Proceedings of the 23rd International Conference

Theoretical and Practical Aspects of Public Finance 2018

Praha, 13 and 14 April 2018

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

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Prologue

On April 13 and 14, 2018 the Department of Public Finance organized already the 23rd international conference "Theoretical and Practical Aspects of Public Finance" with over 60 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 topic of the plenary session was 100 years of public finance at the territory of the Czech Republic, reflecting this years centennial anniversary of the republic. Roman Horák presented an overview paper titled 100 years of the public finance and 100 years of the tax reforms at the Czech Republic territory and Jan Pavel explained how preparation for defense of the Czechoslovak Republic in the years 1933 and 1939 affected public finances at that time.

The number of participants in the last years is slightly declining due to the growth of similar conferences organized by other Czech universities and gradual changes in the system of evaluation of academic research. The conference tries to offer enough space for young scholars including graduate students. The day before the conference starts there is organized a students´ competition. Participation of students at the conference is highly encouraged so that 8 out of 22 papers included in this proceedings are authored or co-authored by graduate or doctoral students. This share 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 focus of the papers presented during the conference shows that after a few years when the center of attention were the challenges in the area of public finance caused by the European debt crisis and the continued slow economic recovery, we are back in let's say normal times when the papers deal with broad range of topics.

The contributions were presented in three sessions: A - Tax Policy, B - Public Expenditure and C – Public finance and finance. This volume includes 22 papers from the conference out of the total of 45 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

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Do the control actions of the Czech SAO have any real impacts?

Jan Buček*

Abstract. The aim of the paper is to evaluate the qualitative impact of selected control activities of the Supreme Audit Office of the Czech Republic in the field of (especially tax) revenues of the state budget. In total, the SAO performs tens of control actions per year. However, an important point is the real impact of SAO's overall control activity. And this is precisely the aim of this paper. The aim is to find out whether control actions of the Czech SAO have any real impacts. In addition, the trend in government decisions on the results of controls carried out since 1993, which are materialized in the individual control conclusions, is examined here. The results show that the number of measures imposed has increased over time. This paper works both with individual government decisions, as well as with control findings and annual reports. The overall results show both the real qualitative impacts of some controls and the potentially increasing capacity for action of the Czech government.

Keywords: SAI, SAO, control action, annual report

JEL Classification: H83

1 Introduction

In the Czech Republic, the Supreme Audit Office which has been operating in its current form since 1993 performs control over the state property and the state budget.

The Supreme Audit Office (SAO) is sometimes referred to as the "fourth pillar of democracy", as it is defined in the Constitution in a separate fifth chapter. Its position, competence, organizational structure and other specificities are laid down in Act no. 166/1993 Coll., On the Supreme Audit Office, as amended.

The controls by the SAO verify whether the controlled activities are in compliance with legal regulations, examine their substantive and formal accuracy and assess whether they are efficient, economic and effective. The control of the SAO is subject to the facts ascertained, regardless of the type and level of confidentiality. The control conclusion is the result of every control action. A control conclusion is a report containing a summary and an evaluation of the facts ascertained during the control under the Act (§ 4 Act no. 166/1993 Coll.).

All approved control conclusions are published by the President of the Office in the Bulletin of the Office and sent to both the Government and the Chamber of Deputies and the Senate.[1] The SAO shall provide the Chamber of Deputies, the Senate, their authorities and the Government, upon request, with control protocols and other supporting documents for the approved control conclusions (§ 30 Act no. 166/1993 Coll.).

However, an important point is the real impact of SAO's overall control activity. And this is precisely the aim of this paper. The main aim is to find out whether control actions of the Czech SAO have any real impacts.

The meaning or the effectiveness of such a control action decreases significantly, if on the basis of the established deficiencies, no further remedial measures are taken by the Government of the Czech Republic or by the Control Committee of the Chamber of Deputies. An interesting indicator is then what amount of control conclusions was adopted by the Government resolution requiring the competent Minister to take corrective action to respond to the shortcomings found in the current control conclusion. The Minister should also be entitled to inform the Cabinet about the impact of the corrective measures in order to remedy the condition.

Furthermore, the aim of this paper is to identify the impacts of the SAO's controlling activity in the field of government revenues and to answer the question whether the control activity have an immediate effect on changing the relevant legislation. The field of the state budget revenues was selected with regard to their importance and a greater chance to influence future developments (compared to state budget expenditures).

A quantification of fiscal impacts in the control of the state budget revenues could be largely controversial so the paper will focus on the obvious, thus demonstrable, impacts of control actions at the legislative level in the most recent five-year period.

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[1] The law does not specify which authority should receive the control conclusion earlier.

The article is divided into the following four chapters (chapter 2 - chapter 5). The chapter 2 discusses the literature that deals with the impact assessments of the SAI's activities, the chapter 3 explains the data and method used, the chapter 4 describes the results both for the period since 1993 and for the selected five-year period and the final chapter 5 summarizes and discusses the most important findings and answers the question whether the SAO's control actions have any real impact.

Motivation to carry out this research was also a fact that no one has concerned with the issue.

