challenge to further research.

No rules regulating CFC and countering mismatches of the tax qualification of domestic companies between two states, as well as the absence of a beneficial-owner test for the reduction of a withholding tax on dividends are negative indicators signaling the lack of taxation anti-abuse provisions, specific rules for corporate tax residency representing an active indicator (according to the European Commission 2015 study).

Conclusions

The aim of the present paper was to identify the parameters of tax systems that promote and/or enable ATP and are reflected in the balance of payments data, collected for the purposes of this analysis from the Czech Republic's BOP. Five models have been tested employing dividends, FDI and portfolio investment interest, royalties and advisory service payments as the dependent variables.

The relationship between FDIs and the dependent variable was evident in all models. Interest on portfolio investments, royalties and advisory service fees are apparently directed to countries with a lower effective tax rate.

As for the dummy variables, only four of them proved to be statistically significant, each in a different model. The results meet expectations as the payments go mostly to countries with less control over the taxation of non-residents. Some of the outcomes can be used directly. The country where the payments flow may be considered as a final destination in the tax optimization structure, which applies to special rules for tax residency and their absence in curbing the mismatch of domestic company tax qualification between one's own and foreign country (P29 and P27, respectively). The absence of a beneficial-owner test when imposing a withholding tax on dividends (P4) suggests that the recipient country serves as a conduit one. It is difficult to draw conclusions about consultancy service fees which go to countries lacking CFC rules as they and their efficiency differ a lot between the countries where implemented.

Governments are looking for new ways how to tackle ATP strategies. Currently, they are implementing the EU Anti Tax Avoidance Directive (2016/1164) – requiring them to adopt, among others, CFC rules – and broadening the scope of application of BEPS recommendations (OECD, 2015, 2017).

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Tax tools to stimulate investment activity of Russian enterprises

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Abstract. The article reviews the tools for stimulation the investment activity of Russian enterprises and their effects. It is shown that despite the significant amount of tax incentives in Russia, the tools of direct tax stimulation of the investment activity are used poorly, and the growth of investments in fixed assets of the enterprises in many areas of economic activity is very moderate. At the same time, there is a significant increase in financial investments by the enterprises in the real sector of the Russian economy. The expediency of creating a balanced taxation system for enterprises, organizations of the real and financial sectors of the national economy is justified.

Keywords: tax incentives, investment activity, economic growth, tax preferences, Russia.

JEL Classification: H22, H25.

Introduction

Tax incentives include a set of measures to reduce a tax burden for taxpayers, encouraging them to a certain model of behavior that meets the interests of the state. Such a model for Russia is the innovation and investment model, which is designed to ensure high rates of growth in labor productivity, to promote the outstripping development of certain sectors of the national economy. As one of the instruments for its implementation in the Russian Federation, tax incentives are widely used both at the federal and regional levels. World experience suggests that tax incentive is a very controversial tool for tax regulation of investment activities. The practice of their use is characterized by a high degree of uncertainty. Among negative consequences, in particular, are the following: a decrease in the neutrality of the tax system (Maiburov, 2012); tax base erosion, which limits the possibility of reducing tax rates (Minarik, 2009); the difficulty of monitoring the targeted use of tax incentives (Klemm, 2009); the departure from making market decisions in the field of investment activity (Holland and Vann, 1998); the emergence of a variety of tax evasion schemes (Easson and Zolt, 2002); shifting the tax burden from some categories of taxpayers to other categories (Malinina, 2010).

Evaluation of the effectiveness of tax incentives for investment activity of organizations was undertaken in the second half of the twentieth century. One of the first authors who devoted a study to this problem was R. Hall and D. Jorgenson, 1967. They showed a positive impact of the tax incentives in 1954-1962 to accelerate the growth of the investment volume in the United States. Theoretical studies in this field were actively developed by other authors (Tobin, 1969; Eisner, 1970; Hayashi, 1982 and others).

Analysis of the actual results of the use of tax incentives led to ambiguous conclusions. Macroeconomic assessments of changes in investment activity indicated both a connection with the tax changes and their absence (see: Djankov et al, 2010; Hassett and Newmark, 2008). In the following decades, microeconomic studies of tax incentives for promotion of investment activity of organizations continued actively (see in review: Hanlon and Heitzman, 2010).

The study of the effects of using various methods of tax incentives for promotion of investment in fixed assets was a theme of E.Orn's study (2018). He correlated the incentives related to accelerated depreciation of fixed assets and lower corporate tax rates in the United States in certain areas of their business. He concluded that both investment promotion tools provide comparable performance.

In the twenty-first century, the analysis of tax incentives is complemented by an assessment of their perception by the business community (L'vova et al, 2017), taking into account the national specifics (Lvova et al, 2016) and specific economic conditions (Ivanov, 2016). In particular, J. Jolie et al (2015) and co-authors conducted a survey among top managers of the companies in the United States, with and without the right to use tax benefits, regarding

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the preferences for the tools for stimulation of the investment activity and creation of the jobs. Most executives in both groups expressed a preference for lowering the corporate tax rate, rather than receiving tax concessions. At the same time, it should be noted that only a third of the heads of the companies that had the right to use an investment tax benefit were aware of it.

The study of investment behavior of small and large businesses representatives (Zwick and Mahon, 2017; Mayoral and Segura, 2017) showed a difference of views on tax incentives for increasing investment activity. The sectoral features of the impact of tax incentives on the investment activity of companies were also studied (Auerbach and Hines, 1988*)*. The mentioned studies on the impact of tax incentives on the investment activity of an enterprise have shown a different directions of the use of the funds released from the provision of tax incentives depending on the stage of the organization's life cycle (Ivanov et al, 2018). Enterprises are interested in increasing investment activity as long as their capital productivity increases. In the future, their interest is to maintain an acceptable level of capital intensity. The need for appropriate sources of financing investment activity both to reach the desired level of capital intensity and to maintain it varies significantly, depending both on the general state of the economy and on the stage of the organization's life cycle.

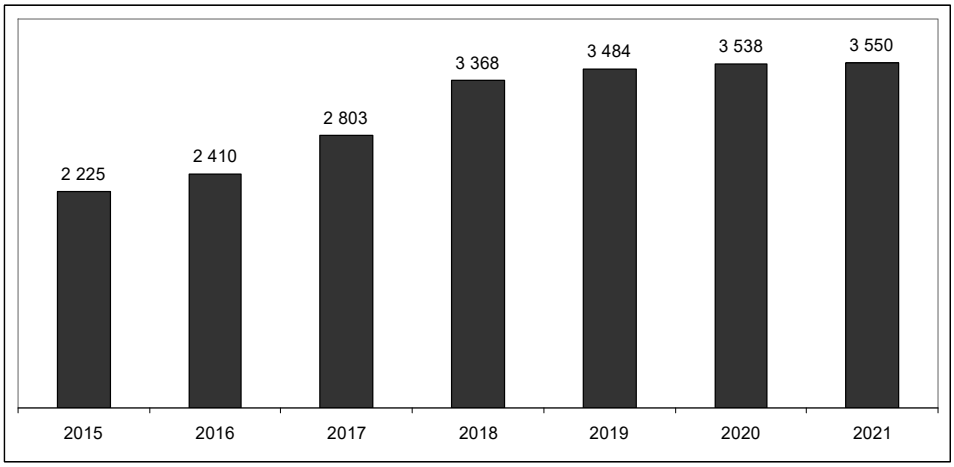
The research purpose is to answer the question: how effective are the tax instruments used today to stimulate investment activity of Russian enterprises? The research methodology implies the characterization of the main instruments of tax incentives for investment activity of a business in Russia and the scope of their use. The second stage of the study is to assess the investment activity of Russian business by industry, determine the factors that stimulate investment activity, and identify the importance of tax instruments among these factors.

Tax tools to stimulate Russian business investment activity

The Russian practice of tax incentives for investment activity of enterprises indicates the priority of tax incentives in comparison with other tools s in the mechanisms for encouraging investment activities of the enterprises.

As follows from the data shown in Fig. 1, in the years 2019-2021 an annual growth of tax expenses of the federal budget is planned, and the overwhelming part of it consists of tax benefits. The main volumes of tax benefits are provided to the enterprises of the real sector of the national economy. Its share in the total tax expenses of the Federal budget in 2015-2018 accounted for about 83%.

Figure 1: Tax expenses of the federal budget in Russia in 2015-2021, billion rubles.



Source: The main directions of the budget, tax and customs tariff policy of Russia for 2019 and the planned period of 2020 and 2021. URL: https://www.minfin.ru/ru/statistics/docs/budpol_taxpol/

Tax incentives that are directly aimed at encouraging investment by Russian businesses in non-current assets have ambiguous consequences. As part of the depreciation policy aimed at creating incentives for increasing capital investments in fixed assets, tax legislation since 2006 has granted the right to apply a depreciation bonus. The depreciation bonus means the possibility of assigning the cost of the purchase of fixed assets in the amount of 30% of their value to the expenses of a current tax period (for property with a useful life of less than 3 years and more than 20 years - 10%) before a depreciation accrual. Since 2009, the approach to depreciation accrual for tax purposes has been conceptually revised. For taxation purposes, in addition to the linear depreciation method, the possibility has arisen of abandoning the unit-by-unit depreciation and the transition to a depreciation accrual by the diminishing balance method for enlarged depreciation groups (pools). When applying a non-linear method of calculating depreciation, up to 50 percent of the original value of depreciable property can be expensed in the first quarter of its useful life. The advantages of the non-linear depreciation method are the promotion of the use of

assets that have a long service life; simplicity of depreciation accrual and control of its correctness, which leads to a significant reduction in costs for the implementation of the tax legislation. When combining the non-linear method of calculating depreciation and depreciation bonus, the taxpayers became able to recognize the most of the value of fixed assets as expenses. Taxpayers retain the right to choose between the linear and non-linear method for calculating depreciation and weather to apply or not the depreciation bonus, whereby a very small number of the Russian companies use this right. In table 1 1. It is shown that the number of the taxpayers using the non-linear method of calculating depreciation is less than 0.5% of all the companies that pay the corporate tax and accrue depreciation. The number of companies applying the depreciation bonus is 6 times higher, but their share is less than 10% of all the companies that accrue depreciation. Thus, the depreciation policy tools for accelerating the transfer of property value to expenses for the tax purposes in Russia have found little by the Russian companies.

Table 1: The scale of application of the non-linear method of depreciation and depreciation bonus in Russia

Indicator	2015	2016	2017	2018
The number of taxpayers who use the linear method of depreciation accrual	375 030	352 135	347 465	324 914
The number of taxpayers who use the non-linear method of depreciation accrual	1 975	2 119	1 621	1 606
The amount of depreciation accrued by the linear method	4 439 037	4 673 127	4 948 342	3 913 504
The amount of depreciation accrued by the nonlinear method	192 064	188 305	177 374	138 368
The number of taxpayers who applied the "depreciation bonus"	11 379	10 668	9 478	10 798
Amount of "depreciation bonus"	559 475	691 666	845 296	1 293 861

Source: author's calculations based on official data of the Federal Tax Service of the Russian Federation.

An investment tax deduction has become a new measure to stimulate the expansion of corporate investment programs at the regional level since 2018. Investment tax deduction is a right to reduce the estimated amount of a corporate tax by the amount of expenses associated with the acquisition or modernization of fixed assets. Such a tax deduction is provided by the decision of the subject of the Russian Federation on the principle of "two keys" based on the economic and budgetary feasibility of providing appropriate benefits for the purchase or modernization of fixed assets and intangible assets with a useful life of 3 to 20 years. The size of the deduction is up to 100% of the object's value: 10% due to the share of the tax paid to the federal budget; up to 90% due to the regional part of the corporate tax (with this, the tax that goes into the regional budget after applying the deduction cannot be less than 5% of a tax base). Thus, co-financing of investment expenditures from the state in the year of the investment is provided; tax legislation at the federal level does not impose any restrictions on the transfer of a deduction that was not debited for the subsequent years. At the same time, the realization of the right to provide an investment deduction means that it is impossible to apply a depreciation bonus or depreciation accrual.

The investment tax deduction declared at the federal level in 2018 was implemented only in the Republic of Karelia, in 2019 it was introduced in nine more regions of the federation (Table 2). In the regions involving the use of investment tax deduction, the list of activities types and the nature of investment for the application of the deduction are rather severely limited.

Table 2: Investment tax deduction when calculating corporate tax in subjects of the Russian Federation

Regions of Russia	Deduction amount, share of investment expenses	The minimum tax rate on profits to the regional budget after deduction	The number of periods of transfer deduction
Republic of Karelia	50%	8,5%	no restrictions
Amur Region	90%	5%	no restrictions
Vologda Region	50%	5%	5 years
Jewish Autonomous Region	20% (fixed assets) 50% (intangible assets)	10%	no restrictions
Kaluga Region	90%	10%	3 years
Sakhalin Region	50%	8,5%	no restrictions
Sverdlovsk Region	90%	5%	3 years
Udmurtian Republic	90%	5%	no restrictions
Khanty-Mansi Autonomous Area – Yugra	45%	10%	no restrictions

Yamal-Nenets Autonomous Area	90%	10%	no restrictions
Reference: federal legislation	До 90%	5%	no restrictions

Source: made by authors on the Tax Code of the Russian Federation and regional legislation.

In most regions, the conditions for granting investment tax deduction are stricter than those provided at the federal level - in terms of the size of the deduction, and in terms of the minimum corporate tax rate to the regional budget, and other parameters. The effectiveness of these measures can be assesed in the future.

Investment activity of Russian enterprises

The growth of general tax incentives and, accordingly, an increase in enterprises' own funds have little effect on their investment activity. In 2014-2017 the growth of investments was mainly observed in the field of mining, in agriculture (in current prices, growth was 45.8% and 31.4%, respectively). The growth of investments in the manufacturing industry as a whole, in social organizations in the period indicated above did not exceed the level of inflation, or decreased. The volume of investments in the field of "manufacturing" for the period indicated above increased in current prices by 15.1%, while in the production of machinery and equipment, investments decreased from 61.7 to 47.6 billion rubles. Investment growth was observed mainly in the industries with a high level of profitability (see Table. 3).

These statistics raise doubts about the effectiveness of the tax incentives as a tool to stimulate the investment activity of enterprises.

Table 3: Composition and structure of investments in fixed assets of organizations and financial investments not classified as small business entities

Indicator	Investments in fixed assets, billion rubles		Financial investments, billion rubles		Return on sales,%		Return on assets,%	
Year	2014	2017	2014	2017	2014	2017	2014	2017
Total	9 853	12 256	78 604	165 669	8,6	8,1	3,9	6,4
Agriculture	304	400	374	815	18,4	16,8	5,7	6,8
Mining, incl.	2 014	2 937	5 965,8	13 095	22,2	27,2	14,6	10,0
- extraction of fuel and energy minerals	1 841	1 987	4 826	6 726	20,7	23,8	15,6	8,1
Manufacturing industries, of which:	1 749	2 015	14 466	22 632	10,7	10,5	2,3	6,6
- manufacture of machinery and equipment	62	45	330	485	6,8	7,4	1,3	5,2
- chemical production	228	396	1 178	1 235	22,4	24,5	0,6	13,8
- metallurgical production	201	329	1 970	4 244	18,7	22,1	4,8	14,9

Source: author’s calculations based on official data of the Federal State Statistics Service of the Russian Federation.

Volumes of investments in the corporate sector of the Russian economy during 2014-2017 did not exceed the amount of the depreciation accrued. At the same time, if investments in fixed assets in 2017 amounted to 12,026 billion rubles, including at the expense of the own funds - 6,268 billion rubles, then financial investments reached approximately 165.7 trillion. rubles, of which only 18.6 trillion. rub. were the long-term investments.

It is characteristic that the largest volumes of financial investments by Russian organizations are currently made on bank deposits, which corresponds to a neo-continental type of national financial system. In 2017, the share of such investments was 39%, in the first half of 2018 having increased to 45.9%. Comparable share in 2017 accounted for investments in equity interests, shares, other forms of participation in capital, debt securities and certificates of deposit - 38.2%, but in the first half of 2018 the share of these investments decreased to 27.1%. The loans provided by organizations had a significant share (15.6% and 19.4%, respectively).

Thus, a significant part of the profits of the corporate sector companies not used for investments in their fixed assets, but is redistributed to other economic entities, primarily banks. Moreover, the free balance of net profit after the payment of dividends in 2017 amounted to 6.4 trillion rubles, which exceeds the volume of investments in the corporate sector made at the expense of own funds, which amounted to 6,268 billion rubles.

The current situation with the use of free financial resources in the corporate sector of the Russian economy is due to many factors, among which priority is given to investment returns.

If we consider the profitability of the goods sold in the Russian economy as a whole over the period from 2014 to 2018, it decreased from 8.6% to 8.1%, respectively. This means that financial attractiveness of investments in a significant part of the enterprises of the real sector of the economy is extremely low (it differs slightly from the size of the key rate set by the Central Bank of the Russian Federation in 2018). In the current situation, an increase in financial investments by the enterprises of the corporate sector is quite natural, since the financial resources of a business are shifting to those areas in which they can bring greater profit.

In general, from 2014 to 2018 the return on sales is very differentiated by particular types of economic activity. If in the fuel and energy complex in 2017, it was 23.8%, in the production of machinery and equipment - 7.4% (see table. 3). High growth rates of investments in the field of mining and minerals are accompanied by an increase in the profitability of the goods sold (from 22.2% in 2014 they grew to 27.2% in 2018). However, another feature of the investment growth in this area should be noted. It is related to the fact that the return on assets decreased from 14.6% in 2014 to 10.0% in 2018. This may be an indication of the need to change the composition and structure of fixed assets in this area. Otherwise, the growth rate of investment will decrease due to the fall in capital productivity. The presence of such a trend is indirectly indicated by a significant increase in financial investments, which for the above period amounted to 19% and led to an increase in the share of financial investments in this sector of the national economy in their total volume from 7.6% to 7.9%.

We note, however, that the reasons for the unattractiveness of real investment in Russia are not limited to low return on investment. Despite the fact that the main part of organizations' financial investments go to bank deposits, their weighted average rates are relatively low (in 2017 they did not exceed 6.5% for short-term bank deposits and 7.84% for long-term deposits), ceding to an average level of profitability of the goods sold (works, services). Thus, the primal significant factor of low investment activity of the Russian enterprises is unfavorable economic expectations, which affect the investment behavior of the enterprises. In the face of the deteriorating external situation, the companies do not seek to develop business.

One of the priorities for increasing the investment activity of enterprises in the literature is given to the lowering of a tax burden on business (see, for example, Sokolov, 2018). It should be noted that the tax burden on business in the Russian Federation is comparable to the tax burden of many developed countries. For example, according to the calculations of the World Bank in 2014, the level of the tax burden on business in the Russian Federation was 47.5% of the GDP. In Germany - 48.9%, in France - 62.6%, in the USA - 43.8% of GDP (Paying Taxes).

According to the information from the Minister of Finance of the Russian Federation A. Siluanov, presented at the Gaidar Forum in 2018, the tax burden during 2007-2017 varied significantly. If in 2007 it amounted to 36.5% of the GDP, in 2009 - 30.9%, in 2014 - 34.7%, in 2017 it decreased to 30.8% of the GDP .

Such significant differences in assessments of the tax burden on business are related to the difference in approaches to its calculation, in particular, the tax burden of the RF Ministry of Finance is defined as the ratio of the total tax revenues of the state budget to the % of the GDP. At the same time, non-tax payments (liabilities), for example, customs duty, are not taken into account in these calculations.

When analyzing the impact of the tax burden on a business, it is important to take into account its differentiation by types of economic activity. Table 4 shows the information on the average industry tax burden and the load of insurance premiums for certain types of activities.

Table 4. Average tax burden by type of activity in 2017

Type of activity	Tax burden,%	Burden of social contribution, %
Total	10,8	3,6
Agriculture	3,5	5,4
Mining, incl.	36,7	1,8
- extraction of fuel and energy minerals	45,4	1,0
Manufacturing industries, of which:	8,2	2,2
- manufacture of machinery and equipment	4,4	2,4
- chemical production	8,8	3,9
- metallurgical production	1,9	2,4

Source: data of the Federal Tax Service of the Russian Federation.

These data indicate that among the factors affecting the profitability indicators, the tax burden is not decisive. Even with a very low level of tax burden in the manufacturing sector, there is a low profitability of goods (works, services) sold and there is practically no growth in investments in fixed assets along with significant financial

inflows. The burden of insurance premiums that employers transfer to non-budgetary funds is worth of individual consideration. For many businesses, this burden is very significant. In particular, in the production of machinery and equipment in 2018, it accounted for 44.3% of its own tax burden. According to the Minister of Finance of the Russian Federation A. Siluanov, high rates of the insurance premiums to extrabudgetary funds amounting to 30% of the wage fund are one of the main reasons for the presence of a large-scale "shadow" sector in the Russian economy.