Literature review

The role and the impact of the activities of the controlling institutions has already been dealt with by several works (e.g. Summa, 1997 or Pollitt et al., 1999 and Pollitt, 2003), in the context of the comparison of several selected Supreme Audit Institutions (SAI). These works compared performance reporting as well as, for example, methods for assessing the financial impact of a public audit performed by the SAI on national budgets. Lonsdale (1997) identified several ways by which SAI evaluate the value of their work, although the role and historical-institutional context of each SAI have a direct impact on how these institutions use these available methods. According to Lonsdale, these impact assessment methods are the following: changes made by the government; financial savings; impact on Parliament; media; independent impact assessment.

However, the quantification of these impacts is rather complex, and in general, an assessment of foreign SAI are diverse. British SAI is considered as advanced in this respect by some studies (e.g. comparative study by Otettea, Tita and Ungureanu, 2015 or Pollit et al. 1999). Pollit et al. (1999) states that the most common instrument for measuring impact, with the exception of financial benefits, appears to be the measurement of the proportion of recommendations adopted by Parliament and the Government for legislative changes. The financial impact can be quantified by reducing expenditure or revenue choice, increasing efficiency and effectiveness, quantifying improvements in the quality of services provided by a public sector entity - a benefit for others (taxpayers).

These studies (Pollitt and Summa (1997) and Lonsdale (1999, 2000)) in the same spirit as the previous analyse what tools are used to measure SAI's work. The results of SAI´s work were assessed on the basis of annual SAI reports.

The use of annual reports beyond the above-mentioned studies is also found in Groenendijk (2004), which deals with the analysis of the European Court of Auditors, namely annual reports from 1996 to 2001 aiming to analyze how the European Court of Auditors assesses the performance of EU Member States regarding management of EU finances. Another example is the study of González, López and García (2008), which discusses how the SAIs measure the impact of their work. These studies justify the use of these documents as an experimental analytical tool.

There are several models within the SAI which also influence the impact assessment itself and the methods by which these impacts are measured/evaluated. According to the NAO study (2005), within the EU it is possible to distinguish a model with a judicial function (e.g. France), a collective model of non-judicial structures (e.g. Germany), an audit office headed by an independent auditor or a non-governmental President (e.g. the United Kingdom), and a model led by the President, where the SAI performs local, regional and central audits (e.g. Slovenia). The World Bank PremNote (2001) also states that most developing countries use one of three audit systems - Napoleonic, Westminster or board.

Data and method

At first, it was necessary to examine the annual SAO reports for selected years, to determine the number of controls in the field of government revenue and to calculate the proportion of these controls on the total number of controls for the period between 2011 and 2016. The name of some controls was sometimes misleading, so it was necessary to verify their focus on the basis of the audit findings. These selected controls serve as a sample of the SAO control activity, which will be subject to subsequent analysis.

In order to determine the impact, it was necessary to read up on all publicly available sources, so the paper is based on information from audit activities, control conclusions, annual SAO reports and government resolutions.

For older control actions, appropriate government decisions had to be sought.

This sample did not include control actions that dealt with the means of selected health insurance companies (CA no. 14/33 and 13/22), the so-called split administration (CA no. 13/26) and actions focused mainly on accounting irregularities (CA no. 11/21, 10/17).

Moreover, the control action no. 11/21 was not included in Annex 1. It dealt with tax receipts only for their correct entry in the accounts. For the same reason the action no. 06/28 was excluded, too. Even action no. 99/31

and action no. 03/16, which followed, were not covered, although these actions concerned the revenue of the state budget, but only the proceeds of fines. The actions no. 13/26 (split administration) and action no. 99/04, which dealt with administrative fees, were also excluded.

Conversely, control action no. 14/08 was included, it dealt not only with spending but also with income from pension insurance premiums.

It is important to mention that these selected controls do not contain subsidies controls (from funds of the European Union).

Results

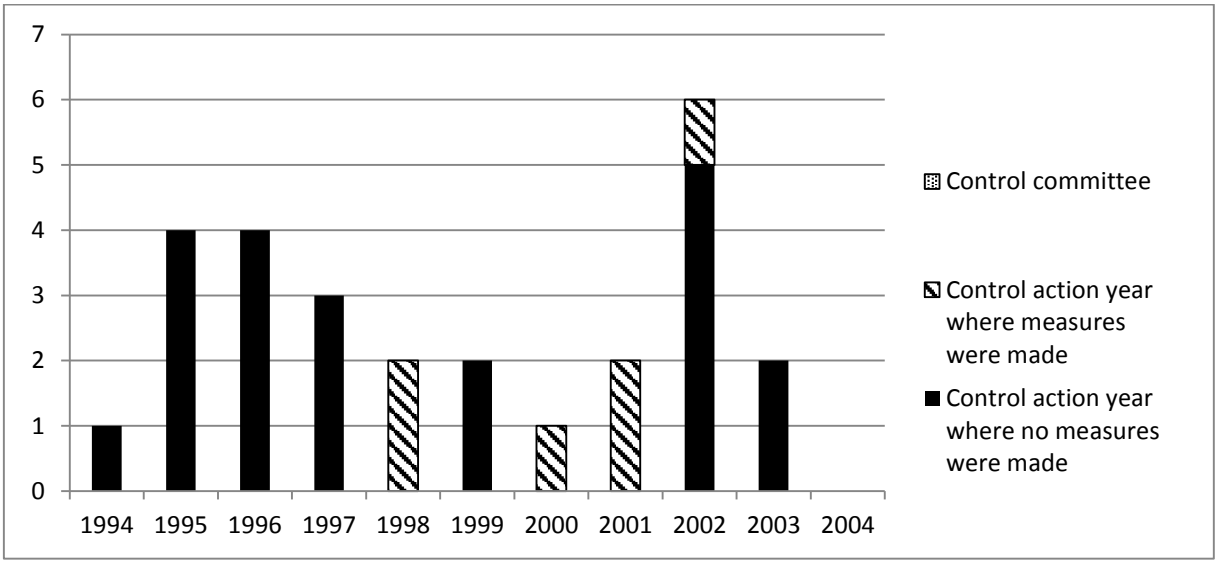
This section will discuss the results of the control actions since 1993. The results of the control actions in the last five years will be discussed in more detail.