In our opinion, the reduction of insurance premium rates to extra-budgetary funds should be carried out as quickly as possible, while focusing on the average rates for OECD countries. However, this is unlikely to fundamentally solve the problem of reducing the level of the shadow economy in Russia to the average indicators of the shadow economy in the OECD countries. Along with the decrease in the insurance premium rates, it is important to create conditions under which "cashing" of the enterprises' financial resources will be economically unprofitable for them.

In our opinion, it is advisable to replace the income tax with a tax on expenses for ordinary activities (expenses included in the cost of goods produced, works, services, commercial, administrative expenses) and other expenses taken into account when calculating profits excluding labor costs, taxes, insurance premiums and other payments to budgets, accrued depreciation, included in the cost of production. The rates of the proposed tax should be differentiated depending on the type of activity.

The experience of Estonia, which excluded the income tax from the tax system of the country, showed that after its cancellation, the number of unprofitable enterprises in the country significantly decreased (Funke and Strulik, 2006) due to a decrease in the interest of the business in manipulating the calculations of income. The issues of the correctness of the incomes calculation in this case are transferred primarily to the sphere of interests of the owners.

Reducing insurance premium rates transfered to non-budgetary funds will require finding additional sources to replenish non-budgetary funds. At the same time, it is important that the tools of the replenishment of these budgets do not hinder the solution of the tasks of restoring the economic growth in the country.

Conclusions

The Russian policy on investment activity stimulation through the tax incentives for enterprises and organizations is primarily associated with the use of tax benefits, other tax preferences, charges, customs duties; direct financial support for the development of individual industries and fields of activity, for example, the support for agriculture, assistance to mortgage lending. The research showed that the results of applying tax instruments to stimulate investment activity of Russian business are ambiguous. On the one hand, many tax incentive instruments (such as depreciation policies) are poorly demanded by Russian companies. On the other hand, there are more significant factors (compared to tax ones) affecting investment activity by industry. At the same time, in order to compensate for revenue falling from tax benefits, the tax burden on businesses and individuals is increased. This leads to an increase in inflation, which the Bank of Russia is trying to deal with by increasing the key rate. This policy does not correspond to the restoration of economic growth in the country, the growth of investment activity of the enterprises. The search for specific mechanisms of taxation for transactions in financial instruments is an essential prerequisite for further research in order to create a balanced tax system for the real and financial sectors of the national economy.

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Sources of local budget revenue in Russia: local taxes versus shared taxes

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Abstract. The study is devoted to the characteristic of fiscal federalism at the local budgets level in Russia. The article analyzes an importance for local budgets in Russia of the tax revenues transferred by the decisions of the federal and regional authorities. On the grounds of the statistical data analysis on the local budgets performance, it is shown that the decline since 2012 in the share of personal income tax assigned to municipalities at the federal level has significantly increased the role of the tax revenues transferred to the budgets of municipalities by the authorities of the regions. It was concluded that active regulation of the local budgets by regional authorities through the redistribution of tax revenues, does not always result in a reduction of significance for the municipalities of grants.

Keywords: local budget, local tax, tax sharing, Russia.

JEL Classification: H71, H24

Introduction

The two main directions in the study of fiscal federalism is the definition of the criteria for the division of taxes by the budget system levels and the characteristic of taxing powers of subnational governments according to the budget revenues. The aim of the paper is assessment of the prospects for the development of the local finance in Russia based on a study of the tax revenues ratio transferred at the federal level, as well as the policies of regional authorities to regulate the revenue of municipalities, the causes and consequences of the choice of regulatory instruments by the authorities of the subjects of the federation. The best local taxes criteria have been studied since the 18th century (see Salina, 2010). In accordance with the generalized principles of tax distribution in a federal state, local authorities should have the power to impose a tax base that is 1) the least mobile (Oates, 1999), 2) evenly distributed (Bahl and Bird, 2008), and 3) resistant to economic cycles (Musgrave, 1983). User fees as implementation of the benefit principle (Salina, 2011) are applicable at an appropriate level (including local); the authority to regulate graduated taxes and taxes having a stabilization function should be assigned to the federal authorities. However, theoretical views do not always correspond to the practice (Ivanova & Polyakova, 2016) of tax distribution across the levels of the budget system both in historical dynamics (McLure, 2000) and in comparison of the experience of developed, developing countries, and countries with transitional economies (Broadway and Shah, 2009; Bird and Vaillancourt, 2006). In the framework of the Organization for Economic Cooperation and Development, since the 1960s, information has been accumulated on the structure of the local budgets revenues of the participating countries (Blöchliger and Rabesona, 2009; Blöchliger et al., 2009; Blöchliger and Campos, 2011), which allows for temporal and intercountry comparisons (Pokrovskaia, 2014). Undertaken in accordance with the original methodology a detailed description of the degree of tax autonomy of the various government levels of the participating countries for 1999, 2003 and 2005, 2011, which was investigated from the point of view of financial independence of subnational authorities, tax competition, fiscal policy and ratio of taxes with high tax autonomy and tax sharing (Blöchliger and Petzold, 2009) in times of crisis, is very interesting.

According to the tax autonomy assessment methodology, all sources of tax revenues of subnational budgets are divided into 5 groups. First group with highest tax autonomy includes tax proceeds if subnational governments set the tax rate and any tax reliefs without needing to consult a higher level government (a1) or after consulting a higher level government (a2). Tax proceeds in second group are those, for which subnational governments set the tax rate, and a higher level government does not set upper or lower limits on the rate chosen (b1) and does sets upper and/or lower limits on the rate chosen (b2). Limited tax autonomy in third group suggest that subnational governments set tax reliefs – but it sets tax allowances only (c1), tax credits only (c2), both tax allowances and tax credits (c3). Most divisions include fourth group tax sharing. There is a tax-sharing arrangement in which subnational governments determine the revenue split (d1), the revenue split can be changed only with the consent of subnational governments (d2), the revenue split is determined in legislation, and where it may be changed unilaterally by a higher level government, but less frequently than once a year (d3) and the revenue split is determined annually by a higher level government (d4). Fifth group consist of other tax proceeds. The instruments for regulating revenues of the local budgets are granting of broad tax powers to local governments; granting of authority within the limits imposed by the higher levels of government; tax sharing in the absence of tax authority; transfer

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of tax proceeds in the form of grants. In the first three cases, tax revenues arise that are credited to the budgets of municipalities as a result of decisions of local authorities, federal and regional authorities. Grants (the gratuitous inflows) from the higher-level budgets are also represented by a redistribution of tax revenues, but their source is not necessarily linked to the territory to whose budget they are transferred, and as a result the benefit principle from public services may be violated at the local level. In most states, the priority of regulating inter-budget relations belongs to a center, which determines the sources of tax revenues at regional and local levels. The powers of regional authorities to allocate financial resources in favor of municipalities cause the parallel existence of various methods and instruments of regulation in particular territories of the state. The correlation between the spheres of regulation of local budget revenues by federal and regional authorities, as well as the instruments chosen for that, predetermine financial sources and powers of local self-government. Sources of local budget revenues in countries with two levels of subnational budgets differ between OECD (main source of local budgets is local taxes) and Russia (main source of local budgets is shared taxes) – see Table 1.

Table 1: Taxing power of local governments in 2014

	As share of sub-central tax revenues				
Local budgets in	Discretion on rates and reliefs	Discretion on rates	Tax sharing arrangements	Rates and reliefs set by local governments	Other
Australia	100,0	0,0	0,0	0,0	0,0
Austria	9,7	15,1	0,0	64,7	10,4
Belgium	8,2	91,5	0,0	0,3	0,0
Canada	1,6	95,6	0,0	1,1	1,7
Italy	28,1	71,0	0,0	0,9	0,0
Spain	30,0	51,0	18,0	0,8	0,2
Germany	0,0	56,0	42,5	0,0	1,4
Switzerland	2,5	97,5	0,0	0,0	0,0
Russian Federation	0	22,58	77,42	0,0	0

Source: [OECD].

Currently, tax revenues of local budgets of Russia are more regulated by federal and regional authorities than generated by local taxes (Table 2).

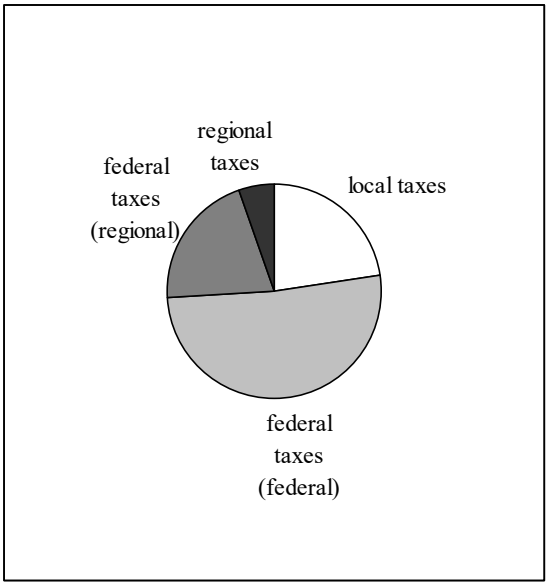
Table 2: Revenue structure of the consolidated local budget of Russia

Year	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**
Grants	59%	61%	62%	61%	64%	64%	64%	64%
Tax Revenues	31%	29%	30%	31%	27%	28%	29%	29%
1. Local taxes	7%	6%	7%	7%	7%	7%	7%	7%
2. Tax sharing by federal authorities	16%	15%	11%	11%	8%	9%	9%	9%
3. Tax sharing by regional authorities	8%	8%	12%	13%	12%	12%	13%	13%
including								
3.1. Federal taxes	6,4%	6,3%	11%	11,5%	10,5%	10,5%	10,9%	10,7%
3.1.1. Personal income tax	5,7%	5,5%	10,7%	11,1%	9,5%	9,4%	9,6%	9,6%
3.1.2. Corporate profit tax	0,7%	0,7%	0,3%	0,3%	0,3%	0,3%	0,2%	0,2%
3.2. Regional taxes	1,6%	1,7%	1%	1,5%	1,2%	1,4%	1,5%	1,8%
3.2.1. Simplified tax system	0,7%	0,7%	0,7%	1,2%	0,9%	1,0%	1,1%	1,4%
3.2.2 Corporate Property Tax	0,5%	0,5%	0,1%	0,2%	0,1%	0,1%	0,1%	0,1%

Source: author's calculations based [Federal Treasury of Russia].

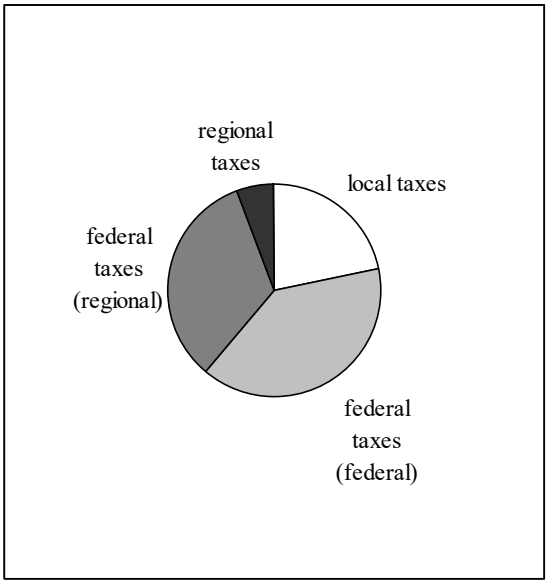
In 2010's in local budgets of Russia tax revenues are dominated by proceeds from federal, but the decision of tax sharing is transferred from federal to regional government (fig. 1 and 2).

Figure 1: Local taxes, federal taxes as result of tax sharing by federal and regional government, regional taxes as result of tax sharing by regional government the consolidated local budget of Russia in 2010



Source: author's calculations

Figure 2: Local taxes, federal taxes as result of tax sharing by federal and regional government, regional taxes as result of tax sharing by regional government the consolidated local budget of Russia in 2017



Source: author's calculations

Regulation of tax revenues of local budgets of Russia by the federal authorities

At the federal level, revenue is regulated at all levels of the budgetary system, primarily through the distribution of tax establishing powers. From this point of view, local taxes are also a source of revenue generation for municipal budgets as a result of the federal authorities' decisions. Currently, not only the land tax and individual property tax directly mentioned as such in the Tax Code of the Russian Federation can be attributed to the local taxes, but also a tax on imputed income, the proceeds of which from 2011 are fully credited to the local budget (from 2005, local budgets credited 90% of the revenues from the tax on imputed income, and the remaining 10% went to the budgets of extra budgetary funds), and local authorities were given a power (within the limits) to determine the base for the tax. The local taxes do not play an important role for municipal revenues - they form about 6-7% of the total revenues and 20-26% of the local budgets tax revenues. Within the framework of the centralized tax system of Russia, the harmonization of tax interests of all levels of government includes the division of not only tax powers, but also of tax revenues.

In the course of the formation of the Russian model of fiscal federalism, priority was given to the regulation of intergovernmental relations between the center and the regional budgets. In the first half of the 1990s the subjects of the federation themselves largely determined their rights and powers, which were fixed in separate agreements between them and the federal center. The local authorities were granted the greatest tax powers in modern Russian history and their revenues were regulated mainly at the regional level. The tax legislation since 1992 assumed a closed list of local taxes. However, since 1994, the regional and local authorities have received unlimited tax powers on their territory. For the regions, this provision has been abolished since 1997, and municipalities were asked to take similar decisions. It was one of the most complicated periods in the development of the tax system of the Russian Federation. Its analysis is complicated by the absence or scarcity of data on the taxes imposed and their significance. Attempts to compile information on local taxes in various municipalities were made from time to time. Taking into account the fact that the procedure of legal taxation was not formally observed in all cases, even the task of unambiguously and exhaustively forming a list of local taxes introduced at that time is very difficult to implement. Maximum tax autonomy of the local authorities in the mid-1990s had little effect on local budget revenues, including due to the significant size of the shadow economy. More than half of the tax revenues of municipal budgets were the revenues from taxes transferred by decisions of regional and federal authorities (Freinkman and Yossifov, 1999). Until 1997, a policy of the regions of securing part of their revenue for municipalities was not regulated at the federal level, but most of the tax revenues of local budgets were shaped

precisely by the taxes transferred by regional authorities (including personal income tax, corporate profit tax, value added tax, excises, payments for the use of the natural resources).

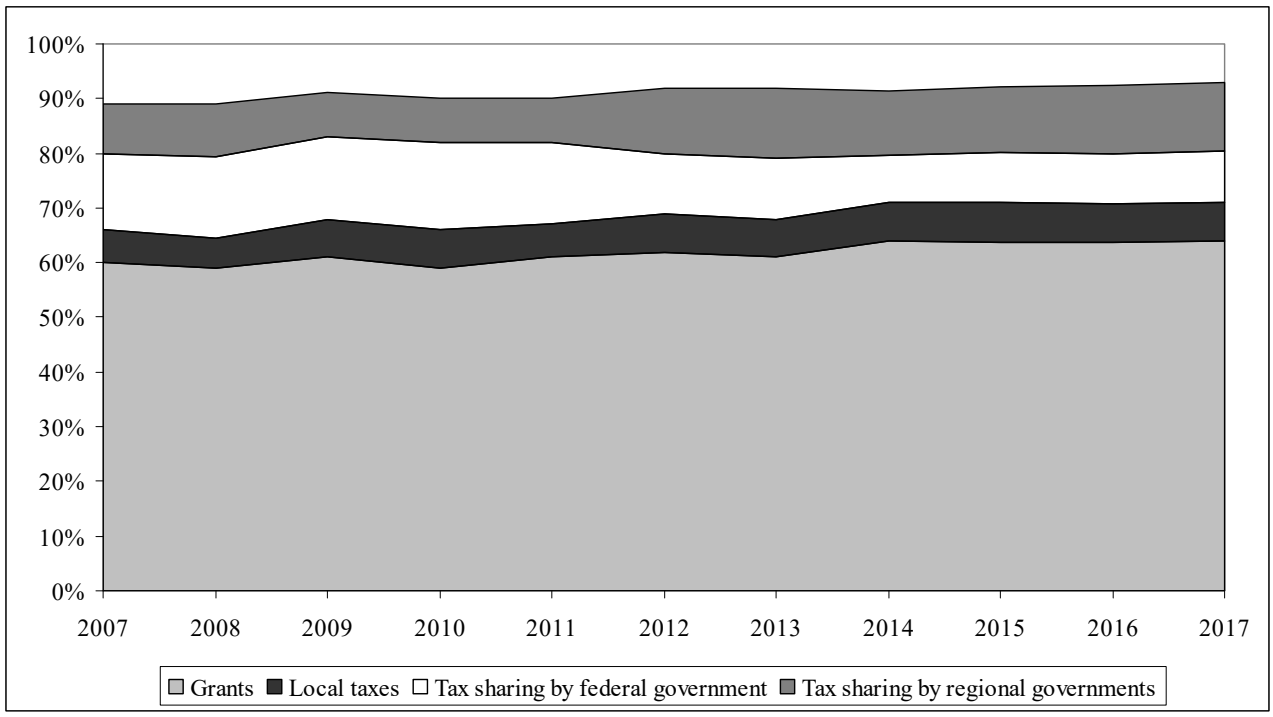
The federal authorities' regulation of the policy of the regions on the transfer of part of tax revenues to municipalities began in 1997. Starting from the 2000s the expansion of autonomy in the field of fiscal policy was implemented in favor of the regional, but not the local authorities (Ivanov, 2010). As a result of a series of tax and budget reforms of the late 1990s-early 2000s taxing powers of the local authorities have been significantly reduced; grants have become the basis for regulating the local budget revenue. In 1998, the regional authorities were granted the right to impose a sales tax, 60% of the revenues from which were assigned to the budgets of the municipalities. The introduction of the sales tax in a subject of the federation abolished sixteen of the twenty-three local taxes. The tax reform of the late 1990s, expressed in the adoption of the Tax Code, with its obvious overall positive impact on the Russian tax system, significantly reduced the tax powers of local authorities. The first chapter of the Tax Code, adopted in 1998, established five local taxes - a tax on property of individuals, land tax, inheritance or gift tax, advertising tax, local licensing fees.

The modern procedure for the formation of revenues of the local budgets has been established by law since 2005. The number of local taxes in the Tax Code has been reduced to two: land tax and corporate property tax; the rights of local authorities on tax on imputed income were expanded and the mandatory transfer of part of the corporate profit tax to local budgets was abolished (Ivanov et al., 2016). The Budget Code assigned to the municipalities on a permanent basis 30% of the personal income tax and 60% of the unified agricultural tax. Since 2011, the share of the unified agricultural tax has been increased to 70%, from next year there has been a gradual reduction in the share of personal income tax provided by the federal authorities, credited to the local budgets (to 20% from 2012 and to 15% from 2014). Since 2013, 100% of the revenues from the patent taxation system, designed to replace the tax on imputed income, has been transferred to the municipalities.

To assess the reflection of these reforms in the revenues of the local budgets, the structure of revenues of the consolidated budget of the subject of the federation, regional and consolidated local budget of the subject of the federation from 2007 to 2017 were analyzed according to the Federal Treasury of the Russian Federation. The consolidated local budget of the federation subject comprised the budgets of urban districts, municipal districts, urban and rural settlements; as well as the budgets of urban districts and budgets of intercity districts from 2016. Thus, tax revenues were analyzed in the sub-federal budgets in 81 regions of the Russian Federation.

In 2007-2011 according to the Federal Treasury of the Russian Federation, the main part of the tax revenues of the consolidated local budgets of the federation subjects was formed at the expense of the taxes fixed at the federal level, primarily (more than 90%) - of the personal income tax. During this period, the taxes transferred by the federal authorities prevailed in the tax revenues of the consolidated local budgets in more than seventy out of eighty-one subjects.

Figure 3: Revenues of the consolidated local budget of Russia in 2007-2017



Source: author's calculations based on [Federal Treasury of Russia].

Since 2012, after the reduction of the share of personal income tax, guaranteed to local budgets, the ratio between tax transfers has changed. In 2012-2017 tax revenues, distributed by regional authorities, prevail in a whole analyzed consolidated local budget of the state, as well as in the consolidated budgets of more than fifty subjects of the federation.