Control actions implemented since 1993

In order to assess the development of the impact of control actions, a longer period should be considered, given the time of the establishment of the Czech SAO it is possible to assess the control actions only for the period since 1993.

The selected control actions are divided into two groups based on their impact. The first group includes controls, where, on the basis of the control findings, some remedial measures were imposed, based on a government decision. The second group consists of actions without impact in the framework of the discussion of the control conclusions by the Czech government. Results between 1994 and 2004 are shown in the Figure 1 below. As the chart shows, for most actions, the Government did not respond by imposing corrective measures.

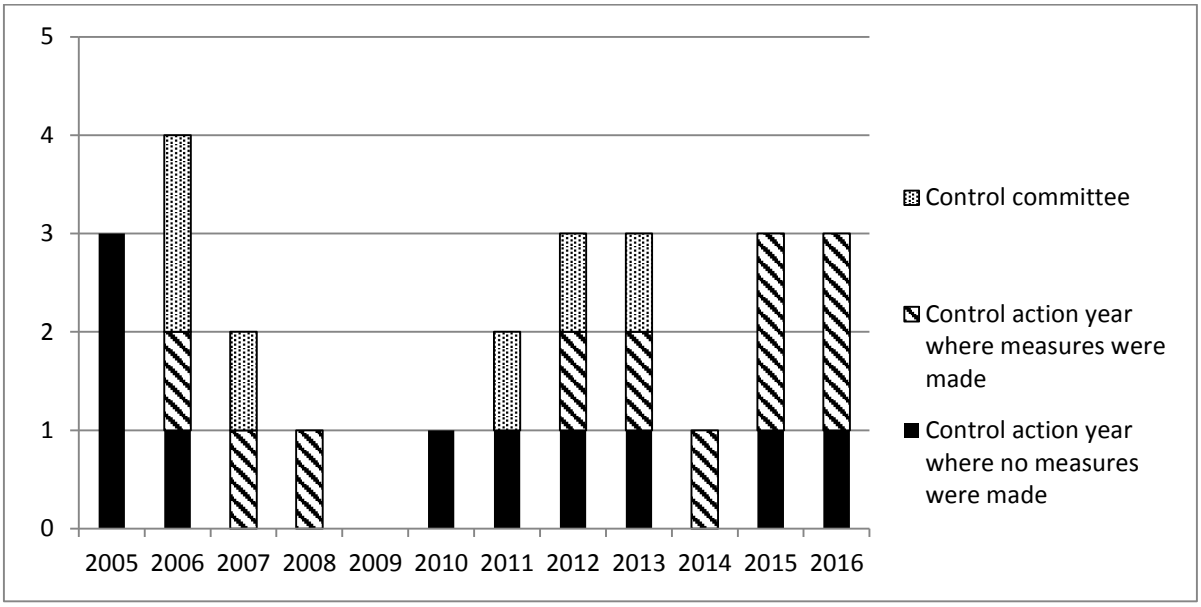
Figure 1: Controls of (mainly) tax revenues of the state budget between 1994 and 2004



Source: author, based on the information from the Government and annual reports of SAO

By contrast, between 2005 and 2016, the Government and the Control committee have responded considerably more often by imposing corrective measures. The results are shown in the Figure 2 below.

Figure 2: Controls of (mainly) tax revenues of the state budget between 2005 and 2016



Source: author, based on the information from the Government and annual reports of SAO

In the case of the assessment of the trend of the impact of control actions, it appears that the results of the control activity may not have been adequately appreciated in the 1990´s. However, there are two ways to interpret these facts. The first option is that the control actions did not come up with such important or interesting findings to initiate an appropriate government response that could eventually result in a change of the relevant legislation. However, if the earlier control actions did not contain, on average, fewer serious findings than the more recent actions, then the question arises – how much the SAO's partner on the side of the Government of the Czech Republic, either Parliament or the Control Committee of the Chamber of Deputies including its earlier parallels, acted reliably (in an operational sense).

As the Table 2 below shows, the number of regulatory interventions by the Government has increased over the period under review, there is a positive trend here. Taking into account the reactions of the Chamber of Deputies' Control Committee, which responded more frequently to control actions where no remedial measures have been imposed by the Government in the recent period, the trend becomes more highlighted. The example can be action no. 10/08 where no remedial measures have been imposed by the Government of the Czech Republic, but the Control Committee of the Chamber of Deputies of the Czech Republic have done so.