Uneven economic development of the regions, which generates inequalities in the economic and tax potentials of the territories, limits the ability to regulate the revenue of municipalities by introducing uniform for the whole of Russia standards for transferring of a part of tax revenues and implies a further redistribution of tax revenues at the federal subjects' level.

Regulation of tax revenues of local budgets of Russia by the regional authorities

From 2005 to 2010, the federal government's tax administration system for local budgets revenues remained unchanged, but the regional policy for regulating municipal revenues was subject to regular changes, through trial and error in the changing economic conditions of the financial crisis, the regions selected the most effective tools for local budgets formation.

Stable prevalence in the revenue of municipalities of grants eloquently testifies that the tax transfers did not become a main way to regulate the local level budgets. Among the latter, the revenues from federal taxes, the most fiscally significant in the Russian tax system, are leading. Since the abolition of compulsory crediting of a part of the corporate profit tax to the local budgets, sharing of this tax by regional authorities significantly decreased (there was a decrease both in the number of subjects of the federation that sent part of this tax to municipalities from forty in 2005 to four in 2013 (Table 3) and the assigned taxes share), which is reflected in the revenues of local budgets in the respective regions. The largest share of the tax revenues redistributed by the decisions of regional authorities, as in the case of corresponding proceeds, as a result of decisions of the federal authorities, is ensured by the personal income tax.

In 2017, in all the regions included in the analysis, the municipal budgets sent a share of the personal income tax and the single agricultural tax exceeding the value fixed at the federal level. When crediting in the local budgets of not less than 15% of the revenues from the personal income tax in 2017 in accordance with art. 56 of the Budget Codex of the Russian Federation, the share actually transferred were 32% on average (the corresponding share as a result of decisions of the regional authorities amounted to an average of 17% of the revenues to the consolidated budget of the subject (Table 3)). In twenty-three regions, the total share of the personal income tax transferred to the local level was from 25% to 30%, in forty-four - from 30% to 35%, in ten - from 35% to 40%, in four - over 40%.

Table 3: Tax revenues in the consolidated local budgets of regions in 2017

	The number of regions (from 81), pcs.	**Transmitted share of tax proceeds, average**	**Tax revenues in the revenues of the consolidated local budget of region, average**
Personal Income tax	81	17%	9,8%
Excise taxes	81	7%	0,1%
Single agricultural tax	81	29%	0,1%
Simplified taxation system	40	51%	2,3%
Mineral Extraction Tax	15	62%	0,3%
Corporate Property Tax	11	27%	2%
Tax on gambling	5	90%	0,004%
Transport tax	6	43%	1%
Corporate profit tax	4	7%	0,2%
Fees for the use of wildlife objects	4	88%	0,001%

Source: author's calculations based on [Federal Treasury of Russia].

The second most important for revenue (among the tax transfers of the regional authorities) was the tax levied under the simplified tax system. It is indicative that the scale of the assignment of a part of this tax substantially exceeds the corresponding scale of the corporate tax.

It is noteworthy that although in the theory of fiscal federalism, it is property taxes that are recognized as the most suitable for the local level (see Kireenko at al., 2018), the corporate property tax is sent to the local budgets only in eleven regions of the federation (with the largest share of 50% in the Altai and Karachay-Cherkessia republics), the transport tax in six regions of the federation. It is necessary to admit the relatively high fiscal significance of the transferred regional property taxes.

Despite the fact that in seven out of fifteen regions of the federation 90% of the revenues from the mineral extraction tax are transferred to the municipalities, they do not play a significant role in their revenue.

An analysis of the regional policy effects on securing a part of tax revenues for local budgets showed that an active redistribution of tax revenues (Table 4) is not always accompanied by a reduction in the share of gratuitous receipts in the revenues of the local budgets. The greatest significance of tax revenues in the local budgets (the leaders in this respect are the Nenets Autonomous District, Primorsky Krai and the Republic of Tatarstan) is observed precisely in the regions that do not transfer the revenues from additional taxes to the local level. And vice versa - in the Altai Republic, despite the full transfer to the municipal budgets of the tax under the simplified taxation system, mineral extraction tax, charges for using the wildlife objects and half of the property tax revenues - grants constitute more than 78% of the revenues.

Table 4: Tax revenues in the consolidated local budgets of regions in 2017

	The number of regions (from 81), pcs.	**The average value of the consolidated local budgets of regions**	
		Share of tax proceeds	**Share of grants**
No taxes transferred	28	62,5%	30,1%
1 transferred tax	32	66,9%	27,0%
2 transferred taxes	11	63,7%	29,3%
3 transferred taxes	9	65,4%	28,7%
4 transferred taxes	1	78,7%	21,3%

Note: The transfer of the tax revenues (full or partial) by the regional authorities to the municipalities is shown (a share of the personal income tax besides a federal one, single agricultural tax, excise duties, tax on imputed income, patent system tax).

Source: author's calculations based on [Federal Treasury of Russia].

Conclusions

In local budgets of Russia tax revenues are dominated by proceeds from federal, but the decision of tax sharing is transferred from federal to regional government. In 2007-2011 the main part of the tax revenues of the consolidated local budgets was formed as tax sharing by federal government. Since 2012 tax sharing by regional authorities, prevail in consolidated local budget of Russia. Despite the possibility of redistribution in favor of local budgets of the revenues from more than ten taxes, the revenues from the personal income tax remain the most significant for the Russian municipalities. In this regard, a reduction in the share of tax transferred at the federal level (twice from 2014 as compared with 2005-2011) can cause a significant reduction in the tax revenues of the local budgets, which is unlikely to be compensated by the increasing personal property tax revenues. Thus, compared with the OECD federal states, the municipalities in Russia have the least tax authority. The tendency of the last decade is to reduce the share of tax revenues in local budgets, to shift the focus from uniform federal tax standards to the local level, to build individual relationships between local and regional budgets. This reduces the scale of financial management of local budgets, the ability of local budgets to influence their revenues by developing the territory, creating favorable conditions for business and population.

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Searching for Ethical Issues Related to EU ETS System

Ladislav Rozenský* - Jan Lípa**

Abstract. With theme EU ETS, far beyond the economic and environmental spheres, social and ethical specificities are linked. In addressing the problem of reducing greenhouse gas production, we encounter the problem of negative externalities, which in this case is associated with ethical issues of greenhouse gas emissions by issuers, towards residents who suffer from the negative effects of this externality. Another aim is to consider the possibility and the way of payments to the owners of the forest and the land for non-production function. This work attempts to identify this problem more closely. As a result, a more equitable distribution of the income flowing from the emission allowance market among residents, for example in the form of a public good, is proposed. This redistribution of income can remove social injustice and mitigate the effects of negative externalities. Indirect payments in the form of subsidies to a public good would eliminate the problem of fair calculation and distribution of direct payments.

Keywords: ethics, emission allowances, innovation, negative externalities

JEL Classification: E65

Introduction

The aim of this article is to address some ethical issues that are associated with the EU ETS emission allowance system and to propose appropriate solutions to reduce social injustice resulting from the negative externalities that the EU ETS seeks to eliminate. Within the chosen goal, the authors have put two research questions. For 1st, what is the ideal model of payments for non-production function of forest and natural biotope and for 2nd, what is a suitable model of compensation for the inhabitants, for a degraded environment. The idea of setting limits and trading in pollution allowances was developed by the economist in the 1960 s., (Barnes, 2008a: 31). The system establishes a maximum allowable pollution limit that is transformed into allowances. Permits consist of the right to issue a certain amount of pollutant, then distributed or sold to designated economic entities, and in the context of reciprocal transactions between economic operators, reallocation may take place on a market principle.

The New Zealand Emissions Trading Scheme (ETS) was created on similar principles as the EU ETS, with the aim of later linking it with the European system. Unlike the EU ETS, however, the New Zealand model also includes support for forestry and farmland owners, with a view to managing carbon sequestration in biomass and further preserving it. It can be predicted that the European ETS model could be further developed in this direction. In particular, after the effectiveness of EP and Council Regulation 2018/841 - LULUCF measures, which already require the landowners to report carbon sequestration, they do not yet reward and stimulate this non-productive function. The European Commission's July 2016 proposal seeks to balance the incentives for carbon capture into soil and forests and the need to reduce emissions in other sectors. If an EU Member State repels the forest, the resulting emissions must compensate for the resulting emissions by planting new forests or by improving the sustainable management of existing forests, farmland and pastures. The revision of Directive 2003/87 / EC assumes that at least 50% of auction proceeds are subsequently used for climate protection policy. The remaining 50% should be used to offset the adverse social and economic impacts of the implementation of the climate and energy package. Among the social and economic impacts, it is necessary to include also the influence of the so-called negative externality, namely the deterioration of the environment by the greenhouse gas emitters to the inhabitants of the given territory. This negative effect, in accordance with the economic theory of negative externalities, provides an advantage to polluters - producers of greenhouse gases and damages the inhabitants. The issue of the ethical nature of such conduct is inextricably linked to this problem. The Emissions Trading System itself is designed to eliminate the impact of this negative externalities. To remedy this unethical behavior and to mitigate the effects of negative externalities, it is also necessary to think about a more equitable redistribution of the profit arising from the sale of emission allowances among the inhabitants of the region. This can be done directly - by paying to the inhabitants of a particular region or by investing in a public good that provides free service and those through innovation.

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Methodology and overview of contemporary knowledge

This chapter details the article-making methodology and includes searches of relevant scientific papers published on the subject in respected sources.

Methodology

As has already been said, the contribution will also address the economic theory and trading systems of emissions trading. Relevant data from official and respected sources were gathered for these purposes. Based on economic theories, future developments will be predicted and some appropriate measures will be proposed for the Czech Republic. The work will include illustrative tables and charts, created by most author articles based on data from respected sources. As a statistical discipline, comparative analysis of data is used in the article. In the paper are used and further theoretically developed researches from respected scientific works that deal with this topic. Given that the main objective of the article is to address some ethical issues related to the EU ETS system, it is necessary to study the system, quantify the actual state of exhalations over the past period in the Czech Republic and suggest possible measures to reduce the social injustice associated with it. There are a number of methodologies to evaluate forest ecosystem services (D'Amato et al., 2016; Ninan, Inoue, 2013; Hansen, Malmaeus, 2016). As far as carbon bonding is concerned, this service is valued on the basis of physical units and own carbon or CO2 valuation. It is also possible to use the market price of emission allowances under the European Emissions Trading Scheme (Šišák 2013).

Overview of contemporary knowledge

Many studies, for example Laing et al., (2014), Hintermann et al. (2016), Muûls et al. (2016) analyzed emission reductions, evolution of allowance prices, and impacts on the economic performance, competitiveness and innovation. The main ETS supporter is for example Mansur (2013), who states that in relation to tax, the ETS can increase prosperity on the market with imperfect competition. Moreover, based on his model of strategic and competitive behavior of traders on the Central Atlantic Market, he notes that when regulators charge tax instead of allowance, the loss caused by deadweight costs in imperfect competition is higher. The emissions allowance price has varied considerably over years (Segura et al., 2018). Brink et al. (2016) point, in particular, to the current emission allowance market price, which is relatively far from the projected price of 20 euros in 2020 and thus does not seem to meet the desired effect. Mason and Plantinga (2013) then tackles the most cost-effective way to compensate for carbon sequestration and recommend individual double-party contracts prior to flat-rate compensation to forest owners, which burden governments with excessive costs. The possibilities of coincidence of carbon binding in forest stands and the ways of its reporting are then dealt with by Gren and Carlsson (2013). Determining the right prices in the public sphere with negative externalities is dealt with by Cao at al., (2018), while Mostert at al., (2017) investigate the minimization of negative externalities in the public sector. Due to the positive and negative externalities of innovation, Batabyal and Nijkamp (2014) are involved. Directly ethical issues associated with the phenomenon of negative externalities are dealt with in Wood and Sullivan (2015), and Elias at al., (2015) addresses ethical behavior, market and social morality.

Results

Greenhouse gases do not only cause environmental problems but also a number of social problems. The relationship between the producer of greenhouse gases, society and the citizens of the given territory is part of the economic problem - Negative externalities. The economic impact of negative externalities, is gaining an advantage in production and causing a burden on society by environmental degradation, largely solves the financial penalty of polluters with emission allowances and the system of environmental taxes. However, this problem also involves an ethical problem. The question of the ethics of environmental pollution, the aim of profit and also the compensation of the inhabitants for this disadvantage in the given region. And the way to compensate for this negative externalities is currently a very topical issue. It should be remembered that the constant pressure on economic growth and GDP growth is precisely the main factor that affects growing production and its associated environmental problems. Future developments must be geared to investing in environmentally friendly technologies and innovations. In its new directive (EU, 2018), the European Union is working with carbon sequestration in the forests of private owners. The model may be the New Zealand NZ ETS (New Zealand Emission Trade System), which directly stimulates forest owners to carbon payments in forest stands (NZ, 2015). Examples of direct payments to forest owners for ecosystem services are also known from published case studies. This is the case, for example, in some EU countries (Sweden, Finland, Germany), Switzerland or Georgia. These are examples of payments by forest owners for ecosystem services.

Carbon sequestration payments - the New Zealand model

The application of greenhouse gas sequestration payments is being used as an economic tool for air protection in New Zealand, (ICAP, 2018). This model of payments to forest owners is basically another form of payment for an off-farm forest function, (Verhagen at all., 2018). Currently, following the introduction of the European Council and Parliament Regulation 2018/841 (EU, 2018), this is a very topical issue. The European Union, through this regulation, and the introduction of a Land Use, Land Use and Forestry (LULUCF) land use, a greenhouse gas sequestration framework for 2030 will include greenhouse gas sequestration, EU Terminology of Carbon Drops into the EU's Official Strategy, 2018/841 (EU, 2018). The EU Regulation provides for further binding action by Member States in post-Kyoto protocols, in line with the Paris Agreement. As has been said, the strategy outlines carbon sinks (sequestration) into the greenhouse gas reduction strategy. However, it deals in particular with the way of reporting and reporting this off-farm function of forest and land, and does not address the mode of positive incentives (payments) for forest and land owners (EU, 2018). The New Zealand Emissions Trading Scheme (NZ ETS), which has been in force since 2008 and now has a ten-year tradition, is seen as highly inspiring in this area (Manley and Maclaren, 2012). The ETS of the ETS is currently in the so-called transitional period (until 2019) when the ½ system ends, allowing the issuers to release two tons of CO2 equivalent per one emission permits. The model is set, just like the EU ETS, in relation to one emission allowance / 1 tonne of CO2 equivalent. From 2019 onwards, no free allowances will be allocated to the issuers after the transition period, and the obligation to purchase the necessary emission allowances is fully established, (ICAP, 2018). This measure is in line with the Kyoto Protocols and the Paris Convention to reduce global GHG emissions in 2030 by 30% compared to 2005 and by 50% in 2050 compared to 1990. It is quite interesting that the total emissions of New Zealand amounted to 2015 80.2 Mt CO2e (million tonnes CO2 equivalent) and the agriculture sector, which also includes the forestry sector, contributes 38.4 Mt CO2 e to these emissions, which is almost 50%. Forestry has been incorporated into the ETS NZ since the very beginning, ie since 2008, (ICAP, 2018). The current carbon price is NZD 21.10, which is approximately USD 15.47 (exchange rate as of 30 September 2018) and the NZ ETS currently covers 52% of all CO2 production in the country. At the start of the system, forest owners who owned the forest before 1990 were granted a one-off subsidy to offset the impact of NZETS. The allowance market (auction) has been in place since 2012, with the exception of forestry. The system was originally designed to be homogeneous with the world carbon market, With the EU ETS, but due to the diversity of the system, it can not be traded on international markets since 2015. At present, forest owners receive 1 t CO2 of 1 emission allowance for sequestration, which they can trade on the market. It is meant the long-term bonding of carbon in the wood mass and the exploitation of the forest for which the support was granted, the owner is obliged to return the allocated allowances, respectively. Their financial equivalent. If the owner of the forest from the NZ ETS project will come out, he has to return all received emission allowances. For registered forest owners, since 2013, it is also an obligation that, within the system, seeks to preserve at least the current size of forest land, for a deforested forest to plant a new forest, anywhere in the territory of New Zealand. For one year, until 6/2017, 9.5 million allowances were allocated to the forest owners, valued at approximately US $ 147 million, which is relatively significant in the ETS NTA system (ICAP, 2018). The New Zealand NZ ETS system is the closest to the EU ETS system, especially after the introduction of the LULUCF agenda in the EU, which already calculates carbon sequestration. The New Zealand model is in the forefront and in a rather sophisticated way, in addition to the carbon balance reporting, the carbon sequestration rewards, as explained in the previous text. The general pattern of carbon change in wood is defined as follows:

$$CS_{change} = \Sigma ({}_{tiding} CS) - \Sigma ({}_{free} CS)$$

where:

CS change is the carbon stock change for the carbon account area in the payback period

Tiding CS is the carbon stock in each subarea in carbon accounting at the end of the period of return on emissions

Free CS the amount of carbon in each sub-area within the carbon billing area at the start of the Emission Return Period

Payments for forest ecosystem function

This subchapter deals with some payment systems for forest ecosystem function on specific examples. These types of payments have been chosen as another option for supporting carbon sequestration. This is not about direct payments for genuine sequestration of carbon, as it is for the ETS NTA system, but to support forest cultivation, like economic activity, alike as in the REDD + program described above. It should be remembered that by paying for the ecosystem function of the forest the owners of forest land are stimulated to preserve and expand their area and creditworthiness and is indirectly supported by sequestration of forest carbon as an integral part of the ecosystem function of the forest.

In the literature, there is no formal definition of payment for forest ecosystem function. However, the criteria that define it are relatively simple.

- This is a voluntary transaction where the required ecosystem service is clearly defined.
- There is at least one buyer of ecosystem services.
- There is at least one provider of ecosystem services.
- Conditional service provision (Wunder, 2005).

The payment system for the ecosystem function of the forest should create an incentive to provide such a service. In general, there are two basic approaches. The first approach is direct payment to preserve or improve ecosystem services. The second approach is a payment to support the conservation of ecosystem services in cases where the service is threatened or support prevents land use change that could have negative impacts. (EU Commission, 2016).

According to these criteria, payments for forest ecosystem function can be divided into three basic schemes (Schomers & Matzdorf, 2013, Matzdorf et al., 2013):

- Government-funded public programs - the addressee is another government, non-governmental or non-governmental an international organization acting on behalf of users of ecosystem services.
- Private systems that are funded by the user (addressees are real users of ecosystem services).
- Public-Private Systems (Hybrids), (EU Commission, 2016).

In the next part we present concrete cases of European countries that apply some form of payment for forest ecosystem function. For this case study, four countries of the European region and Armenia, as the only representative of the Transcaucasian region, were selected at the border between Europe and Asia. Of the European countries, two Nordic countries - Finland and Sweden - whose environmental policy is traditionally very progressive, are represented in the case study. Two other countries - Germany and Switzerland are German-speaking countries of European space and neighboring, economically-cooperating states.

Forest biodiversity program METSO (Finland)

The METSO Forest Biodiversity Program (2008-2025) aims to halt the continued decline in biodiversity of forest habitats and species and to create stable favorable trends in the recovery of biodiversity in forest ecosystems in southern Finland. The aim of the program is to ensure that Finnish forests continue to provide suitable habitat for endangered species in a given habitat. The METSO program is focused on both private and state land. This is a joint project of the Ministries of Environment, Agriculture and Forestry, the Finnish Institute for the Environment and the Tapio Forest Development Center. This METSO pilot program aims to protect forest land in southern Finland. It was launched in 2002. New voluntary protective measures have been introduced for private small landowners, for a fixed period, in order to create a private protected area and under the control of the state. Criteria for selected locations are elaborated and standardized in detail. Conservation contracts are either permanent or temporary, with a validity period 10-20 years. Landowners receive financial compensation for the preservation of areas and a duty free compensation for permanent protection. Compensation is based only on "occasional costs". This means that the amount of the payment is determined by the loss of income from wood. Places are selected based on exact characteristics (habitat type, natural value of business opportunity, etc.). The eligibility of the site for damages must always be discussed between the owner of the land and area management. Biological criteria for inclusion in the program are defined by an independent working group (Working Group on Biological Criteria for Forest Protection in Southern Finland), (EU Commission, 2016).

Drinking water forest resource (Germany)

Already since 2008, Bionade is the first German company, which acts as a partner in the field of sustainable water protection and the expansion of drinking water. The company needed high-quality drinking water to produce its organic non-alcoholic snack. In cooperation with Trinkwasserwald, 11 forest plots for potable water were set up for the production of Bionado. Plots covered more than 63 hectares of land. Bionade Corporation has covered most of the cost of conversion of forest land from conifers to deciduous trees, including land preparation costs, nurseries, planting and fencing, as well as ongoing ongoing crop protection in the years to come (EU Commission, 2016). In this German case, this is the type of private payment defined above for the forest ecosystem function.

KOMET Program (Sweden)

The Swedish government launched the program in 2010 as a joint project of three government bodies. Its goal is to inspire landowners to protect valuable forests in their property and to inform them of the possibilities available to protect biotopes. Contracts can take between 1 and 50 years, depending on the importance of the site. Owners receive payments as compensation for the restrictions set for their management and use in the interest of nature

conservation. In cases of sites with natural habitats protection, the owners receive a full refund plus an additional 25% of the payment (EU Commission, 2016).

Drinking water payments from wooded river basins (Switzerland)

Basel-Stadt's Swiss canton is covered by 12% of the forest. Deciduous forests spread over an area of 429 hectares, of which 90 hectares are owned by 330 private forest owners. Approximately half of the drinking water for the Basel-Stadt canton is supplied from the Langen Erlen basin. In this area, the Rhine water is cleaned naturally by forest stands. The sustainability of this process required educational interventions in species composition as a substitute for hybrid poplars that damaged the soil, willows and prunusavium (wild cherry). Water consumers pay part of the costs of sustainable forest management in the Basle area, by surcharging in their water account (EU Commission, 2016).

Afforestation of forest plantations (Georgia)

The Samegrelo (Georgia) area on the Black Sea coast of the Caucasus was before the fall of the USSR in the 1990s, a former grower of fruit, nuts and wine to the USSR. Its disintegration was noted by the region's deteriorating infrastructure and land maintenance problems. This was followed by soil degradation, deforestation, deforestation and unauthorized landfilling. On the other hand, there was no support for the sustainable development of agricultural land in this region. Agri Georgia, a subsidiary owned by Ferrero, subsequently developed the project on sequestration of carbon in hazel trees, throughout the planting life. It concerns the restoration of previously degraded land and vegetation cover. Furthermore, protection of the catchment area with newly created ecosystems, while preserving 50 ha of natural forests and a specially designed network of corridors to create a natural ecosystem. The project uses additional carbon credits revenue, provides desirable opportunities for environmental improvement and provides economic opportunities in the Samegrelo region. By creating permanent forests on previously abandoned soils, they continue to degrade soil and increase vegetative potential (EU Commission, 2016). The Case Study of Samagrelo (Georgia) is an example of a hybrid way of financing the forest ecosystem function and an example of involvement of a private forest owner in carbon trading. The remaining part of the problem, however, is to compensate the inhabitants for the degraded environment. Here, for example, the Canadian country of British Columbia, where the proportion of oil and minerals extraction is paid to the population, is tracked in the form of personal credits (Track E Implementation Science, Health Systems and Economics, 2015). Such a payment system would not be the most appropriate model in our conditions because of the purpose of offsetting the environment. Another possible step could be an adequate payment to a public sector in the region. Ideally, free public transport or offer free relaxation zones and programs. Such payments would also seem to encourage further public service innovation.

Payments to the population of the polluted regions

Another research issue addressed by this work is to compensate the inhabitants of the polluted region for this negative externality, which is associated with the EU ETS system. As mentioned above, the sale of emission allowances can be perceived as a so-called indirect environmental tax and income to the state budget. The system addresses the stimulation of pollutants to environmentally friendly technologies and reduces the amount of greenhouse gases discharged. This measure thus shows both restrictive and preventive functions. However, the system does not, in the context of the redistribution of funds generated by the sale of emission allowances, compensate the environment for the inhabitants of the polluted regions. This can also be seen as an ethical issue of the relationship between public finances and citizens. Case studies are known to address this problem in the world. An example may be the US state of Alaska or the Canadian province of British Columbia. Here, the authorities in areas affected by oil and mining exploit the inhabitants of the affected regions with personal accounts for which they are paid a share of the mining, compensation for the environment. In our region, this is one of the possible solutions. These personal accounts could be tied, for example, to medical and recreational services. However, this solution would involve a problem with increased administrative burdens and subsequent expenditure in the public sphere.

Discussion

Ethics (from the Greek ethos) or moral theory is a philosophical discipline that examines the moral dimension of reality. Ethics examines morality or morally relevant behavior and its norms and is a discipline of practical philosophy. Ethics deals with the theoretical investigation of values and principles that guide human action in situations, where there is a choice through free will. So The Environmental Ethics comments on concrete, practical issues relating to ethical decisions of the environmental issues, like for example bioethics. K. Blumenfeld (1989) also deals with this subject, in her work Dilemmas of Disclosure: Ethical Issues in Environmental Auditing. On the legislative basis, the issue of reporting ecosystem services in the EU, LULUCF, within the EU ETS (Commission, 2018), has already been addressed. However, the payment method is not yet resolved by forest owners for

this ecosystem service. This fact also raises the question of the ethicity of the administrative authorities' demand for forestry and agricultural landowners, directing their production towards sequestration of carbon, without subsequent remuneration for this non-production function and service. The proposed solution here is to reward landowners for carbon sequestration, following the example of the New Zealand NZ ETS system, for example, 1 allowance, with 1 tons of CO2 bound, as described above. Based on EU regulations, LULUCF, it is possible to predict that further EU legislation in this area will evolve in this direction. However, this is only one part of the ethical problem associated with the problem of this negative externality.

Conclusions

The article deals with the possibility of payments to the Czech population for the environment, caused by the production of greenhouse gases by the production. As a solution, a way of compensating for a public good such as transport, health and relaxation can be introduced. These investments could also contribute to innovation in these sectors. Only by offsetting injuries and regulating the negative effects of the negative externality described above can we achieve a higher ethical problem. Logical is also discussion with supporters of the theory of unlimited market power and extensive production. In addition, on the basis of case studies, persistent problems in the EU territory can be identified in connection with both research questions. Possible solutions to both problems were outlined above. By comparing each of the two emission trading systems described above, it can be concluded that the New Zealand NZ ETS model already addresses payments to landowners for non-production function - sequestration of carbon.

A further research in this area and the ongoing evaluation of data and information will be required for the correct composition of the economic and politic tools mix to reduce ethical problems associated with this negative externality.

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Minimum Wage in the Czech Republic

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Abstract. The minimum wage and its determination is not an economic, but primarily a political category, strongly depending on the constitution of the Government and Parliament. The process of increasing the minimum wage does not correlate with economic growth.
The paper deals with the development of the minimum wage and the guaranteed wage deriving therefrom. The authors suggest a new approach to the determination of the minimum wage, which is not dependent on political decisions, which would be enacted by law according to particular known criteria, depending on objective economic data. Also, they recommend that the so-called guaranteed wage should be cancelled.

Keywords: minimum wage, guaranteed wage, gross domestic product, inflation

JEL Classification: H3, J3, J6, J8

Introduction

Minimum wage was first introduced in New Zealand in 1894. [4] It was implemented in Czechoslovakia in 1919; we were one of the first European countries, which started applying the minimum wage for some very low paid professions. It was the original meaning of the regulation and it should have had remained until now [6]. At the time of the socialistic Czechoslovakia, the minimum wage was connected with the first wage scale tariff classes. In 1950 and 1964, two fundamental conventions of the International Labour Organisation (ILO) concerning minimum wages were ratified (Convention No. 26 and No. 99); after the dissolution of Czechoslovakia, they were ratified by the Czech Republic as well. In the Czech Republic (the Czech and Slovak Federative Republic), the generally binding legal regulation of minimum wage was introduced in 1991 [7]. Following the adoption of this and subsequent legal regulations, the original goal had become a powerful political topic, strongly reliant on the "colourful" constitution of the Government and Parliament, independent of the impacts on the employment rate, business sector, inflation rate and economic growth rules.

In Europe, the situation of the minimum wage institute is neither uniform nor simple, and some countries do not even have it.

The article aims to propose a new approach to setting the minimum wage, which would not be dependent on political decisions, was given by law according to certain known criteria, depending on objective economic data.

Data and Methodology

Basic statistical methods, description methods, analyses and syntheses are used in the paper. The index analysis and comparison method has been selected for the calculation of the suggested growth of the minimum wage.

The function of the minimum wage

As mentioned above, the original function of the minimum wage was to protect the most poorly paid professions, and this should have had remained until now. Beyond all doubt, the purpose of the minimum wage is to ensure that the level of the most poorly paid employees enables to guarantee that the living standard does not diminish. It is without doubt influenced by two factors – the growth of the inflation rate and the growth of economy. The minimum wage should motivate people to find a job instead of living on social benefits. Its political misuse can have counter-productive effects. According to a study [3], the growth of the minimum wage, which had been noticeable in the Czech Republic since 1999, has not led to any increase in employment or overall income of poor households. Moreover, the minimum wage has a significant impact on the district economies, which show a relatively low wage level, its increase affecting the growth of the unemployment rate.

Development of the minimum wage in the Czech Republic

In the Czech Republic (former Czech and Slovak Federative Republic), the present form of the minimum wage was introduced in 1991. Table 1 shows the development of the monthly and hourly minimum wage in the Czech

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Republic. The increase applicable as of 1 January 2018 has been the twentieth change in this quantity since its introduction.

Table 1: Development of the minimum wage (in CZK)

Year	Minimum monthly wage (in CZK)	Hourly minimum wage (in CZK)
1991/February	2,000	10.80
1992	2,200	12.00
1996	2,500	13.60
1998	2,650	14.80
1999/January	3,250	18.00
1999/July	3,600	20.00
2000/January	4,000	22.30
2000/July	4,500	25.00
2001	5,000	30.00
2002	5,700	33.90
2003	6,200	36.90
2004	6,700	39.60
2005	7,185	42.50
2006/January	7,570	44.70
2006/July	7,955	48.10
2007	8,000	48.10
2013 August	8,500	50.60
2015	9,200	55.00
2016	9,900	58.70
2017	11,000	66.00
2018	12,200	73.20

Source: Processed according to information obtained from the Ministry of Labour and Social Affairs

Table 2 compares the average wage, minimum wage and median value. The average wage is a very disputable indicator regarding the distortion caused by high salaries of a small group of employees. In general, half or up to two thirds of employees do not reach the average wage. The average wage is not the same throughout the Czech Republic; it varies in the capital city and in poorer regions. The average wage and median value in Q3 of the year have been selected for comparison. The median, i.e. the middle value, of wages has a higher information value. As the index shows, the median value of ages is approx. 15% lower than the average wage, thus being closer to real wages. This would be important for simplifying the measures of the legal regulation of the process of increasing the minimum wage. Instead of reaching 40% of the average wage, which is frequently mentioned by the unions, a lower value, e.g. 25, 30 or 35% should be determined, taking the median value into account.

Table 2: Development and ratio of median to average wage (in CZK)

Year	Minimum monthly wage (in CZK)	Average monthly wage in Q3 (in CZK)	Median value in Q3 (in CZK)	MW/AW Index
2012	8,000	24,514	21,331	0.870155829
2013	8,500[6]	24,836	20,764	0.836044452
2014	8,500	25,219	22,531	0.893413696
2015	9,200	26,072	23,527	0.902385701
2016	9,900	27,220	25,181	0.925091844
2017	11,000	29,050	21,331	0.734285714
2018	12,200	31,646[7]	27,320[8]	0.863300259

Source: Processed according to information obtained from the Czech Statistical Office

6 Minimum wage since August 2013
7 For this year, it is the average wage for Q4 2017
8 For this year, it is the median value for Q4 2017

Guaranteed wage

In calculating the wage, an employer must comply with the statutory provisions concerning the minimum wage as well as the provisions concerning the guaranteed wage.

The guaranteed wage is a stillborn child of social engineers wishing to regulate nonsense as well. Under the rule of economically educated governments, no guaranteed wage was referred to in government decrees.

The guaranteed wage in the form of salary tables is meaningful in the case of public administration employees, but not in the commercial sector. It does not protect anyone; on the contrary, at the time of historically recurring crises, it can and will often lead to the dismissal of the "most expensive" employees.

Table 3 shows the development of the guaranteed wage in the last five years.

Table 3: Development of the guaranteed wage from 2013 to 2018

Period	From 1 August 2013		From 1 January 2015		From 1 January 2016		From 1 January 2017		From 1 January 2018	
Job class	CZK/ h	CZK/ month	CZK/h	CZK/ month	CZK/h	CZK/ month	CZK/h	CZK/ month	CZK/h	CZK/ month
1.	50.60	8,500	55.00	9,200	58.70	9,900	66.00	11,000	73.20	12,200
2.	55.90	9,400	60.70	10,200	64.80	10,900	72.90	12,200	80.80	13,500
3.	61.70	10,400	67.00	11,200	71.60	12,100	80.50	13,400	89.20	14,900
4.	68.10	11,400	74.00	12,400	79.00	13,300	88.80	14,800	98.50	16,400
5.	75.20	12,600	81.70	13,700	87.20	14,700	98.10	16,400	108.80	18,100
6.	83.00	13,900	90.20	15,100	96.30	16,200	108.30	18,100	120.10	20,000
7.	91.70	15,400	99.60	16,700	106.30	17,900	119.60	19,900	132.60	22,100
8.	101.20	17,000	110.00	18,400	117.40	19,800	132.00	22,000	146.40	24,400

Source: Processed according to information obtained from the Ministry of Labour and Social Affairs

The growth of the minimum wage involves the deformation of wages in higher income brackets. It reflects neither the increased labour productivity nor the economic situation of a company. So, the higher protection of skilled labour is a pointless interference in the powers of companies. Employers do not dare to pay low wages to a skilled employee because the employee would give in their notice and offer their skills to an employer that would provide them with adequate remuneration.

Reference to the minimum wage

The minimum wage influences numerous regulations and acts, such as:

1. Income tax:
   Section 4(1)(h) of Act No. 586/1992 Sb. exempts the old age pension only if it does not exceed 36 times the amount of the minimum wage, i.e. the monthly pension of CZK 36,600 for 2018,
   Section 35c(4) of Act No. 586/1992 Sb., which deals with the negative income tax. The negative income tax can be applied if the taxpayer reaches six times the amount of the minimum wage. The negative income tax is paid to the taxpayer by the state if his/her taxes do not qualify for tax benefit deductions, bringing him/her to "negative" numbers. In 2017, it was CZK 66,000; since 2018, a parent's income will need to be CZK 7,200 higher, i.e. CZK 73,200.
2. Health insurance: the minimum wage has a direct impact on the calculation of the minimum health insurance contribution. Persons without taxable income must pay at least the minimum health insurance contribution. It is CZK 1,647 in 2018. Part-timers whose income is below the minimum wage must pay a health insurance contribution in the amount they would pay if they received the minimum wage.
3. Unemployment: the minimum wage also affects possible earnings of a job applicant on the list of the Labour Office, who may earn not more than one half of the minimum wage, i.e. CZK 6,100 since 2018. However, if a registered job applicant earns extra money, he/she is not entitled to receive an unemployment benefit; it applies to agreements to complete a job as well.
4. Labour Code, Copyright Act, etc.

Minimum wage in the European Union

In the EU member states, the issue of minimum wage is not regulated on the multinational level, but it remains within the powers of individual states.

The mechanisms of determining the minimum wage can be divided into two groups.

The first group consists in the determination of the minimum wage by law. This method of determining the minimum wage is applied in 22 out of 28 EU countries. They include Belgium, Bulgaria, Croatia, Czech Republic,

Estonia, Francie, Greece, Hungary, Ireland, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain and United Kingdom. In Germany, it was introduced in 2017.

The second approach to the determination of the minimum wage applied in some other member states, which is characterised by a high rate of union density is based on the binding force of collective agreements defining one minimum wage or several levels thereof divided by sectors, branches, professions and qualifications. It is not a statutory minimum wage, but a guaranteed minimum wage in some industries, which is given by a collective agreement made between unions and employers. This approach is applied in Austria, Italy, Denmark, Cyprus, Sweden and Finland. In 2015, 6 states with no institute of the minimum wage reported the lowest unemployment rate [7].

Table 4 shows European Union countries with the minimum wage arranged from the highest to the lowest. The Czech Republic appears in the second part of the table. However, conversions to the euro distort the actual information value.

Table 4: Minimum wage in the European Union countries

EU country	Minimum wage as at 1 Jan 2018 (in EUR)	EU country	Minimum wage as at 1 Jan 2018 (in EUR)
Luxembourg	1,999	Portugal	677
Ireland	1,614	Poland	503
Netherlands	1,578	Estonia	500
Belgium	1,563	Slovakia	480
France	1,498	Czech Republic	478
Germany	1,498	Croatia	462
United Kingdom	1,401	Hungary	445
Spain	859	Latvia	430
Slovenia	843	Romania	408
Malta	748	Lithuania	400
Greece	684	Bulgaria	261

Source: Processed according to information obtained from Eurostat

Results and Discussion

Minimum wage issues

The main issue of the minimum wage is its increase without any system [8]. The unemployment benefit amount is an important factor determining the willingness to work. The minimum wage must be determined so that it is worth being employed. A 30-year-old childless benefit claimant was chosen as a model example. Table 5 shows the calculation of the unemployment benefit for various levels of gross wage earned by the claimant in previous jobs. The employment was terminated by notice served by the employer.

The period of receiving unemployment benefits varies according to the applicant's age. People under 50 are entitled to receive unemployment benefits for 5 months; people at the age of 50-55 are entitled to receive unemployment benefits for 8 months, and people over 55 are entitled to receive benefits for 11 months. The maximum amount of benefits for 2018 is CZK 16,682; the amount will be increased upon retraining.

Table 5: Calculation of the unemployment benefits in the Czech Republic for 2018 (in CZK)

Notice served by	Redundancy payment (in CZK)	Claimant's age	Gross wage (in CZK)	Average net wage (in CZK)	Benefit Month 1 and 2 (in CZK)	Benefit Month 3 and 4 (in CZK)	Month 5 (in CZK)
Employer	0	30	12,200	10,468	6,804	5,234	4,710
			20,000	15,850	10,302	7,925	7,132
			26,611	20,399	13,259	10,199	9,179
			35,000	26,185	16,682	13,092	11,783
			50,000	36,520	16,682	16,682	16,434
			100,000	70,970	16,682	16,682	16,682

Source: Processed according to information obtained from applicable legislation

As indicated by Table 5, the unemployment benefits granted to that type of a former employee amounts to approx. 64% of the average net income in case of a low or medium-income individual; the rate is lower for high-income employees, i.e. 24% of the average net income in this case.

The regulation of the minimum wage should be a standard process that would accept the current economic conditions. The minimum wage should be increased gradually and should be predictable by companies, i.e. defined by law. Below we tried to suggest a mechanism of determining the minimum wage, which could be enacted upon external examination and completion.

Determination of the minimum wage by percentage of the average wage

A possible way of depoliticising the minimum is to associate the growth of the minimum wage with the determination of a fixed percentage of the average wage by law. However, the question is whether the average wage should not be calculated on the basis of data obtained from the private sector only. The average wage contains values, which also reflect high salaries and wages, especially of managers of state enterprises, which distort the average wage.

Table 6 compares the minimum wage increase amounting to 40% of the average wage as proposed by the unions, and the values of 25%, 30% and 35%. The median value is approx. 15% lower than the average wage.

Table 6: Determination of the minimum wage by fixed percentage of the average wage

Year	Average wage (in CZK)	Development of the minimum wage according to current legislation (in CZK)	Percentage of the average wage	Minimum wage amounting to 40% of the average wage (in CZK)	Minimum wage amounting to 35% of the average wage (in CZK)	Minimum wage amounting to 30% of the average wage (in CZK)	Minimum wage amounting to 25% of the average wage (in CZK)
2002	15,524	5,700	37	6,210	5,433	4,657	3,881
2003	16,430	6,200	38	6,572	5,751	4,929	4,108
2004	17,466	6,700	38	6,986	6,113	5,240	4,367
2005	18,344	7,180	39	7,338	6,420	5,503	4,586
2006	19,546	7,570	39	7,818	6,841	5,864	4,887
2007	20,957	8,000	38	8,383	7,335	6,287	5,239
2008	22,592	8,000	35	9,037	7,907	6,778	5,648
2009	23,344	8,000	34	9,338	8,170	7,003	5,836
2010	23,864	8,000	34	9,546	8,352	7,159	5,966
2011	23,864	8,000	34	9,546	8,352	7,159	5,966
2012	24,455	8,000	33	9,782	8,559	7,337	6,114
2013	25,067	8,500	34	10,027	8,773	7,520	6,267
2014	25,035	8,500	34	10,014	8,762	7,511	6,259
2015	25,768	9,200	36	10,307	9,019	7,730	6,442
2016	26,467	9,900	37	10,587	9,263	7,940	6,617
2017	27,583	11,000	40	11,033	9,654	8,275	6,896
2018	31,646[5]	12,200	39	12,658	11,076	9,494	7,912
Total	387,952	14,065	36	x	x	x	x

Source: Processed according to information obtained from the Ministry of Labour and Social Affairs

Determination of the minimum wage on the basis of the development of the gross domestic product and inflation rate

Another possible way to depoliticise the minimum wage is to associate the growth of the minimum wage with factors influencing the living standard of employees, which, in our opinion, include the gross domestic product and inflation rate, although these indicators involve many difficulties. The gross domestic product ("GDP") is a recognised indicator of the development of the national economy, reflecting the total monetary value of goods and services created for the relevant period and presenting the economic performance of the state.