Table 2: Control actions since 1993

Period when a control action started	Total remedial measures	Actions without remedial measures
between 1994-2004	6	21
between 2005-2015	10	11

Source: author

In the context of the impact of control actions, the frequency of prosecutions or notifications to tax authorities made may also be interesting. The interesting fact is that by the year 2000, a total of 14 prosecutions were filed in the framework of the three control actions carried out, only one prosecution was followed after 2000. This may be related to both potentially more problematic control area and a short period since revolution.

Table 3: Control actions in field of the state budget revenues - number of notifications and prosecutions since 1993

Notifications to tax authorities	Prosecutions
99/21, 00/13, 00/25, 13/35, 15/17	95/04 (8x), 96/26 (4x), 98/02 (2x) 13/35 (1x)

Source: author, based on the information from SAO

Control actions in the last five years

The Table 4 below shows the number of control actions in the field of the state budget revenues completed in the last five years. The number of these audits is based on an average of 2 per year. However, the SAO (Annual Report, 2016) notes that, despite their minority status, these control actions are in the centre of attention of the SAO.

Table 4: Number of finished control actions

The year in which the control actions were finished	Total number of control actions completed in a given year	Number of control actions in the field of the state budget revenues	Share of actions in the field of the state budget revenues (%)
2016	40	3 (15/15, 15/17, 15/33)	7,5
2015	36	3 (14/08, 14/17, 14/28)	8,33
2014	40	1 (13/35)	2,5
2013	41	2 (13/02,13/15)	4,88
2012	40	2 (11/07, 12/01)	5
2011	32	1 (10/08)	3,13

Source: author, based on annual reports of SAO from 2011 to 2016

Based on the qualitative research carried out, it was found that a significant change in legislation based on control actions started between 2010-2015 occurred only at control action no. 13/35, the action no. 10/08 (follow-up 13/15) had some legislative impact, too. A shorter description of these actions is attached in Annex 1.
For other control actions, the impact in terms of obtaining information on the state of the controlled area occurred or there might have been changes in the internal nature that cannot be evaluated from publicly available sources in any relevant way.

Table 5: Legislative impacts of control action of (mainly) tax revenues of the state budget since 2010

Control action year and number, where measures were made	Control committee	Control action year and number, where no measures were made
12/01, 13/15, 13/35, 14/17, 14/28, 15/15, 15/33	**10/08, 13/02**	**10/08, 11/07, 13/02, 14/08, 15/17**
A legislative solution has (also) been imposed		
10/08, 12/01, 13/15, 13/35, 14/17 (as one of the options)		
Significant change of legislation	**Small change of legislation**	**No direct change of legislation**
13/35	10/08 (13/15)	11/07, 12/01, 13/02, 14/08, 14/17, 14/28, 15/15, 15/17, 15/33

Source: author

Conclusion and discussion

Although the controlled persons can take remedial measures in the form of internal changes, clearly demonstrable changes, which are the result of legislation changes themselves, are a significantly more conclusive indicator of the impact of the control actions implemented.

However, the number of such immediate legislative changes is not high, but it has to be always kept in mind that the adoption of measures in the tax area is a long-term process. This is particularly the case for the amendment of legislation, where measures are being implemented over a period of several years.

The results answer the question whether the control activity has an immediate effect on the change of the relevant legislation. Although the SAO has no effective means of enforcing the change (for this reason, it acts in the position of a watch dog that barks but does not bite), its control actions have a real impact. Despite the fact that the SAO cannot impose any sanctions or to force Government to perform legislative changes, its activity is not without any results.

Although to most actions in the last five years corrective measures have been imposed, there have been only two legislative changes. The reason is that not only all the shortcomings need to be remedied by changing legislation (for example, internal changes are sufficient), but also non-compliance with the corrective measures by the appropriate institution.

Based on control actions carried out since 1993, there is also a much more frequent use of control findings by the Government of the Czech Republic. However, how many imposed measures ultimately led to the actual change of the legislation could be the subject to further research in this area.

Even though financial evaluation of the benefit of the control activity should be included in the annual reports of the SAO according to § 18 Act no. 166/1993 Coll., the annual reports only show the indicator of the total amount of funds, assets and liabilities checked. Although the benefit of control actions cannot be evaluated solely on the basis of financial benefits, some more advanced SAI are also able to evaluate financial benefits from the control actions. This is why the author sees the opportunity for possible further improvement here.

The weak point of the selected method consists in assessing the benefit of the SAO only on the basis of the legislative amendments adopted. However, this is partly a consequence of the current state of the SAO. The SAO could focus more on evaluating the financial benefits of controls. This does not mean that it should neglect to check compliance with the law, for example, the financial impacts on the basis of the government's adopted legislative changes can be evaluated. Another weakness is the fact that to evaluate the control actions based on the current state does not mean that the total impact of the activity cannot be even greater later on.

The results for the chosen five-year period also indicate that the focus of control actions is not accidental in the sense that "it has not been checked for a long time, we will check here".

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Annex 1

Control action no. 10/08 and 13/15 - Reporting of charges for breach of budget discipline

The SAO, in the framework of these two inspections, found ineffectiveness of the system of levy management. Between 2006-2009, an average of 90 % of the sanctions imposed (levies and penalties) were passed, and the system produced unnecessary administrative costs in both public administration and grant recipients.

The Government of the Czech Republic took note of the control action no. 10/08 but did not take any action. The Control Committee of the Chamber of Deputies of the Parliament of the Czech Republic adopted Resolution no. 87 of 7 June 2011 and Resolution no. 97 of 13 October 2011 on the Control conclusion of control no. 10/08 and asked the Minister of Finance to prepare and submit (in 2012) a proposal for streamlining the system of management of levies for breach of budgetary discipline and propose the relevant legislative changes.

In the follow-up period (action no. 13/15) 73 % of the levies and penalties were legally waived. On the basis of the inspections carried out, there was an improvement, a stricter procedure and changes in the legislation, which would solve the identified shortcomings. However, the positive effects of the measures introduced depend to a large extent on the active approach of grant providers, in particular when setting the conditions and their control activities.

Control action no. 13/35 - State budget revenues related to the operation of lotteries and other similar games

In control action no. 13/35, the SAO found that no conditions had been created for the effective and efficient administration of the management of levies and state supervision. In particular, the Ministry of Finance did not create a functioning system of state supervision and did not provide the financial authorities with the necessary conditions for the correct, complete and timely detection and assessment of levies.

Ministry of Finance accepted the SAO's complaints and developed a completely new legal regulation in this area, which was adopted by the Parliament of the Czech Republic. The SAO control findings also had a criminal impact on one of the Deputy Ministers.

Local tax on land at the level of Slovak towns

Lukáš Cíbik*

Abstract. The objective of this paper is to analyze and compare tax rate on land in case of Slovak towns during the period of 2012-2016. The selected sample is composed of Slovak towns (67) from four different self-governing regions. In our post we focus on tax rate on the selected types of land, which can bet set out by towns independently. That's why this is primarily based on the GBR (General Binding Regulation) of all researched towns regulating individual tax rates for specific types of land. In our contribution, we identified the average tax rate on the land surveyed cities (67) for five years. The result of our work is the determination of the average tax rate for each type of land. Finally, the contribution compares the level of tax rates on land in individual regions (VÚC) in Slovakia.

Keywords: local tax, tax rate, Slovakia, cities.

JEL Classification: H71, H29

1 Introduction

Tax on land together with tax on building, tax on flat and non-residential spaces in a residential building, together form the property tax. In case of towns and municipalities in Slovakia, the property tax is a local tax, whose basic aspects – taxpayer, subject, tax base, tax rate and tax period is set out by the Act No. 582/2004 on local taxes and fees for municipal waste (hereinafter as the act on local taxes). As this is classic local tax, it's characterized by optionality, while towns and municipalities are entitled to amend its tax rate, or possibly determine the exemption from tax through the GBR (General Binding Regulation).

In case of tax on land, the taxpayer is the owner of land, the manager of land, the lessee, legal or natural person to whom the replacement land has been allocated (Sedmihradská and Bakoš, 2015). In Slovakia, the subject of tax on land are the lands located in the territory of the Slovak Republic. According to the second division, they are divided into basic types of land, where under the Act No. 582/2004 on local taxes and fee for municipal waste, are involved:

1. arable land, hop gardens, vineyards, orchards, permanent grasslands;
2. gardens;
3. built-up areas and courtyards, other areas;
4. forest lands, on which are commercial forests, fish ponds and other commercially used water areas;
5. building lands.

From long-term point of view, we can identify three basic types of land from which the tax is payable (Zachar, 2017). The first basic type of land is arable land, hop gardens, vineyards, orchards and grasslands. The value of these lands is given directly in the appendix of the Act No. 582/2004 on local taxes. The value of lands belonging to the first basic category is stated separately for every municipality and town under their cadastral area.

The second basic group of land consists of forest lands on which are commercial forests, fish ponds and other commercially used water areas. The value of such forest lands depends on general value of the property determined by the expert under the valid regulations (in particular by the Decree No. 492/2004 of the Ministry of Justice of the Slovak Republic). A municipality or town, as the tax authority is entitled to set out the value of these lands through their GBR. If the tax authority has not determined different value of forest land, here applies the value determined by the Decree No. 492/2004. Such determined value is valid only in case that the taxpayer does not submit the appraisal to the tax authority (town, municipality).

The last basic type of land is gardens, built-up areas, courtyards, building lands and other lands. The value of these lands is stated in a separate appendix of the act on local taxes, while the final value of lands is influenced by the number of population of the municipality or town concerned. In determining the value of lands in the appendix of the act generally applies that the value of building areas is ten-times higher than the value of other lands.

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Tax on land is calculated as the product of the tax base and annual tax rate. Simpler, we could summarize the procedure for the calculation of tax on land in the following formula:

$$D = V \text{ x } HP \text{ x } RSD \quad (1)$$

where D = tax that must be paid

V = land area in m^2

HP = the value of land for 1 m^2

RSD = annual tax rate

The tax base on land is the total value of specific land. To determine it, there is necessary to multiply the land area in square meters (hereinafter as m^2) and the relevant value of land on 1 m^2.

Probably the most important aspect of the tax not only for our work, but also for the very tax on land is annual tax rate. For conditions of Slovakia, the basic tax rate on land is determined by the act at the level of 0,25 %. This basic tax rate on land represents a base that can be adjusted by the representatives of towns and municipalities according to local conditions. On the one hand, they may be able to reduce this tax rate or, on the other hand, they can increase annual tax rate through the GBR. In addition, there is an option to determine various tax rates for various types of land as well as different tax rate for individual locations of the municipality, urban areas or cadastral areas (Schulzová et. al, 2015).