The inflation rate expressed by the increase in the average annual consumer price index is another recognised objective economic indicator.

Table 7 shows the current and suggested growth of the minimum wage, which is increased on the basis of the GDP increase rate (%) and price level changes (%) for the past 12 months as against the average of the past twelve

months. If the GDP will not increase, or it will decrease, in the next year, the minimum wage will be the same as in the past year, and will change only on the basis of the increase in the average annual consumer price index.

$$SMW_n = \{[(MWG_{n-1} \times GDP\ r/r_{n-1}/100) + MMG_{n-1}] + [(AW_{n-1} \times I_{n-1}/100) + MWI_{n-1}]\} \times 0.5,$$

where SMWn = suggested minimum wage, MWGn-1 = minimum wage in the past year calculated according to GDP, MWIn-1=minimum wage in the past year calculated according to inflation, In-1 = inflation rate in the past year, GDP r/rn-1 = change in the gross domestic product as against the same period of the past year calculated on the basis of fixed prices of 1995, AWn-1 = average wage of the past year according to data obtained from the Ministry of Labour and Social Affairs.

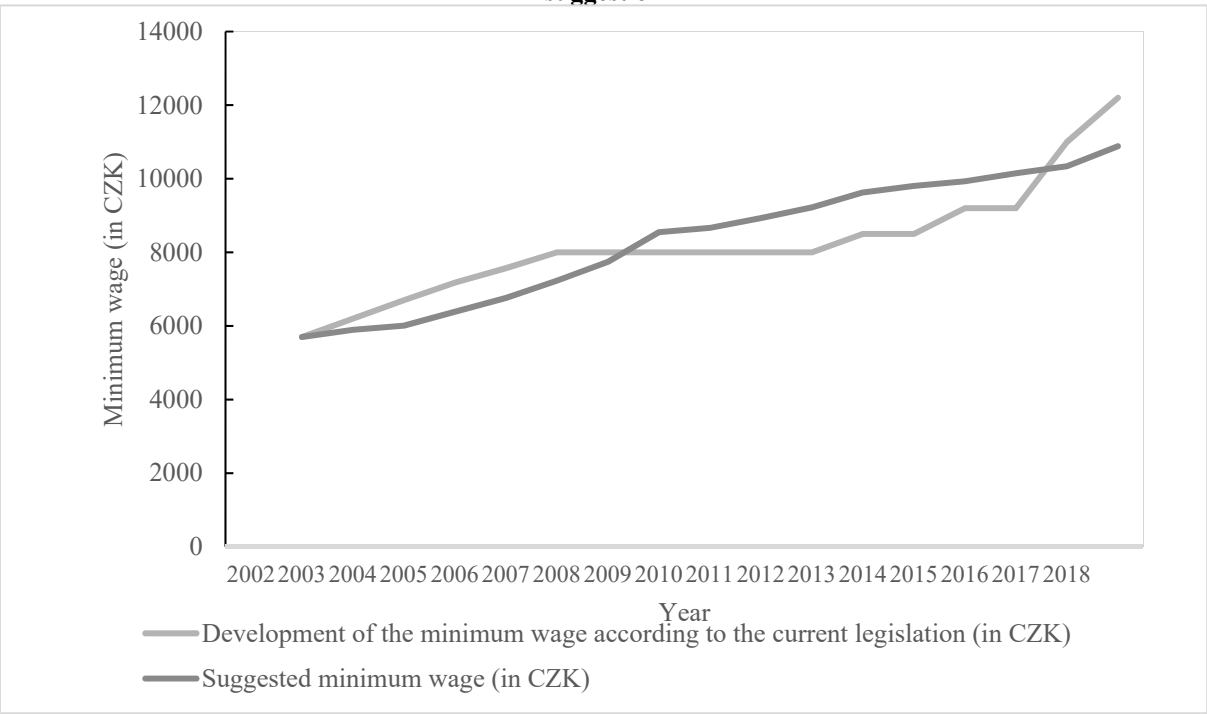
Table 7: Determination of the minimum wage on the basis of the gross domestic product and inflation rate

Year	Average wage (in CZK)	GDP r/r (in %)	MWG (in CZK)	Inflation rate (in %)	MWI (in CZK)	Development of the minimum wage according to current legislation (in CZK)	Suggested minimum wage (in CZK)
2002	15,524	1.9	-	1.8	-	5,700	-
2003	16,430	3.6	5,808	0.1	5,979	6,200	5,894
2004	17,466	4.5	6,017	2.8	5,996	6,700	6,007
2005	18,344	6.3	6,288	1.9	6,485	7,180	6,387
2006	19,546	6.8	6,684	2.5	6,834	7,570	6,759
2007	20,957	6.1	7,139	2.8	7,323	8,000	7,231
2008	22,592	2.5	7,574	6.3	7,910	8,000	7,742
2009	23,344	-4.1	7,764	1.0	9,333	8,000	8,549
2010	23,864	2.2	7,764	1.5	9,566	8,000	8,665
2011	23,864	1.7	7,935	1.9	9,924	8,000	8,930
2012	24,455	0	8,070	3.3	10,377	8,000	9,224
2013	25,067	-0.9	8,070	1.4	11,184	8,500	9,627
2014	25,035	2.0	8,070	0.4	11,535	8,500	9,803
2015	25,768	4.3	8,231	0.3	11,635	9,200	9,933
2016	26,467	2.3	8,585	0.7	11,712	9,900	10,149
2017	27,583	4.5	8,783	2.5	11,897	11,000	10,340
2018	31,646[5]	-	9,178	-	12,587	12,200	10,883

Source: Processed according to information obtained from the Ministry of Labour and Social Affairs

Figure 1 shows the development of the minimum wage according to the current legislation and the development based on the suggested calculation of the minimum wage on the basis of the gross domestic product and inflation rate.

Figure 1: Development of the minimum wage according to the actual situation and according to the suggestion



Source: Processed by own means

Cancellation of the minimum wage and guaranteed wage

The entire cancellation of both the minimum and guaranteed wage would be an ideal solution corresponding to the outcome of our long-term research. The expected "opening of the scissors" between pays and wages in the public sector and private sector would be an objective indicator of the real economic performance and would reflect the labour productivity as well. However, we assume the suggestion is not passable politically. At least the definite cancellation of the "guaranteed" wage would be a great success, and we clearly prefer this option.

Conclusion

Regarding the experience with the existence or non-existence of the minimum wage in socialistic Europe and in the world, certain conclusions can be drawn.

The definite cancellation of the minimum wage, including any required changes in the related acts would be the simplest solution for the elimination of labour market deformations. If we still want to preserve the institute of the minimum wage, receiving social benefits must not be more advantageous than being employed. We believe the issue of the minimum wage should be solved by the formation of two fundamental groups, i.e. free market subjects creating value and bringing money to the state budget, and public administration subjects living on the money generated by the former group.

Our analysis indicates that the determination of the minimum wage by percentage of the average wage is basically possible. Impartial consideration and calculation of the average wage is still a problem. This problem could be partially removed by calculating the average wage for the purposes of the minimum wage only on the basis of wages of economically active subjects. We think the calculation of the minimum wage on the basis of the GDP and inflation rate is more favourable as it involves objective indicators and better reflect the actual needs of employees and employers.

We think the cancellation of the guaranteed wage is a solution which corresponds to the reality and needs of the economy.

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Risk management in occupational pension plans. Case study of Poland

Marek Szczepański*

Abstract. The aim of the article is to present the results of the analysis of investment results and of risk management in occupational pension schemes on the example of Poland. Employee retirement programs in Poland (PPE) have been operating since 1999. These are the programs with the formula of a defined contribution (DC), where the entire investment risk was transferred to the program participants. After 20 years of operation, a more accurate assessment of investment results and implementation of investment risk in PPE are possible. The method of risk management in PPE, which so far has covered a small group of employees (about 2.5% of the workforce), will be compared to the solutions applied in the new, quasi-obligatory employee capital plans (PPKs), introduced since January 2019. Ultimately, within 3 years, PPKs should cover about 11 million employees (about 70% of the working population). These new occupational pension schemes will have a much greater impact on the level of pension security and the state of public finances in Poland. The analysis of investment results and risk management in occupational pension systems is presented in the broader context of the reform of the pension system in Poland.

Keywords: occupational pension schemes, public pension system, Defined Contribution pension scheme, public finance.

JEL Classification: H55, J26.

Introduction

Employee pension schemes (PPE) were introduced together with the comprehensive reform of the pension system in Poland in 1999. They took the form of a defined contribution (DC) pension schemes, which means that the entire investment risk is borne by program participants. After 20 years of operation it is possible to measure their long-term investment performance, but also to evaluate the risk management in this type of occupational pension schemes. PPE cover only 2.6% of the workforce (of 400,000 participants in 2018), and their functioning has not significantly increased the level of pension security in Poland nor has it affected the state of public finances. The new, quasi-obligatory employee capital plans (PPK) with automatic enrolment (automatic inclusion of the workers into pension plans, with an opt-out option), introduced as of 2019, will ultimately cover 11 million employees, and their impact on the level of pension security for future pensioners will be much higher. PPKs are also organized as defined contribution pension plans, but the investment risk is to be reduced by the fact that they will be programs of a defined date (life-cycle funds). The comparison of investment risk in both types of programs will be carried out in the final part of this article.

The starting point for further considerations will be the risk classification in occupational pension schemes, and then - locating occupational pension schemes in the broader context of the structure of the reformed pension system in Poland and its further evolution. Polish experiences with 20 years of radical, comprehensive pension reform could be interesting for others, especially the CEE countries.

Classification of the risk of occupational and public pension schemes

Population ageing and financial sustainability concerns have exerted pressures on policymakers to introduce pension reforms at the end of XX and in the first decade of XXI centuries. The primary goal of these reforms was to reduce the risk in pension systems (especially the demographic one), ensure their long-term financial stability and adequacy of benefits. Some of these reforms were limited to changes in the parameters of pension systems (e.g. extending the required periods of payment of retirement contributions allowing for the payment of a pension, extension of the statutory retirement age), others were systemic (e.g. full or partial privatization of public pension systems in Latin America and most of the countries of Central and Eastern Europe – including Poland in 1999 – and the former Soviet Union between 1981 and 2014). Fully or partially funded pension schemes were to provide higher benefits from the same pension contributions (because the rate of investment in the financial market in the long run exceeds the rate of labor income) and reduce the politicization of pension systems. Of course, fully or partially funded pension systems are exposed to investment risk. Proponents of the privatization of public pension

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systems, however, assumed that the risk could be reduced by appropriate selection of financial instruments with different risk levels and proper investment policy conducted by specialized financial institutions managing pension funds. This "experimentation" in social security systems proved to be unsuccessful. Sixty per-cent of countries that had privatized public mandatory pensions reversed the privatization before 2018 [ILO 2018].

One of the reasons was the realization of investment risk in pension funds as a result of the global financial and economic crisis of 2007-2009. The crisis caused a fall in the value of assets of pension funds, with a particularly drastic impact on funds with the formula of a defined contribution (DC). The privatization of public pension systems has not contributed to the adequacy of pension benefits, on the contrary - they have been reduced [ILO 2018]. The true beneficiaries of the privatization of public pension systems were private financial service providers managing pension funds, who generated high profits from various types of fees for asset management.

While the full or partial privatization of public pension systems has failed due to the implementation of underestimated, as it turned out, investment risk, the sense of collecting additional pension savings, invested and multiplied on the financial market, has not been questioned. The occupational pension schemes (depending on the adopted classification - classified as the 2nd or 3rd pillars of the pension system) have a major role to play in the entire pension system. They increase the level of overall pension benefits and pensions adequacy. In countries where they are disseminated (e.g. in the Netherlands, Switzerland or Sweden) future pensioners can expect a much higher replacement rate (relations of pension benefits from all pillars to the last or the average wages) than in countries where such workplace pension systems are underdeveloped (as in Poland today). Nonetheless, occupational pension schemes are also exposed to a variety of risks. This applies in particular to systems with defined contribution (DC) formula, which do not guarantee a certain amount of the occupational pension in relation to the last over career-average earnings. The occupational DC pension schemes transfer the entire investment risk to the program participant. A more detailed analysis indicates that they are exposed to many other types of risk. Of course, this risk can be managed and limited - both through the appropriate program structure (legal and institutional rules) as well as the investment policy of the organizational institutions managing the pension scheme in a company.

Effective risk management in occupational pension systems requires, above all, an analysis and identification of various types of risk [Szczepański, Brzęczek 2013]. The risk is mostly defined as an event with various results, achieved with a certain probability (measurable uncertainty about future events). There are generally two mostly used definitions of risk in the literature of finance [Jajuga 2009]. The first one is negative: risk as the possibility of loss, and the second one, neutral: risk as the possibility of a result different than expected (better or worse). The generally accepted definition of risk does not exist. Economic and technical literature defines risk as the probable loss of the right holder, which is expressed in monetary or other units [Tichý 2006, Bartošíková, Biliková, Taraba 2014]. Most generally, risk is classified according to the outcome of an event:

- pure risk – refers to situations, in which the result of an event is either loss or the lack of loss,
- speculative risk – refers to a case, in which an outcome of an event, different from the initial assumptions, is positive or negative.

The literature of pension economics [Diamond 1997, Blake 2006] contains more detailed classifications of risk. Operation of occupational pension schemes is subject to pure risks of bankruptcy, breach of contract or an insurance event, in case of occupational pension plan in the form of capital insurance fund. Speculative risk factors are much more common in occupational pension schemes, including political-legal regulations risk, investment risk, financial risk or business risk.

Very significant from the perspective of risk management remains the classification of risk factors into both systematic and specific. Systematic risk is related to events that are beyond the risk-taker's control, because they result from the state of macroenvironment.

In the case of an occupational pension scheme, these factors receive the following interpretation:

- demographic risk, especially the longevity of employees in a corporate pension
- scheme,
- political risk resulting from a number of legal regulations and their frequent
- changes, to which the retirement institutions have to adjust their operations.
- interest rate risk affects investment performance,
- currency risk affects the results of foreign investments and revenues of a company importing or exporting goods,
- risk of market evaluation of the asset class and associated risk of the economic situation,
- the risk of purchasing power resulting from uncertain future rate of inflation,
- market liquidity of assets,
- conditions for reinvestment.

Table 1 summarizes the systematic (macroeconomic) and specific (microeconomic) business risks of occupational pension schemes, according to their operational, financial and investment activity.

Table 1: Classification of risk of occupational pension schemes

Activity risk	Systematic risk (macroeconomic)	Specific risk (microeconomic)
Operational	demographic (particularly the longevity)	business
	political	management
		breach of contract
		insurance event
Financial and investment activity risk	interest rate	liquidity of assets
	currency	investment preferences of insured
	market conditions for asset class	valuation of financial instruments (investment efficiency)
	inflation and purchasing power	financial (financial state)
	market liquidity of assets	bankruptcy
	the conditions for reinvestment.	the strategy of reinvestment

Source: Szczepański, Brzęczek 2013, p. 48.

Specific risk relates to a single occupational pension scheme and therefore it is called a microeconomic risk here. The following factors have been distinguished:

- business risks, including the market-demand risk of economic activity of a company operating occupational pension system and an institution managing it,
- management risk – is conditioned by improper management of the company and an occupational pension scheme; the risk is limited by public supervision of retirement institutions,
- breach of contract risk – the source of this risk is a failure to meet the conditions agreed upon between the parties of the transaction and written in the contract,
- insurance event risk, regarding the insured in an occupational pension system in the form of life insurance,
- assets liquidity risk results from the adopted investment strategy, just as the following factors,
- risk of investment preferences of the insured, relates to accepted risk of rate of return and its time structure, tailored to the age of the insured,
- risk of valuation of financial instrument or an asset is a problem of risky investment efficiency in terms of the ratio of expected return and its volatility measured with e.g. standard deviation,
- reinvestment risk – specific to a situation in which money from one investment is reinvested, financial risks is associated with interests and repayment of borrowed foreign capital or incurred liabilities, which in case of occupational pension schemes relates to the payment of pensions,
- bankruptcy risk – it may result in the bankruptcy of the company caused by the two previously described types of risk, i.e. breach of contract risk and financial risk.

Design of Polish pension system from the point of view of risk management

Poland has introduced a comprehensive reform of its old-age pension system in 1999. The reform established a defined contribution, multi-pillar system involving: a pay-as-you-go (PAYG) pillar based on notional (non-financial) defined contributions (NDC) and administered by the Social Insurance Institution (ZUS), a mandatory funded pillar in which private pension funds manage individuals' contributions, and a voluntary third pillar consisting of company pension plans and other savings vehicles (see Tab. 2).

The total pension contribution rate amounts to 19.52% of gross wages (pillar 1 + pillar 2). The contributions (premiums) are financed equally by both employers and employees. 16.60% of pension contributions are transferred to pillar 1 (being written down on the individual accounts and sub-accounts of those insured) and 2.92% goes to open pension funds (pillar 2), if the insured person is a member of an OFE (Open Pension Fund). If not, the entire 19.52% is transferred to the first pillar. The notional interest rate is defined as 100 percent of the growth of the real covered wage bill, but not less than the price of inflation. The second pillar is a voluntary funded defined contribution (FDC) scheme. Contributions paid into the second pillar are indexed with the rate of return on pension fund investments.

Table. 2. The architecture (design) of the three pillar Polish pension system

Pillar 1	Pillar 2	Pillar 3
Mandatory	Mandatory/Voluntary*	Voluntary
PAYG	Funded	Funded
Basic pension benefit	Basic pension benefit	Additional/supplementary pension benefit
Notional Defined Contribution** (NDC)	Defined Contribution (DC)	Defined Contribution (DC)
Managed by public institution: Social Insurance Institution (ZUS)	Privately managed: Open pension funds (OFEs) managed by Pension Fund Societies (PFSs)	Privately managed: Individual and group (occupational) pension savings managed by different financial institutions

*Open Pension Funds (OFEs) were introduced in 1999 and have been obligatory since 1999. As of 1 April, 2014 they have been voluntary. The role of the second pillar has been marginalized.
**Notional (or non-financial) defined contribution (NDC) are unfunded schemes in which members have individual defined contribution (DC) accounts in which the returns that are credited to the contributions are not related to the returns of financial assets, but to some non-financial variable, such as GDP or gross rate in national gross earnings [Blake 2006, p.4].

(Source: own elaboration based on data from ZUS (Social Insurance Institution) and Blake 2006).

One of its main objectives in the economic dimension was the division of risk between the financial market and the labor market by introducing a three-pillar structure, with PAYG financed first pillar and the second capital funded pillar composed of private pension funds (called „OFE") operating within it [Góra 2003]. After retirement (in the decumulation phase of a pension system), pension benefits are indexed annually by inflation with at least 20 percent of the real average wage growth. The pension formula is to a large extent similar to the first and the second pillar. Benefits are equal to the accumulated capital from contributions (plus indexation) divided by life expectancy obtained from the observed unisex period mortality tables. Mortality tables are recalculated by the Polish Central Statistical Office (GUS) every year.

The assumptions of the systemic pension reform introduced in Poland in 1999 predicted the development of additional voluntary pension schemes ("the third pillar of the pension scheme"). The third pillar consists of voluntary, additional private pension plans:

- occupational pension plans („pracownicze programy emerytalne", PPE),
- individual retirement accounts („indywidualne konta emerytalne", IKE),
- individual retirement saving accounts („indywidualne konta zabezpieczenia emerytalnego", IKZE).
- employee capital plans (PPK) – new, quasi-obligatory occupational pension schemes, introduced since January 1st, 2019; they will be implemented first in big companies with 250 or more employees, as of the 1st July 2019, and then successively in small and medium-sized enterprises as well as in the public sector.

In the years 1999–2004 (until the introduction of individual retirement accounts –IKEs) the only form of saving for retirement, benefiting from certain (relatively modest) economic and fiscal incentives from the state, were occupational pension plans, which operated in Poland under the name "pracownicze programy emerytalne" (PPE). However, the current development of OPS in Poland has been very slow. Only a little over 1,000 employers offer their employees an opportunity to participate in pension schemes (1 053 OFEs at the end of 2017, of which 645 in a form of a contract with an insurance company, 382 - a contract with mutual investment fund and implemented with an employee pension fund, the so called PFE). The number of participants at the end of 2017 amounted to about 400 000 and the total value of assets at 1,224,6 bln PLN (about EUR 360 bln). In this respect Poland can not be compared favorably with other EU countries, including some former socialist states (e.g. Slovakia and the Czech Republic), where occupational pension schemes are more prevalent.

While the first pillar (PAYG) is in the accumulation (savings) phase, the pension system is more sensitive to the risk of demographics which increases with the aging of the population, and the funded pillar in public system is subject to different (demographically non-correlated) kinds of risk (including investment risk). Additional pension schemes (individual: IKE, IKZE, and occupational: PPE and PPK) with DC formula are exposed to investment risk in accumulation (savings) phase and to longevity risk in the pay-out phase of the scheme (decumulation of pension capital).

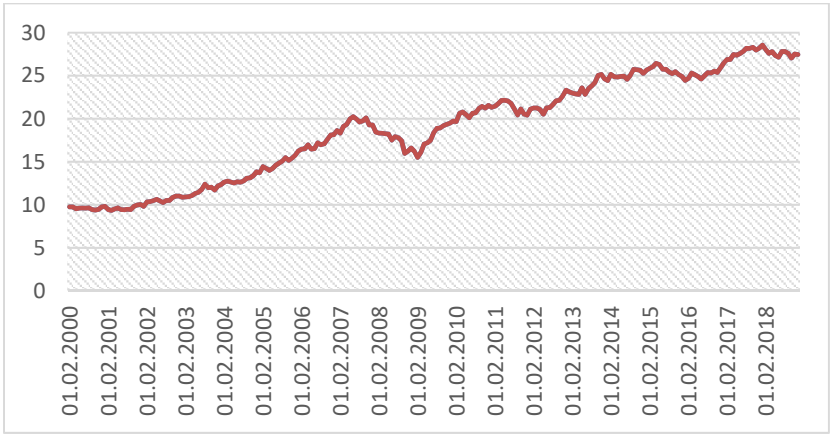
Due to different regulations concerning acceptable investment strategies and available financial instruments, the problem of optimal investment portfolio management must be differently analyzed in relation to pension funds

operating in the public pension system (OFE), and differently to additional pension systems – individual (IKE, IKZE) and occupational pension schemes (PPE, PPK).

Analysis of risk management in selected occupational pension schemes in Poland

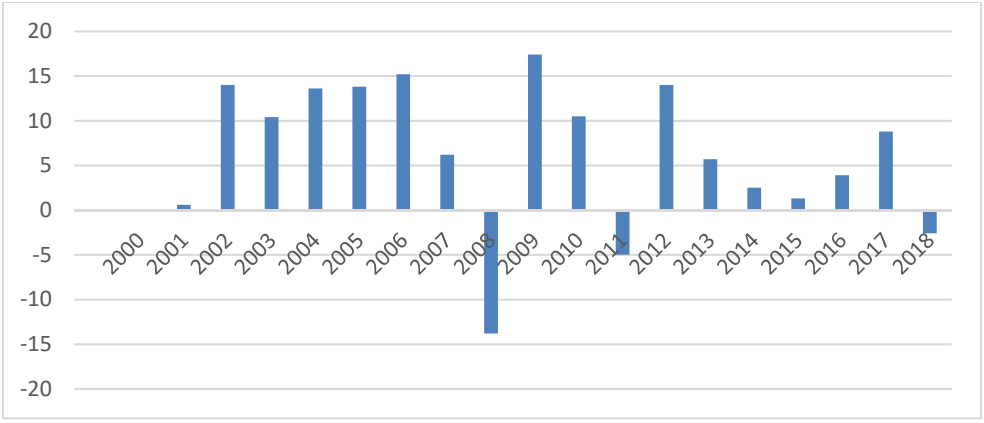
From the three forms of occupational pension schemes operating on the market since 1999, only statistical data on the value of participation units (after deducting service costs) of employee pension funds (PFE) were published in a systematic manner and can be used to assess their investment performance (see figure 1). PPEs in the form of an agreement with an investment fund or life insurance company were of individual nature, based on arrangements between financial service providers and the companies' employers and the representation of employees (mostly – trade unions). That and the service costs have not been made public and it is not possible to analyze their rates of return precisely.

Figure 1. The value of PFE "Nowy Świat" participation units from (2000-2018) in PLN



(Source: KNF (Polish Supervision Financial Authority)

Figure 2. Rates of return of investment in Employee Pension Fund (PFE) "Nowy Świat" 2000-2018



(Source: Polish Financial Supervision Authority (KNF) 2018)

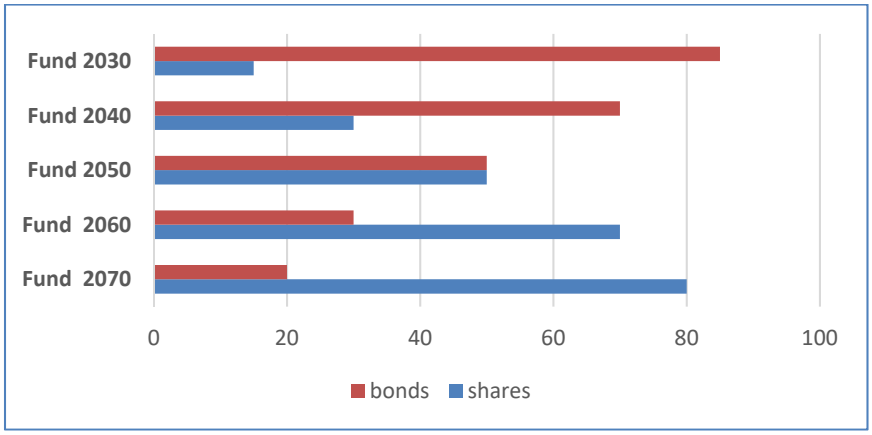
The standard deviation of the rates of return on investments realized by PFEs in the years 2000-2018 (see figure 2) was amounted to 8,16292. Only in 2008, at the peak of the global financial crisis, there was a negative double-digit rate of return (-13.5%). It is difficult to make it different, because during this period the value of financial assets dropped sharply in most countries around the world, while the value of assets of pension funds in many EU countries was higher than in Poland (e.g. Ireland minus 30%). As early as in 2009, the value of participation units of PFE Nowy Świat increased enough to fully recuperate the 2008 losses (+ 15.2%). In the nearly twenty-year period of operation of the analyzed PFEs, the rate of return on investments was negative also in 2011 and 2018 (- 5% in 2011 and -2.2%), but it was much lower than during the time of the crisis in 2008. A similar

distribution of investment returns can be observed on the open pension funds (OFE) market in the public pension system between 1999 and 2014.

Occupational pension plans (PPE) have operated in Poland for nearly two decades. This is a relatively short time in the perspective of a professional career and saving for retirement, where a typical savings period (accumulation phase) is about 40 years. That is why the phenomenon of the so-called "bad date" – the need to pay-out occupational savings during the financial crisis, when the value of pension assets drops sharply. In Poland it occurred only regarding a very small group of employees in 2008 (less than 500 people according to data from Polish Financial Supervision Authority). In the case of occupational pension schemes (PPE), the managing financial institutions could use investments in shares and bonds to diversify investment risk. In this respect, they differ from open pension funds (OFEs) operating in the second pillar of the public pension system in Poland. After changes in legal regulations since 2014 OFEs have only been able to invest in shares, and they do not hold the right to treasury debt securities. Obviously, it increased the investment risk in OFE and indirectly in the entire public pension system. However, this is the subject of separate considerations that go beyond the scope of this article.

To mitigate the investment risk in occupational pension schemes in Poland and avoid the so called "bad-date" risk, the newly created employee capital plans (PPKs) provide for only one investment option for employees: a fund (sub-fund) of a defined date. This solution is a compromise between an individual approach to the method of multiplying funds and the lack of influence of participants on investment decisions. The investment portfolio should be adjusted to take into account the need to limit the level of investment risk as the participants approache retirement age. In connection with the conclusion of a contract for the conduct of a PPK, funds collected by a participant may be placed in one of at least five funds of a defined date, applying different investment policy principles, appropriate for the date of birth of the participant (see figure 3).

Figure 3. The model of proportions of shares (equities) to bonds in the investment portfolio of employee capital plans (PPK) according to the law regulations (Article 40 of the Act on Employee Capital Plans)



(Source: Instytut Emerytalny (Pensions Institute) Warsaw 2018)

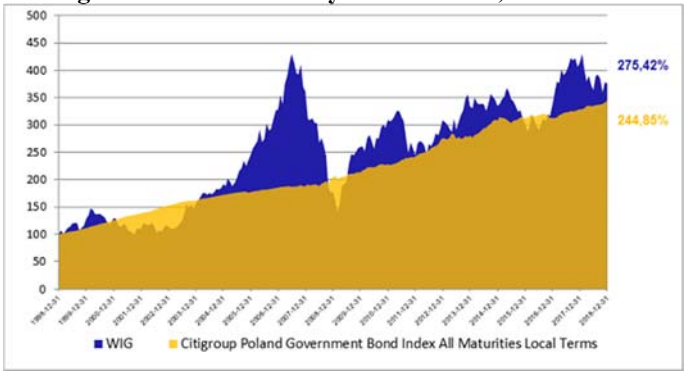
Financial institutions managing PPKs (such as mutual investment funds, life insurance companies and pension societies) will offer at least 8 sub-funds of a defined date with a different share of equities in assets (within the framework of the participation in the provisions of minimum and maximum shares):

- Employees who are under 40 years of age at the time of enrollment in the PPK (they will remain at least 20 years until they reach the age of 60) - will participate in sub-funds of the defined date that most assets will invest in shares (up to 80%).
- Employees joining the old-age PPK will be registered in sub-funds of the defined date, which will be able to invest in shares in a correspondingly smaller part of the assets.
- The oldest people who, at the time of PPK launching , are 55, will become participants in the sub-fund, which will be required to invest at least 85% of assets in debt securities, mainly in bonds and treasury bills.
- The youngest employees will be enrolled in sub-funds that will invest most of their assets in shares. Thanks to this, they will be able to benefit from high rates of return on this type of investment, with a correspondingly lower investment risk (resulting from a long investment horizon).

To reduce the risk of a deep loss in the recent years of participating in the PPK, sub-funds will be required to gradually reduce the investment risk (reducing the share in assets). At the participant's request, it is possible to change the fund of a defined date. Due to the risk diversification in life cycle funds, the PPK participants will be able to take advantage of the opportunities offered by investing in shares over a longer time horizon, while avoiding

the risk of bad dates [Esaliens 2018]. The adjustment of long-term returns on investment in shares and secure debt documents indicates that in the longer run, e.g. 20 years, shares prove to be more profitable financial instruments, but periodically the value of shares falls sharply (see figure 4).

Figure 4: Change in the WIG index (the main index of shares listed on the Warsaw Stock Exchange) compared to the change in the bond index by December 31, 1998 - December 31, 2018.



(Source: Esaliens 2018)

The investment model adopted in the PPK (the life cycle model or the defined date model) - automatic adjustment of the investment structure (risk) to the current age of participants - is also justified by the fact that the majority of employees will be automatically enrolled in the plan , based on the employer's record. Therefore, most of the PPK participants, unlike other types of plans with tax concessions (PPE, IKE and IKZE), will not have to actively make decisions on how to invest. The optimal solution in this situation is the implementation of a life cycle model in sub-funds of defined date.

Conclusions and discussion

The example of a radical, systemic Polish pension reform indicates that public pension system should be based on the principle of intergenerational solidarity supported by the state. The partial replacement of the social insurance system with a construction based on privately managed pension funds did not bring the desired results. In particular, the idea of reducing the demographic risk through a market mechanism has not been proven, not only in Poland. A demographic risk exists also in relation to funded pension systems (e.g. a fall in the value of pension assets with an increase in their supply at the time of retirement of more numerous demographic cohorts).

On the other hand, the rates of return for the selected occupational pension systems should be considered satisfactory in the long term of 20 years. However, if some group of participants of PPEs had to take advantage of the occupational pension during the period of a sharp decline in the value of pension assets (e.g. in 2008 or 2011), this would mean significant losses.

Therefore, it should be positively assessed that the new quasi-employee capital plans (PPK), introduced in Poland successively as of 2019, will be based on sub-funds of the defined date (life cycle funds). This will allow for better diversification and reduction of investment risk than in the case of occupational pension schemes that have been operating since 1999 (PPE). Polish experience may also be of interest to other CEE countries, reforming their pension systems, especially with regard to occupational pension schemes.

The history of the Polish pension reform can also be a contribution to a broader discussion on the role of occupational pension systems in the entire pension security. Despite changes in the labor market, changes in the career model (departure from the long-term tradition of employment in one company) also in the 21st century workplace pensions can be - and in many countries have long been - a significant part (pillar, layer) of pension security systems. To realize this goal, the cooperation of the state (good legal regulations, fiscal incentives, and effective supervision over the financial market) and other stakeholder groups (employees, financial institutions servicing occupational pension schemes) is necessary. An important issue is limiting the investment risk and the effective management of other types of risk related to the functioning of occupational pension programs. It is a matter of debate whether the legal regulations allowing for diversification of the investment portfolio are sufficient solutions. Should further regulations be introduced to mitigate the investment risk, such as the minimum guaranteed rate of return of investment in occupational pension schemes (as in Switzerland), or special insurance fund, securing participants of the occupational pension scheme in case of employer's bankruptcy (as in Germany)? On the other hand, too many regulations and restrictions may negatively affect the investment results of long-term pension

systems. There is no doubt regarding the necessity of educational activities addressed to participants of occupational pension systems, who have no obligation to orientate themselves in the rules of investing in financial markets . It is particularly important that participants in voluntary or quasi-mandatory programs do not withdraw their savings too hastily during the period when financial assets are traded.

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Revenue Factors of City Districts of Territorially Structured Statutory City

Petr Tománek*

Abstract. The paper focuses on assessing of factors that affect the revenues and the management of the city districts in the statutory city. Statutory cities can organize their internal conditions by creating city districts with their own self-government that is applied only by seven statutory cities in the Czech Republic. In the internal management of these statutory cities, i.e. the dismemberment into a part of the citywide and the city districts, different approaches are applied that can be monitored, for example, by the share of the funds that the districts manage. The city that provides the most resources from its budget to the city districts is Ostrava. The aim of the contribution is to address the main factors influencing and differentiating management resources of the city districts. The analysis showed that the main factors are income from real estate tax and non-tax revenue.

Key words: statutory city, city districts, revenues, expenditure

JEL Classification: H50, H72

Introduction

In terms of the Czech Republic (hereinafter "CR"), the municipality are the basic territorial self-governing unit and some of them have a specific status in the form of statutory cities. In the conditions of the CR there are 26 statutory cities (except Prague) since 2018.

The specific status of statutory cities is primarily based on the possibility of creating city districts with self-government. However, this option uses only seven of the 26 statutory cities.

The formal establishment of the city districts is bonded with the adoption of the decree by the representative of the statutory city, which is designated as a statute, and the division of responsibilities of the city council and the city districts is regulated here. The adjustment also applies to the area of the city and city districts management. For the management of the statutory city and its districts are applied the management rules as for other municipalities. By law, the relations between the city council and the city districts are not regulated, so it depends on the particular decision of the responsible statutory city to modify these relations.

The models applied for the financing of city districts in the CR are different. The differences of these models can be documented on the indicator of the share of total district expenditure on the expenditures of statutory city (see Table 1). This share ranges from 3,6 % (Opava) to 29,6 % (Ostrava). Within these statutory cities there are significant differences especially between Opava and Liberec and other cities (see Tománek, 2018). This significant difference is caused by approaches of the division of these two statutory cities, where these two cities are not territorially structured entirely but only in part, so that some territories of these cities are not part of any city district. The Statutory City of Opava has created 8 city districts in which 12,8 % of the inhabitants live. Only one city district is created in Liberec, representing 8,6 % of the population of entire statutory city. The conditions of individual statutory cities in the Czech Republic are so different (Čechák, 2017).

The aim of the paper is to identify the factors that affect the size of municipal city districts' income in a selected statutory city, namely in a statutory city with the highest share of resources among statutory cities with city districts (Ostrava).

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Table 1: The share of expenditures of the city districts of the territorially structured statutory cities on the expenditures of the statutory city

Statutory City	Population	The share of the city district's budget on the city budget
Brno	377 973	23,7 %
Ostrava	291 634	29,6 %
Plzeň	170 548	11,2 %
Liberec	103 853	6,1 %
Pardubice	90 044	12,2 %
Ústí nad Labem	92 984	12,0 %
Opava	57 387	3,6 %

Source: Own calculation based on Monitor and Final Accounts of Statutory Cities (2016)

In the broader context, public spending is generally influenced, for example, by the political cycle (Plaček et al., 2016) and in the conditions of statutory cities, in terms of distribution of resources between city districts, the role of the statutory city authorities can be significant (within Ostrava were these rules for 2018 are also modified).

The monitored issue fits into the wider context of monitoring the efficiency of municipal expenditures, in here specifically focused on one segment of municipalities, on statutory cities (Bagorová, 2017) and only on their revenues as a presumption of possible expenditures.

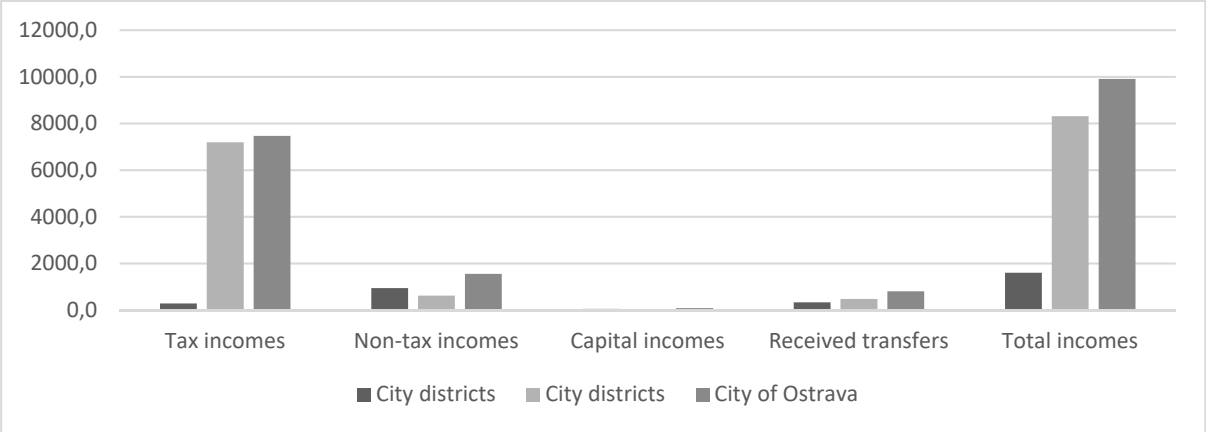
Methodology and data

The Statutory City of Ostrava (SCO) has created a total of 23 city districts with its own administration and its own budget. Within this statutory city, city districts manage the largest share of total funds from all statutory cities (see Table 1).

City and city districts revenues

The revenues of the SCO budget in 2017 amounted to 9910 million CZK. The revenue structure of the SCO budget consisted of 75,4 % of tax revenues, non-tax revenues account for 15,7 %, capital revenues 0,8 % and transfers 8,1 %. The relatively higher share of tax revenues of SCO compared to the average of municipalities in the CR (which was about 70% of total municipal revenues) is due to a significantly higher coefficient for tax sharing, which is in the cities of Ostrava, Plzeň, Brno and Prague.

Figure 1: Revenue of the Statutory City of Ostrava and its Districts (in million CZK)



Source: Own calculation based on management result of city districts and city council of SCO in 2017.

The total revenue of the SCO budget was contributed by the city council revenue, which accounted for 83,9 % of the total revenue of the SCO and the rest, i.e. 16,1 % are the city districts revenues. The high share of the city council revenue is mainly due to the fact that the city council is the recipient of all shared taxes and the main part of transfers from other budgets.