In fact, there is not explicitly determined the bottom limit for tax rate on separate types of land, but there is defined the upper limit (Duľová Spišáková et al. 2017). Individual tax rates on land cannot exceed the maximum possible tax rate defined by the act. The maximum possible annual tax rate for individual types of land is mentioned in the table 1.

Table 1: Maximum possible tax rate for different types of land

Type of land	Maximum tax rate	Maximum tax rate in %
Arable land, hop gardens, vineyards, orchards, permanent grasslands	5 times of basic annual tax rate (0,25%) determined by the act	5 x 0,25 = **max. 1,25%**
Gardens, built-up areas and courtyards, building lands and other areas	5 times of the lowest annual tax rate determined by municipality/town in its GBR	5 x the lowest tax rate of this group of lands[2]
Lands on which are mined deposits of non-reserved mineral, lands on which are located solar power plants, transformation stations or sales stand	5 times of the lowest annual tax rate determined by municipality/town in its GBR	5 x the lowest tax rate of this group of lands
Forest lands, fish ponds, other commercially used forest and water areas	10 times of basic annual tax rate (0,25%) determined by the act	10 x 0,25 = **max. 2,5%**
Lands functionally associated with the construction of a nuclear installation	100 times of basic annual tax rate (0,25%) determined by the act	100 x 0,25 = **max. 25%**

Source**:** processed by author under the Act No. 582/2004 on local taxes

In case that tax rate on some type of land in the GBR is determined incorrectly and exceeds the determined maximum tax rate, such incorrectly determined tax rate is not applicable. For tax calculation is used basic legal tax rate on land of 0,25 %.

[2] *It can't be exactly calculated, because the maximum tax rate may be theoretically different in every municipality and town in Slovakia. In principle, the maximum tax rate on gardens, built-up areas and courtyards, building lands and other lands, is bound to the lowest tax rate (minimum) on these lands, when the maximum tax rate may not exceed the 5 times of the lowest tax rate.*

As the primary objective in our research was determined the identification of the average tax rate on land in case of 67 Slovak towns during the period of 2012-2016. Secondary tasks consisted of tax rate development analysis of three types of land and evaluation of their regional disparities. In this field we focused on the research of defined average tax rates on arable land, hop gardens, vineyards, orchards and permanent grasslands. In addition, we analyzed the development of tax rate on forest lands and fish ponds. At both the above-mentioned types of land are determined the maximum possible tax rates at the level of 1,25%, and 2,5% respectively. Very important component of our post is the research of tax rate on gardens, built-up areas, courtyards and building lands, where is not defined the upper limit of the maximum taxation. Just in this field, self-governing function of Slovak towns is applied in the maximum possible rate, when they decide autonomously under their needs and information. It's clearly directed by Slovak towns, which tax rate on gardens, built-up areas and courtyards, building lands or other areas they will determine. Tax rates on these lands may be theoretically higher than set out maximum tax rate on lands whose the maximum possible tax rate is based on a multiple of the basic legal tax rate of 0,25%.

Methodology

At the beginning of the research, there was need to receive necessary materials about tax rates on land in case of different types of land from 67 towns. Our sample consisted of almost half (47,9%) of all towns in Slovakia. The research towns form the summary of all towns from four self-governing regions so that the whole Slovakia is geographically covered, and therefore analyzed towns are from the Bratislava self-governing region (BSR – west of the SR), the Žilina self-governing region (ŽSR – north of the SR), the Banská Bystrica self-governing region (BBSR – middle and south of the SR), and the Košice self-governing region (KSR – east of the SR). In addition, we were trying to avoid distortion that results from ability of towns to levy tax on nuclear installation, which may logically reflect in the rate of other local taxes, and that's why we have not involved in our research the towns from the Trnava and Nitra self-governing region.

In case of our sample of towns, the primary data source were the documents of towns – the GBR, which regulates individual tax rates. We focused on the GBR of research towns through that they regulated tax rate on land from 2012 to 2016. Subsequently we summarized obtained data on tax rate from the GBR of towns for every analyzed land and we noticed the development of tax rates in case of six types of land which were:

1. arable land, hop gardens, vineyards, orchards, permanent grasslands;
2. gardens;
3. built-up areas and courtyards;
4. forest lands, on which are commercial forests;
5. fish ponds and other commercially used water areas;
6. building lands.

Our work consisted of determining tax rate on these specific types of land in individual years. If different tax rates were determined on any of these lands in the territory of different urban areas within one town, we redirected these tax rates. For example, if resulting from the GBR of town that certain town applies three different tax rates on building lands in their three urban areas, we counted all three tax rates together and we divided by number 3 (number of different tax rates). The resulting amount represented for us the total tax rate for certain town in a particular year.