The structure of revenues of municipal districts and the city council (Fig. 1) shows the differences in the types of revenues of these budget parts. While tax revenues represent the main part of the revenue of city council, non-tax revenues prevail in city districts revenues, but they are supplemented in frame of redistribution of funds between city council and city districts by additional transfers, because there are provided transfers to the city district budgets from the collected funds of shared taxes and SCO transfers.

The volume of funds managed by the city districts reflect the rules applied by the SCO in 2017. These rules are characterized by the following main elements of revenues:

City council revenues:

- revenues from shared taxes (used to provide subsidies to city districts),
- local municipal waste fee,
- administrative fees,
- funds for state administration from the state budget.

City district revenues9:

- real estate tax,
- local dog fee,
- a local public space fee,
- 50 % share of lottery tax,
- share in subsidies for state administration; division between city council and city districts in proportion 55:45, the criterion of the number of inhabitants and the type of state administration performance, the so-called aggregate subsidy relationship (SDV),
- non-investment funds from the city council budget, which they take into account
    - population number,
    - city district area,
    - area of communications,
    - number of pupils,
- non-investment funds from the city council budget:
    - for the swimming training of primary school pupils,
    - for the operation of swimming pools of city districts,
    - to the central cemetery, to the administration, maintenance and modification of the 1st and 2nd stages of the revitalization of the pre-railway area to the city district, to the maintenance of the area around the Karolína shopping center and the pre-railway area,
    - to compensate for remitted payments for education in kindergartens,
    - green area,
    - number of population,
    - city district area,
    - the area of the roads,

9 For 2018, the distribution of resources for city districts was modified as follows:

- 3 % of SCO shared taxes to city districts for capital expenditure based on rules:
    - each city district will receive CZK 1 million,
    - and the remaining amount shall be distributed as follows: 55 % proportionally among city districts by population, 15 % by city district area and 30 % by area of roads,
- 10 % of shared taxes to city districts as non-purpose non-investment subsidies based on rules:
    - 44 % will be distributed among the city districts according to the number of inhabitants, 12 % according to the area of the city districts, 19 % according to the area of the green areas on the territory of the city districts, 25 % according to the area of roads in the territory of the city districts.

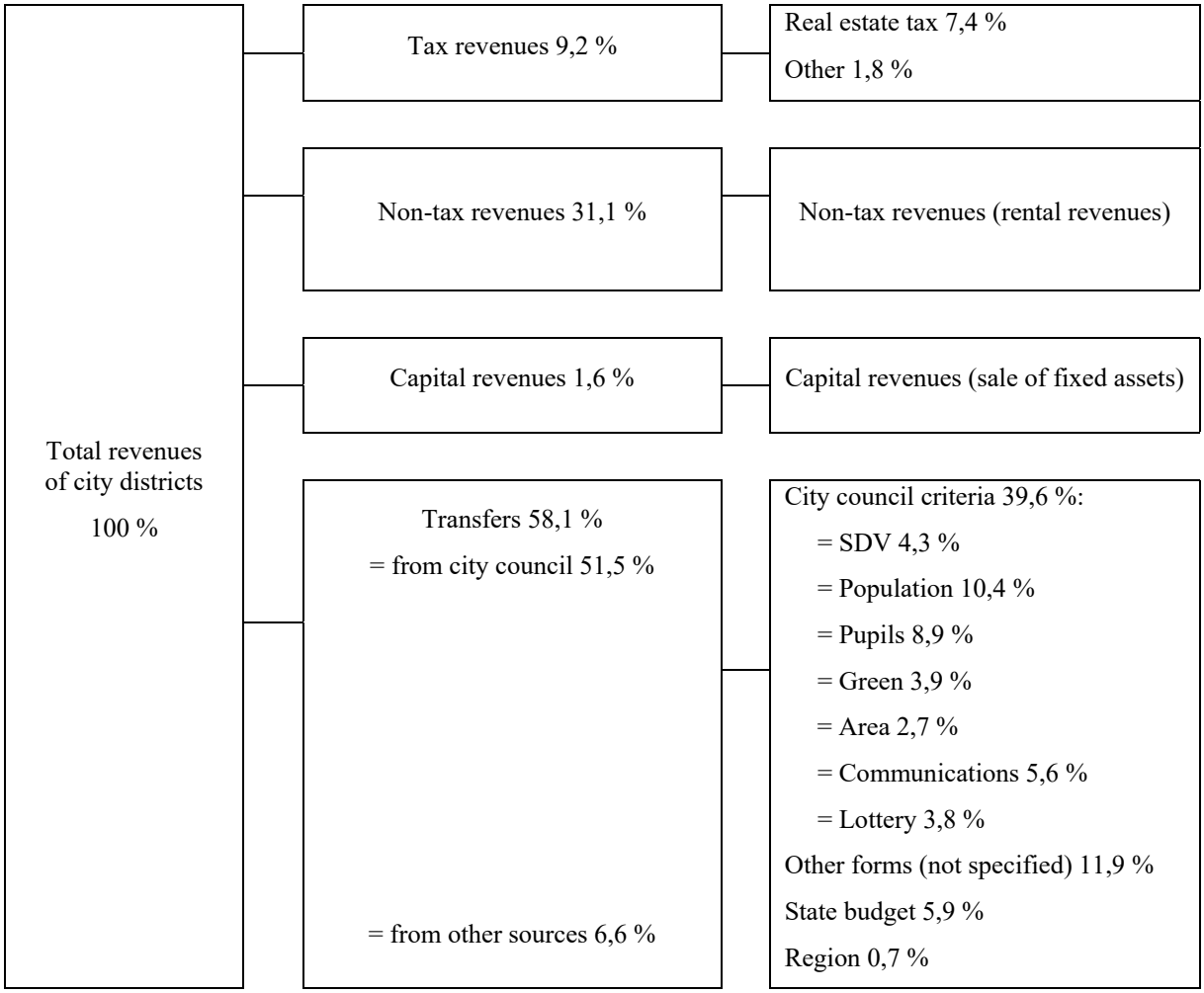
- for minor coverage, transfers from previous years, etc.

Some of the criteria in the listed city district revenue survey are applied two times and in fig. 2 is the sum only. Annex 1 shows the revenue of city districts in CZK.

Definition of factors of city districts revenues

For the purpose of defining the factors, it is possible to use the volume of individual types of city districts revenues. For this purpose, it will be worked with delimitation of such revenues that city district can influence, that are reflect of its aspects, and can use them freely. Their definition is as follows:

Figure 2: Structure of revenues of city districts in % (2007)



Source: Own calculation based on city district budgets

In frame of tax revenues there is significant mainly revenue from real estate tax. This tax is significantly differentiated per inhabitant of individual city districts. The reason for the large differences among the city districts is the placement of property in the territory of the city districts, especially the assets of business entities.

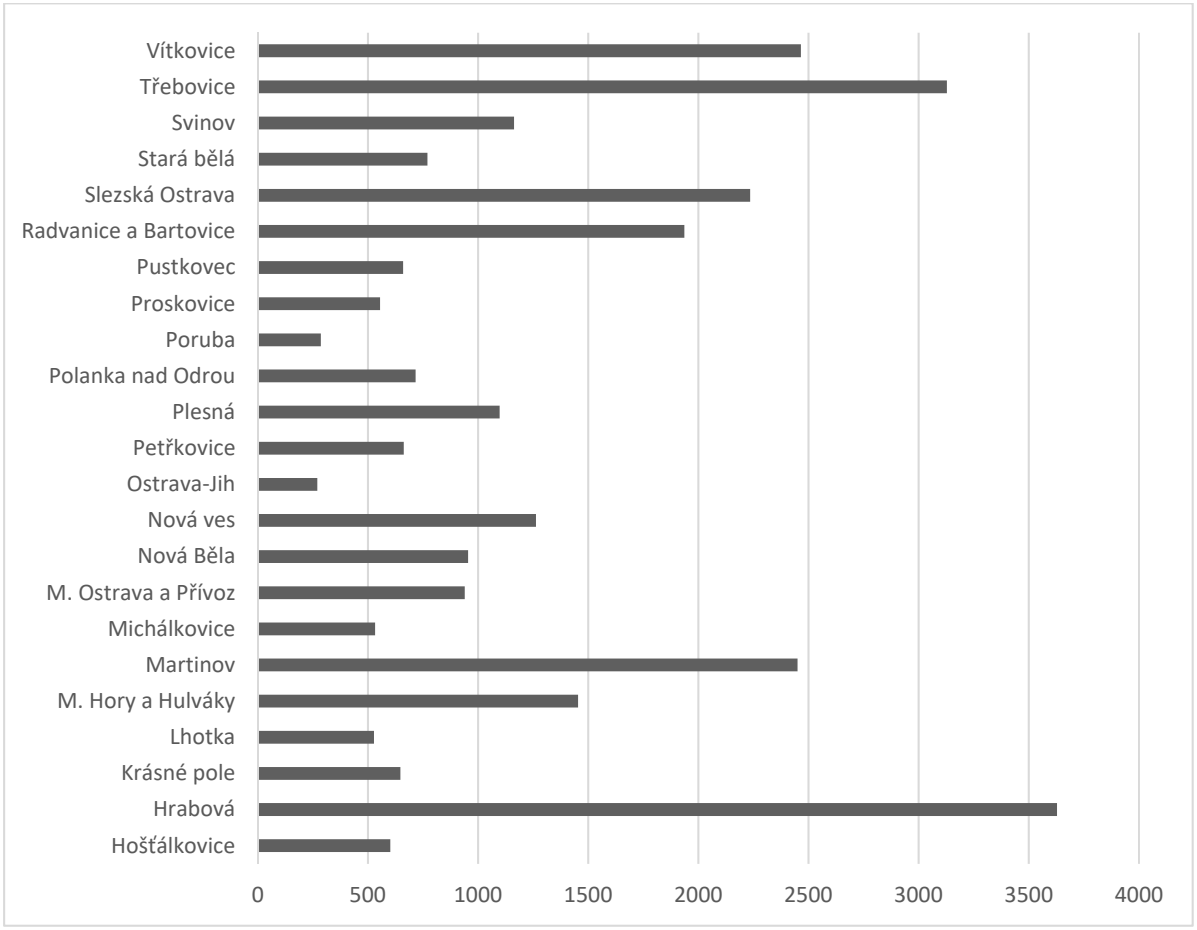
- Relatively large representation in city district budgets have non-tax revenues. However, their role as a source of management is limited by the fact that these non-tax revenues result from the lease of property, especially housing, when the city districts return the funds to the housing stock. Thus, non-tax revenues cannot be considered as resources having the nature of free use.
- Capital revenues are very small, but can be considered as own disposable revenue.
- Transfers are not generally included in the own revenues framework. For city districts, these are transfers provided from the city budget on the basis of set criteria - however, from a methodological point of view, a part of the transfers that the city districts have acquired from their own activities from other public budgets, especially from the state budget and from the regional budget, is included.

Results and Discussion

The revenues of the city districts after the reallocation of funds within the city are mainly composed of transfers with a share of 58.1 %. It turns out that revenues of city districts depend primarily on the redistribution process within the statutory city (51.5%). In this way, the city districts can influence 48,5 % of their revenue by their own activities (9,2 % + 31,1 % + 1,6 % + 6,6 %); these are tax revenues, non-tax revenues, capital revenues and transfers from other budgets (see Fig 2).

The set rules (subsidy criteria) for distribution of resources to city districts determine the resource by 51,5 %. In frame of other possibilities of resources for the city districts significantly act their non-tax revenues, where their size is also largely influenced by the relevant expenditure (e.g. in terms of revenue from property leases and, on the other hand, expenditure in the given property). In this way the city districts themselves can influence the size of these revenues (and expenditure).

Figure 3: Yield of real estate tax per capita in Ostrava city districts (in CZK)



Source: Own calculation based on results of management of city districts in 2017

Therefore, if we also consider non-tax revenues as revenue conditionally related to expenditure within the stated structure of revenue (especially when it comes to revenue from property rentals, i.e. flats and non-residential premises, on the other hand, these revenues are used to pay for services to suppliers for repairs etc.), then the given conditions of revenue of city districts "freely usable" creates mainly real estate tax (7,4 %), or local fees. No specific coefficients are applied in the city territory within the real estate tax.

This tax reflects the placement of buildings and land in the city, and a relatively larger amount of tax occurs in those parts of the city where significant business activities are located. Yield of taxes on per capita in city districts (see Fig. 3) vary widely. The highest values are reported for Hrabová district (industrial zone), Třebovice district (power plant), Vítkovice district (engineering plant), Martinov district (food processing plant). On the other hand, low values are reported by Ostrava-Jih district (mainly housing), Poruba district (mainly housing), etc. By the average of tax yield value within the city which is 759 CZK/person, the values in city districts range from 270 CZK/person (Ostrava-Jih) to 3622 CZK/person (Hrabová), which is more than 13 times.

Conclusion

The analysis of city district management showed the main factors influencing the sources of the city districts.

More than half of the resources are provided to the city districts by a statutory city on the basis of statutes (51,5 %). This takes into account the specific conditions of the city districts such as population, area of communications, number of pupils and other specifics. The rest of the resources depend on the management of the city districts. The main factors are non-tax revenues, but related to expenditure, as well as tax revenues, or grands from public budgets outside the city.

In terms of tax revenues, the most important role is played by the real estate tax, which has a significantly differentiated character in terms of yield on per capita in city district. This tax then affects the resources that city districts have for free use. However, related with this tax, it is appropriate to discuss the issue of its redistribution in the management of all city districts.

From the point of view of the real estate tax, the tax yield, especially in the case of higher values of this tax in places of business activities, is linked to environmental pollution. However, within one city, the question is whether the impact of the deteriorated environment (i.e. emissions) from a single source falls only on the relevant city district, or even on other city districts.

This situation of differentiation of revenue from real estate tax is offered for discussion in terms of the suitability of said source as revenue of city districts. In the broader context, this question is also offered for discussion in terms of the suitability of the tax in municipal budgets, where there are significant differences between municipalities per capita, similar to the districts of Ostrava.

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Health & Long-term Care Financing

Jaroslav Vostatek*

Abstract. The typology of health care systems adopted by the OECD does not reflect the typology of basic welfare regimes and, as far as Czechia is concerned, does not in fact affect the restoration of detailed central management through the so-called reimbursement decree introduced in 2006. The Czech 7 public health insurance funds rather than reflecting a market system, present only a complication and a platform for the promotion of lobbying interests. The health insurance premium is an unfair personal income tax, which most affects employees and employers.
Since the Czech health care financing "system" lies closest to the social democratic model in terms of content, the paper focuses on reform measures that will lead to transformation in this direction. The easiest task concerns the elimination of health insurance premiums. The financing of long-term care should be conceptually linked to the health care system; thus, the universal long-term care allowance is redundant.

Keywords: welfare regimes, health insurance, long-term care, personal income tax.

JEL Classification: I13, H75, H24

Introduction

The OECD (2018) recommends us to reform the funding of health and long-term care:

„Gradually increase contributions from the self-employed to better reflect their contribution capacity.
Broaden revenues from general taxation for the health care sector by setting a contribution on all kinds of revenues.
…
Incentivise regional authorities to ensure that enough long-term care institutions exist within their borders.
Provide social care allowance taking into account individual's income to guarantee that individuals can afford accesss to institutional care." (OECD, 2018).

It has been claimed repeatedly that the Czech health care financing system is unconstitutional. A recently filed, broad-based constitutional complaint "refers to the complete spending of CZK 320 billion concerning which no legislative regulation exists and where those affected have nowhere to appeal." (Dostál, 2019).

This paper focuses on the basic characteristics of the financing of the Czech general health insurance and long-term care systems. We start with the premise that the financing system should be based on the selection of a health and long-term care social model (welfare regime). And conversely, the underlying hypothesis is that the main source of the above-mentioned problems in the Czech system consisted of the combination of several models during and following the establishment of the Czech general health insurance system.

When systematising the financing of health and long-term care, the author proposes the application of the Esping-Andersen (1990) typology of the whole welfare regimes which distinguishes between the liberal, Christian democratic (conservative) and social democratic (universal) social models. We add the neoliberal model that has emerged since the 1990s. The fundamental differences between these four basic social models can be represented schematically by differences in emphasis on the individual choice and mandate on the one hand and the role of the state in the organization of the security system on the other – see Figure 1.

Figure 1: Typology of basic social models (welfare regimes)

Privately organized — *Individual choice* — *State organized*

Liberal model	**Neoliberal model**
Christian democratic model	**Social democratic model**

Mandate

Source: own elaboration.

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The liberal model of health & long-term care financing

The private health insurance has several characteristic design elements which are derived from the equivalence principle and its implementation in the market environment. Prior to the conclusion of the insurance contract, the private insurer checks the health conditions of the client and tries to reflect the individual risk in the amount of the premium. In the case of a bad "risk", the insurer refuses to conclude the contract. The US health and long-term care programme for those with low incomes, Medicaid, complies with the liberal health and long-term care model. The programme is based on the purchase of health and long-term care or the payment of private health insurance premiums for its clients. Around one-sixth (74 million) of Americans participated in the Medicaid programme in 2017, accounting for roughly one-sixth of all healthcare spending; Medicaid's share of total long-term care spending exceeds 50% (Rudowitz and Valentine, 2017). A further 7 million children are clients of a similar system known as the Children's Health Insurance Program (CHIP) intended for uninsured children up to the age of 19 and pregnant women from families with lower incomes above Medicaid income limits. In total, nearly a quarter of all Americans participate in these two programmes.

The system of universal financial benefits at the subsistence level (the Beveridge model) provides a typical example of the modern version of the liberal social model. A universal benefit scheme of this type was introduced in the United Kingdom in 1948. A universal care allowance element was added to the system in 1971 in two variants: for those aged 65 and over (Attendance Allowance, AA) and those aged 16-64 (Personal Independence Payment, PIP). The benefits differ in the fact that the AA does not include a mobility allowance. The AA has two rates, £57.30 and £85.60 per week for 2018/2019. The lower amount is for persons who require personal care only during the day or only during the night, while the higher rate is available to those who need day and night care. The mobility component of the PIP is also provided in two amounts: £21 and £55.25 per week. The caregiver is entitled to receive the Carer's Allowance of £64.60 weekly provided he/she cares for at least one client for a minimum of at least 35 hours per week. The health care of clients in institutions is fully funded by the NHS. Moreover, the NHS contributes £158.16 per week via the Nursing Care Contribution to the payment of institutional fees, paid directly to the care institution. The private sector, which largely prevails in the provision of institutional care, receives no institutional subsidies. Special social assistance is provided at the county level for those in need involving the means-testing of the applicant's income and assets and the assessment of the adequacy of basic care services and the cost thereof (at the local level). It is based on the principle that the recipient pays for accommodation, meals and other "hotel services" him/herself. A significant source of payment for permanent institutional care consists or may consist of the client's financial assets including the selling price of the client's home. Attention is devoted to the functioning of institutions as a whole and on personalised contributions to individual clients (a defined amount of pocket money must remain available to the client). These various components together make up a typical example of a modern liberal system.

The Christian democratic model of health & long-term care financing

While the Christian democratic social model consists of several completely different (sub)models, i.e. for individual social groups (civil servants, military personnel, police officers etc., private sector employees, entrepreneurs etc.), in this paper we restrict ourselves to the social insurance system (the Bismarck model) which is now applied in the respective countries to the vast majority of employees in the private sector..

The Bismarck model is generally characterised as a model of earnings-related benefits. The incorporation of a universal health care system into the Bismarck model is clearly in conflict with this characteristic since such care cannot be provided in dependence on employee earnings. Originally, this made up a "minor" deviation since healthcare constituted a less significant benefit of social sickness insurance. However, the relative importance of healthcare as an in-kind benefit has increased significantly with the development of healthcare as such, while the quantitative significance of sickness benefit has declined significantly as a result of the transition to wage compensation in the first weeks of incapacity for work funded by the employer. In addition, social health insurance has been extended to non-earning members of the household of insured employees. According to this model, social sickness insurance is administered by self-governing, non-profit sickness funds of respective companies or the branches thereof supplemented by territorial sickness funds. Each of these sickness funds is "self-financing" through the collection of premiums from insured persons and their employers. A variation to the self-financing principle has been introduced in Germany where legislation provides for a single nationwide premium rate (14.6% of which the employee pays half) and sickness funds can impose additional premiums according to their needs. The uniform premiums constitute receipts for the Central Health Fund which redistributes them to sickness funds according to the number of clients, their age and gender while taking into account selected diagnoses.

Care insurance was introduced into the German social insurance system in 1995 to cover part of the costs of long-term care. The contribution rate is currently 3.05% of salaries, of which the employer pays half. Social insurance for long-term care is managed by sickness funds. The reason for the introduction of this insurance consisted of the need to provide a financial relief for municipal budgets in connection with the funding of long-term care.

The Bismarck model of self-governing sickness funds has also been applied in Austria. The system includes 15 sickness funds in the basic employer system, consisting of 9 territorial funds and 6 company funds. The premiums cover approximately two thirds of the costs of the Austrian public health care; one third is provided by the public budgets, mainly through territorial sickness funds. Major organisational reform will be introduced this year to the Austrian system involving the merging of the 15 sickness funds into one national system under the Austrian Health Insurance Fund (Österreichische Gesundheitskasse). The main effect of the reform will consist of the cancelation of around 19,000 jobs, resulting in a saving of €1 billion by 2023.

A care allowance (Pflegegeld) was introduced in Austria in 1993 in the form of a universal state long-term care benefit which was conceived as a partial reimbursement of the extra costs of long-term care. The care allowance is split into 7 categories according to the degree of assistance required, from €157.30 to €1,688.90 per month in 2019. In addition, there is an all-day care support (Förderung der 24-Stunden-Betreuung), which is available for assistance in the household of clients with a net income of up to €2,500 per month.

The inclusion of (almost) universal healthcare in the social sickness insurance system and its funding by insurance contributions – a percentage of earnings – constitutes a systemic problem: social health insurance premium is a bad tax since not all income is taxed. This also applies to long-term care social insurance. Healthcare is substantially more solidary than are "remnant" social sickness insurance benefits.

The social democratic model of health & long-term care financing

The social democratic social model places emphasis on the provision of universal services and benefits. Universally-provided health and long-term care (for all residents) forms part of this model as does the predominantly budgetary funding of this care. There are no insurance premiums in this model.

Around 83% of health and long-term care costs in Sweden are funded from public budgets: 53% from the regions, 25% from the municipalities and 2% from the state budget. Regions and municipalities collect significant proportional personal income taxes; in 2015 expenditure on healthcare constituted 89% of all regional expenditures. 69% of all regional revenues are provided by the collection of regional taxes and 17% via state subsidies. The purpose of state grants is to redistribute financial resources between the regions according to needs (Glenngård, 2016). Healthcare charges are regulated on the national level and are generally considered to be low.

The vast majority of Swedish general practitioners (GPs) are employees. There are around 1,200 medical practices of which roughly 40% are private. On average, each medical practice has 4 GPs; it is standard that Swedes register at such a practice. No formal gate-keeping system exists, patients are permitted to directly visit hospitals or specialists; however, visits to specialists are usually associated with a higher fee.

The social democratic model is the most common healthcare model in the OECD countries. The second most common model is the Christian democratic model which, in practice, has been modified via a significant shift towards universal healthcare. Other models are applied only in a small number of OECD countries. Almost all post-communist countries apply a system of one public health insurance fund, which can be considered to be a modification of the social democratic model.

The neoliberal model of health & long-term care financing

The neoliberal social model calls for significant state intervention so as to enable or, in some cases, create a comprehensive competitive environment. Mandatory private health insurance can be considered to make up the basic version of the neoliberal model. This model includes the payment of a universal premium, independent of the earnings of the participant. Moreover, it assumes the provision of subsidies for a substantial proportion of the insured population. Private health insurance companies are not permitted to reject clients according to this model.

The neoliberal health insurance system is applied in many respects in Switzerland, although it is often referred to as social health insurance there. The introduction of mandatory health insurance in 1996 considered three objectives: high-quality health care for all, social solidarity in the form of universal insurance premiums and pressure to avoid increasing costs. Deviations from the neoliberal model are evident with respect to the relatively high level of the direct financing of hospitals from cantonal budgets and the compulsory non-profitability of insurance companies. The premium for the basic care package is a uniform amount in individual cantons differentiated according to three age groups (children up to 18 years, young adults up to 26 and other adults). These three groups also include insured persons who are entitled to an insurance premium "discount"; cantonal insurance premium subsidies constitute a separate benefit in the social assistance system. The basic health care package does not include, *inter alia*, dental care. Around 80% of Swiss citizens have private supplementary insurance, especially dental insurance. There is also a large selection of private hospital supplementary insurance schemes on offer.

A typical feature of the Swiss mandatory health insurance system consists of a relatively high out-of-pocket payments (10% of the account, up to CHF 700 per year for adults and CHF 350 for children up to 18 years), including the use of "franchises" (annual deductible excess). Other typical private insurance constructs are also

used, especially the option to reduce the extent of care provided in return for a discount on premiums (higher franchises) and to limit the choice of doctors and health facilities, a telephone consultation instead of a visit to the doctor, etc. The third objective has not been met, i.e. effective systemic pressure against increasing costs. Overall, the level of health care in Switzerland is very high but at the extent of substantially higher costs.

Around 36% of long-term care in Switzerland is funded privately, the provision of it is largely seen to be a personal or family problem. Public long-term care is the responsibility of municipalities and cantons. Mandatory private health insurance covers the costs of institutional and home-care services and contributions to long-term institutional care. Since 2011, the following have served to cover the costs of institutional long-term care:

- A health insurance company contribution according to the degree of care required (12 degrees) - up to CHF 108 daily;
- A client contribution of up to 20% of the above amount, i.e. up to CHF 21.60 daily;
- A contribution from the municipality which covers the remaining costs.

The cost of "hotel services" under the institutional care is borne by clients. It is obvious that the aforementioned long-term care financing schemes allow for the individualisation of the bearing of costs. The financing of long-term care in Switzerland includes neoliberal features primarily through the link to mandatory private health insurance with the associated significant client excesses and the universal premium.

The neoliberal theory of healthcare was developed in the 1980s by Enthoven who employed the term managed competition. The aim was to reform the basic American healthcare system provided as an employee benefit (Enthoven, 2003). "The managed competition model relies on three central assumptions with regard to the behaviour of market actors. All of these assumptions are interlinked, each one is necessary but not sufficient:

1. Insurers compete with each other via price, quality and range of services without having permanent monopoly power.

2. Consumers have free choice between insurers and exercise their right to choose.

3. Non-effective and/or non-efficient providers are induced by insurers to work more effectively and efficiently and provide good quality. Otherwise, they are not contracted." (Greß a kol., 2001).

Enthoven's concept of managed competition has been applied to a significant extent in the Netherlands since 2006, to substantially boost the motivation for increasing the efficiency of the healthcare system. The three main actors in this system are insured persons/patients, insurance companies and healthcare providers and the corresponding three main regulated markets consist of the health insurance market, the healthcare provision market and the healthcare purchase market.

The three mentioned conditions for the operation of Enthoven's concept of managed competition have not been met in practice in the Netherlands. "The Dutch reforms have not caused individual consumers to seek value, and "managed competition" has led to a less competitive market. After just two years, the Dutch insurance market was a clear-cut oligopoly." (Altenburg and Lynch, 2010).

The principle deviation from the neoliberal model in the Netherlands consists of the dual system of the financing of mandatory private health insurance. In addition to the universal premium ("nominal premium") collected by individual insurers (some 66% of clients have "group insurance" with a discount of up to 10%), a further earnings-related insurance premium system exists - as is usual under social insurance schemes, this premium is paid by employers to the fiscal administration. This second premium (6.95% of wages) is then remitted to the Central Health Fund which uses the premiums as a source for the assignment of capitation payments for clients to individual health insurance companies. Capitation payments are differentiated in a similar way as in Germany. The earnings-related insurance premiums provide for around 50% of the total financial resources of this health pillar and "nominal premiums" around 40%. Nominal premiums for children under 18 are paid by the state. Those in need (around 40% of the total insured population) are entitled to a state contribution towards the payment of nominal premiums.

A further healthcare financing pillar in the Netherlands consists of voluntary private insurance which is arranged with (the same) specialised health insurance companies. In most cases, the supplementary insurance covers mainly dental care which does not form part of the mandatory private health insurance basic healthcare package.

The third pillar of the Dutch health insurance system consists of social long-term care insurance; in 2015 this insurance was reduced to cover only 24 hours per day, 7 days per week institutional care. Eligible persons who, nevertheless, would prefer to stay at home can apply for in-kind care provision at home or for a personal budget. Domestic nursing care was transferred to the mandatory private health insurance pillar, with the remaining part of long-term care becoming a municipal responsibility. In 2015, long-term care insurance premiums were reduced to 9.65% of the salary; insurance premiums are paid by employees through the fiscal administration system to the Long-term Care Fund.

The Obama health insurance reform introduced a neoliberal individual mandate to purchase health insurance for those not covered by any other healthcare system. More healthcare systems exist in parallel in the US that emerged long before the introduction of the Obama reform, concerning which Reid (2009) provided an interesting characterisation. He presents that the 9 million war veterans and members of their families (including survivors) enjoy the best public healthcare in the US: "When it comes to treating veterans, we're Britain or Cuba." Seniors – former employees are covered by Medicare: "For Americans over the age of 65 on Medicare, we're Canada"; this system is generally referred to as the single-payer system. Medicare collects a payroll tax levied at a basic rate of 2.9% (employees pay half); this insurance premium/tax covers around 37% of the total expenditure of the Medicare system.

The third US healthcare system consists of the occupational scheme: "For working Americans who get insurance on the job, we're Germany." (Reid, 2009). The Affordable Care Act (Obamacare) requires employers with at least 50 full-time workers to offer health insurance coverage to full-time employees and their dependents. In March 2018 health care benefits were available to 69% of private industry workers and 89% of state and local government workers. The participation rates were lower: 50% in private industry and 70% in state and local government. Obamacare rules entitle employees who receive this employee benefit to exchange this benefit for a voucher for the purchase of private health insurance. Employer-based health care covers 49% of the US population, followed by Medicaid (21%) and Medicare (14%). The fourth and final system as classified by Reid (2009) consists of the out-of-pocket model: "For the 15 percent of the population who have no health insurance, the United States is Cambodia or Burkina Faso or rural India, with access to a doctor available if you can pay the bill out-of-pocket at the time of treatment or if you're sick enough to be admitted to the emergency ward at the public hospital."

The neoliberal mandatory private health insurance system makes up only an "supplementary" health care system in the US: in 2017 it covered 7% of the population, with 9% of the population uninsured. Elements of neoliberalism, however, influence almost all the medical systems in the US. Trump intended to abolish Obamacare; in the end, however, this legislation was "merely" undermined by the amendment that the amount of the fine for the non-conclusion of mandatory health insurance was set at zero from 2019. Together with the rise in the number of uninsured Americans, savings in government spending are also to be expected since the conclusion of individual health insurance is associated with large state subsidies. Meanwhile, legislation has been enacted in four US states introducing an individual mandate to purchase health insurance in the given state, pointing also to a large increase in premiums. Similar legislation is under preparation in other US states.

The American long-term care system includes significant neoliberal features. "Unlike Medicare, Medicaid covers many more types of long-term care costs for people 65 or older (in nursing homes, at home and in assisted living facilities), but most people do not qualify for it because their income or assets are too high. … In fact, Medicaid is the default payer for about 62 percent of nursing home residents and over half of long-term care spending in America is done through Medicaid." (Eisenberg, 2017).

„The U.S. health care system does not work as well as it could, or should. Prices are high and rising, there are serious quality problems, and many characterize the system as rigid and unresponsive, lacking dynamism and innovation. A lack of competition is a major contributor to this dysfunction. In some cases, markets lack the basic conditions required to stimulate and support competition. In others, conditions have changed in ways that reduce competition." (Gaynor a kol., 2017). „The United States is unlike every other country because it maintains so many separate systems for separate classes of people. All the other countries have settled on one model for everybody. This is much simpler than the U.S. system; it's fairer and cheaper, too." (Reid, 2009).

The Czech system of health & long-term care financing

Following the Velvet Revolution, the pre-existing base of the state healthcare system could have continued; it would have been sufficient to merely adopt the experience of one of the Western countries that operated an NHS system. In most other European post-communist countries, monopolistic health insurance companies were created which, essentially, took over the financing of universal healthcare. At the same time, public health insurance contributions were introduced. Mostly formal changes were realized that served mainly to complicate the functioning of the public healthcare system.

One of the basic pillars of healthcare reform issuing from a Czech Government Resolution in 1991 consisted of the intention to re-introduce a Bismarck-type health insurance system as the dominant approach to the financing of healthcare and including the privatisation of especially outpatient-type health facilities. From the point of view of citizens, the most important benefit consisted of the introduction of free choice with concern to medical facilities. "The reform of the Czech healthcare system was primarily prepared within healthcare circles with the low participation of the non-healthcare public. The driving force was clear, i.e. to provide for a steadily higher level of healthcare funding and to create space for the privatisation of healthcare services. It is questionable whether the

reform sufficiently accentuated the interests of citizens both as taxpayers and healthcare consumers" (Němec, 2001).

In 1992, the General Health Insurance Fund of the Czech Republic was established, the mission of which was to "provide for general health insurance, unless such insurance was provided by ministerial, professional or occupational health insurance funds". The liberal policy leading to the creation of "ministerial, professional, occupational or other health insurance funds" was introduced in 1992 and focused on specific employee groups thus enabling the collection of substantially higher contributions from their clients; as a result principally of this (absurd) motive, a total of 27 health insurance companies were created. The redistribution of premiums of health insurance funds amounted to 50% of collected premiums only. Not until 2005, 100% of premiums have been redistributed. The liberal regulation of newly-created occupational health insurance funds and the emphasis on the fee-for-service payments to medical practices in the early 1990s led to a substantial increase in public health spending relative to GDP (the World Bank explicitly warned the Czech Republic against introducing the fee-for-service payments). The explosion in costs was only halted by the issuance of the reimbursement decree in 2006 which essentially involved the reinstatement of a detailed central management system. Subsequently, most of the new health insurance funds closed. Now we have a "public health insurance" system provided by the General Health Insurance Fund of the Czech Republic and 6 "occupational" health insurance funds. The competition between these non-profit insurance funds is, in principle, only theoretical.

No functional healthcare market has ever been introduced in our country; moreover, conditions in the various healthcare provider sectors differ significantly. In this context, the breakthrough all-sector provider agreement prior to the issuance of this year's reimbursement decree has done little to change the situation. The Public Health Insurance Act has, for more than 25 years, stipulated that the reimbursement of healthcare services is to be agreed between providers and insurance funds; the ministerial decree shall ultimately confirm the agreement of the "market partners".

Public health insurance premiums are commonly regarded as a "health tax" in Czechia despite it flows from payers to individual health insurance funds. The premiums for the so-called state-insured persons (pensioners, children, etc.) are paid by the state in the form of a universal contribution, the amount of which is determined by the fiscal considerations of the government and the legislative body, regardless of the real cost of the healthcare of state-insured persons. So-called persons without taxable income are obliged to pay (another) universal contribution, in the amount of 13.5% of the official minimum wage (this year CZK 1,803 per month); around half of such persons in fact do not pay this contribution.

The current Czech healthcare insurance premiums were established in the tax reform of 1993 which splitted the wage tax into tax on income from dependent activity and employee insurance contributions. The notion that (the same) contribution should be paid by every insured person complies with the neoliberal mandatory private health insurance model only. The more this principle (in the neoliberal system) is breached, the bigger nonsense it produces. It is so today in Czechia: the premium for state-insured persons amounts to one-fifth, the premium of insured persons without taxable income around one-third and the premium of the self-employed around half of the average employee premium. We have no neoliberal healthcare financing system; thus, the Czech healthcare insurance premium clearly constitutes an unfair tax. All contributions are fully redistributed in Czechia according to cost indices announced annually by a Ministry of Health decree. Such cost indices are similar to the capitation payments made by the German Health Fund. The existence of insurance contributions cannot be justified from the systemic point of view since the provision of basic healthcare services is universal, independent of earnings.

The classification of the Czech public healthcare insurance system is not simple since it is a mixture of the "leftovers" of several different systems. The social democratic model, however, provides the "best fit" given the current universality of public healthcare and state regulation. The simplest reform would, therefore, be the abolition of both health insurance funds and public health insurance contributions. "The Czech health insurance system, the existence of several health insurance funds is a nonsense that survives due to the activities of a group of lobbyists ... The state should eliminate these mafia and lobbying groups via the implementation of one single effective solution – the merging of all health insurance funds into one state institution. This would reduce the administrative costs. ... the management of the entire health insurance agenda would be ensured by one minor state office. ... Health insurance funds administer the health payment system 4.36 times less efficiently than the Czech Social Security Administration (CSSA) and 3.86 times less efficiently than the tax authorities!! ... There should be just one health insurance fund; I imagine that the CSSA would do the job as well. ... Total cost savings can be estimated at approximately CZK 10 to 13 billion per year!" (Rotschedl, 2019).

Long-term care in Czechia is partly provided by medical facilities according to public health care rules and its predominant part is regulated by the Social Services Act. The introduction of the long-term care allowance (CA) from 2007 was motivated by the effort to transfer public resources to clients and not to institutions. The Czech CA is a universal public benefit, with 4 levels, according to dependence on another person's assistance. It is thus analogous to the Austrian CA which was expressly designed as the universal partial reimbursement of the extra costs of long-term care. The CAs in Czechia, Austria and Germany favour informal client care, unlike the social

democratic model that prefers the provision of services via an employment or similar contract (including employment of family members).

According to legislation, the individual subsidies to social service providers from the state budget ought to be abolished by 2012; however, this has not happened, and no-one counts on this happening in the near future. For more than 10 years, the Ministry of Health has been unable to agree with the Ministry of Labour and Social Affairs on a unified approach to financing social health care. Municipalities should focus on social services including long-term care, according to foreign experience. The NHS should be concentrated mainly at the regional level. There is no need to have a care allowance in a single-payer system.

The OECD's advice to motivate regional authorities to ensure a sufficient number of long-term care institutions in their regions will not help the situation. Responsibility for long-term care should be transferred to "municipalities with extended powers", i.e. the only Czech state administration level that can be transformed into a basic municipal self-government unit. It would be easier to cancel the care allowance and differentiate the institutional care fee according to the income of the recipient than to provide a CA that considers the individual's income. The regulation and financing of health and long-term care should consist of three levels: national, regional and municipal (at the level of municipalities with extended powers).

The simplest and most effective way forward for Czechia is to move to a single-payer system of the financing of health and long-term care. Long-term care could be integrated into the healthcare system. It would be both expedient and effective to abolish both the general health insurance premiums and the universal care allowance. OECD advice, on the other hand, is directed towards the adoption of a liberal or neoliberal model.

Conclusions

The national health service system corresponds to the social democratic social model. Moreover, it is also the most commonly applied healthcare financing system in OECD countries, which can be attributed to the on-average lower cost of providing the basic care package compared to the other social models. This model makes do without any hypothecated health tax. The system of a single public health insurance fund applied in most post-communist countries is a modification of the social democratic model and is linked to the existence of a hypothecated tax called public health insurance premium. From the theoretical point of view, we recommend the replacement of the health tax by general taxes, in particular personal income tax.

The original Bismarck system of integrating healthcare for private sector employees into segmented social insurance systems is reflected in the Christian democratic social model. However, the application of the principle of universality in the provision of healthcare in almost all countries with social health insurance systems, while simultaneously developing the supply and provision of healthcare, has led to the dismantling of the segmented social insurance system. Social health insurance systems designed primarily for employees no longer makes sense as a model.

The neoliberal healthcare financing model had many supporters among general economic theoreticians. Several neoliberal elements have emerged in several countries, stemming from both the social democratic and Christian democratic models with respect to the administration of the provision of healthcare. The model neoliberal system of financing a basic healthcare package is based on mandatory private health insurance which is regulated intensively by the state. The neoliberal model includes a universal premium combined with a special social assistance system, which enables a substantial part of the population to pay the premium. The neoliberal model is applied in several high-income countries with many modifications, e.g. in combination with earnings-related premiums or non-profit insurance companies. However, the results of neoliberal healthcare reforms have not been positive in terms of the development of costs.

The Czech healthcare financing system is closest to the social democratic model thanks in particular to the so-called reimbursement decree issued by the Ministry of Health. This decree will need to be transformed into a wider model of consensual bargaining and financial management. The existence of several health insurance funds is the remnant of efforts to apply the neoliberal model. However, the presence of health insurance funds in a single-payer system has no sense and is wasteful; indeed, the public health insurance system is counterproductive. When financing long-term care, it is most expedient to apply the same social model as that governing the healthcare system.

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