After finding the tax rates for research lands in one year, we were also finding out in similar way the tax rates for the same lands in other years of the research period. The resulting values of tax rate for separate types of land were summarized in the table. By given procedure we eventually created a small list of individual tax rates for selected types of land during five years for every analyzed town. This also provided us the option to find out the average tax rate on these lands in the research period of 2012-2016, and also allowed us to calculate the average tax rate on lands in a particular year. The average tax rate on lands for a particular town in one year was counted according to following formula:

$$Average\ tax\ rate\ on\ land\ for\ town = \frac{Tax\ rate\ A + Tax\ rate\ \ B + \ldots Tax\ rate\ F}{6} \quad (2)$$

where A – tax rate on arable land, hop gardens, vineyards, orchards and permanent grasslands;
B – tax rate on gardens;
C – tax rate on built-up areas and courtyards;
D – tax rate on forest lands, on which are commercial forests;
E – tax rate on fish ponds and other commercially used water areas; F – tax rate on building lands.

By this way we achieved to determine the average tax rate on lands in all monitored towns. The average tax rate of certain town represented the sum of annual average tax rates on land for given town divided by number 5 (number of years, on which was focused our research).

In the last step we had to categorize the average tax rate on land. To assess the taxation rate (the average tax rate on land), the resulting average values were divided into five categories, from very low taxation rate (tax rate) to very high tax rate on land, for all towns. The difference between individual categories represented 0,25%.

In the research we focused on a local tax rate, which is determined independently by each town in the relevant GBR. This GBR may be changed every year, or the second extreme case is a situation when the same local tax rates apply during the period of 2012-2016.

Problem Solution

In our research we were working with the average tax rate on land for individual towns during monitored period of 2012-2016. Based on this average tax rate on land, we could divide all research towns into five categories according to the average tax rate without any problem. The number in individual categories was very different as demonstrated in the table 2.

Table 2: Division of research sample of towns according to average tax rate on land during the period of 2012-2016

Average tax rate on land during the period of 2012-2016 in %	Evaluation	Number of towns
0,01 - 0,25%	Very low	**2**
0,26 – 0,5 %	Low	**28**
0,51 – 0,75%	Average	**24**
0,75 – 1 %	High	**9**
More than 1 %	Very high	**4**

Source**:** processed by author

The largest representation of research towns (28) may be found in the category of towns with low tax rate during the period of 2012-2016. In this group is totally involved more than 41%. At the close conclusion, the category associating towns with the average tax rate, whose the number of towns was stabilized on the number 24 (35%) during the monitored period. The third largest group consisted of towns with the average tax rate on land between 0,75% - 1%. As categories with the lowest number of towns, we can mark boundary groups that cover towns with the lowest and the highest average tax rate on land. The average tax rate lower than 0,25% was found in 2 towns (Gelnica and Banská Bystrica).

Due to the finding of the average tax rate, we can determine taxes that have the highest and the lowest average tax rates during the period of 2012-2016. The values of average tax rates of individual types of land for the period of 2012-2016 for tax on land are mentioned in the table 3.

The average tax rate in the monitored period for arable land, hop gardens, vineyards, orchards, permanent grasslands of analyzed towns is between 0,61% - 0,45% according to their regional affiliation. The highest average tax rate for this type of land was found in towns of the BSR. Of all 67 monitored towns, the average tax rate for arable land, hop gardens, vineyards, orchards and permanent grasslands was 0,51 % during the period of 2012-2016.

The selected group of 67 monitored towns during the period of 2012-2016 determined the average tax rate on gardens of 0,59%. Individual partial average rates of this tax are between the maximum average tax rate of towns of the BSR (0,85%) and the minimum average tax rate determined by towns in the ŽSR (0,50%).

Table 3: Average tax rate on land for selected types of land during the period of 2012-2016 in towns according to self-governing regions in percentage (%)

Self-governing region	Arable land, hop gardens, vineyards, orchards, permanent grasslands	Gardens	Built-up areas and courtyards	Forest lands	Fish ponds and other water areas	Building lands and other areas	Average
BSR	0,61	0,85	0,87	0,57	0,57	0,79	0,71
BBSR	0,50	0,52	0,52	0,75	0,75	0,56	0,60
KSR	0,45	0,48	0,56	0,68	0,68	0,57	0,57
ŽSR	0,49	0,51	0,53	0,57	0,57	0,51	0,53
AVERAGE	0,51	0,59	0,62	0,64	0,64	0,61	0,60

Source: processed by author

Legend: **BSR** – Bratislava self-governing region, **BBSR** – Banská Bystrica self-governing region, **KSR** – Košice self-governing region, **ŽSR** – Žilina self-governing region

In case of determining the tax rate on land for forest lands on which are located commercial forests, and the tax rate on fish ponds and other commercially used water areas, the dominant part of towns proceeded the same in its taxation. In most of cases, for both types of land was applied identical tax rate determined by a particular town. Therefore, it's not a surprise that the average tax rate on land in case of forest lands, fish ponds and other water areas of all 67 towns was also identical. The average tax rate for both types of land was 0,64% for the whole research sample of towns during the period of 2012-2016.

During the monitored period of five years, the highest average tax rate on land in forest lands, fish ponds and other water areas was in towns of the BBSR. During the period of 2012-2015, towns in the BBSR determined the average tax rate of 0,75% on these types of land. The lowest average tax rate on forest lands, fish ponds and other water areas for the period of 2012-2016 was identified in the GBR of towns belonging to the BSR. Its tax rate was 0,56% for both types of land.

The last monitored tax rate on land was tax rate on building lands and other lands. Towns in the BSR determined the highest average tax rate on building lands and other lands with a significant distance compared to the average rates of this tax in case of towns in other analyzed self-governing regions. The average tax rate on land for building lands and other lands of other research towns in the BBSR, KSR and ŽSR was between 0,5% (ŽSR) minus 0,57% (KSR) during the monitored period.

Slovak municipalities and towns have the right to introduce a local tax on land, while the maximum tax rate for individual types of land is determined by the act (Imrovič – Švikruha, 2015). For lands belonging to the first category (arable land, hop gardens, vineyards, orchards and permanent grasslands), the highest possible tax rate is 1,25%. Based upon our research, we have found that during the period of 2012-2016, 67 of research Slovak towns determined tax rate for these types of land on average only 0,51%. Of course, there are differences towards to higher as well as lower taxation rate of given types of land in individual towns, however, from general point of view, the research sample has not determined neither the half possible tax rate on land in the first category.

Determining tax rates for the second type of land (forest lands, on which are commercial forests, fish ponds and other commercially used water areas) is also limited at the upper level. The maximum tax rate is 10-times of basic tax rate and represents 2,5%. The research Slovak towns determined the average tax rate of 0,64% on these types of land during the monitored period. This tax rate represents only the quarter of tax rate that can be maximally introduced by the town's GBR.

In case of the last monitored group of lands (gardens, built-up areas and courtyards, and building lands), the maximum possible tax rate is derived from its minimum threshold determined by a particular town. Therefore it's fully under control of town representatives, which taxation rate will be determined for separate types of land. From our research resulted that from these types of lands, built-up areas and courtyards in cadastral area of monitored towns were taxed by the highest average tax rate (0,62%). This was followed by the average tax rate on building lands and gardens. In summary, however, we must state that the difference between the average tax rates on these types of land were minimum and represented only 0,03 percentage point.

Conclusions

Our contribution has no ambition to be a comprehensive analysis of taxation - its reasons and impacts. Firstly, in our opinion, we need to know the current conditions of this issues. Only after that we can identify weaknesses and propose appropriate measures.

The contribution is normative. The benefit of this article is a detailed research of taxation at the level of Slovak cities. City-level taxation is untouched, bud very important, topic in Slovakia. This article is based on the partial results of the project focused on the research of the financing of the Slovak territorial self-government. In the final form, research focuses on the correlation between the rate of taxation and local tax revenue. The article focused on the approximation of research results of one variable - taxation.

The submitted work is focused on the research of tax rate on land, as a local tax, in case of Slovak towns during the period of 2012-2016. The result of our work is the identification of the average tax rate on land for the whole research sample of 67 Slovak towns. The average tax rate on land in the selected sample of towns for five years reached 0,6%.

Secondarily, we were able to find out the average tax rates on different types of land in the monitored period. During the period of 2012-2016, the selected towns determined following average tax rates on separate types of land: 0,51% tax rate on arable land, hop gardens, vineyards, orchards and permanent grasslands; 0,64% tax rate on forest lands, fish ponds and other water areas; 0,59% tax rate on gardens; 0,61% tax rate on building lands; and 0,62% tax rate on built-up areas and courtyards.

The last obtained finding is the comparison of interregional disparities in terms of determined average tax rates on land between towns in individual self-governing regions. Based on our research over the years 2012-2016, we state that the highest average tax rate on land was found in towns from the BSR (0,71%). With a significant distance followed by towns from the BBSR (0,6%) and KSR (0,57%). The lowest average tax rate on land from the research towns in regional self-governing regions during the period of 2012-2016 was shown by towns in Žilina self-governing region, where was reached 0,53%

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Geographic Inequalities in the Distribution of Physicians and Nurses: Czech Republic 2005 and 2015

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Abstract. The objective of this study is to measure and evaluate development of the geographic inequality in the distribution of physicians and nurses between the Czech regions, 2005 and 2015. The Robin Hood Index and the new inequality measure that is able to deal with multiple health resources by transforming them into a single virtual resource were used. In 2015, the values of individual Robin Hood Indexes were 6.64% for physicians and 3.96% for nurses. In 2005, the values of individual Robin Hood Indexes were 7.18% for physicians and 4.52% for nurses. So we observe an improvement in the distribution of both physicians and nurses during the years 2005 and 2015. The combined Robin Hood Index values 4.58% (2005) and 5.06% (2015) take into account that the combinations of two health resources serve regional populations. Paradoxically, we obtained an opposite result, the inequality increased.

Keywords: geographic inequality, physicians, nurses, data envelopment analysis.

JEL Classification: I14, D63

1 Introduction

Equal access to health services is an important objective of the national health policy (e.g., WHO, 1998). The importance of this objective represents an essential element that affects the overall organization of the national health system. The free market allocates health resources according to the willingness and ability to pay, not according to the health needs of the local population. So a supply of health services will be concentrated in rich areas, whereas poor areas, albeit being usually those with the greatest health needs, will not be served adequately. However, European health systems are mostly publicly funded and highly regulated, therefore the unequal distribution of health resources should be considered as a consequence of wrong regulation.

Analyzing the geographic distribution of health resources that are necessary for the provision of health services is about measuring variations. The question is whether the observed variations in health resources reflect the variations in the real health needs of the population. If it is not the case, then the resource variations are a sign of health policy failure.

To measure the inequality between geographic areas, it is necessary to define what an appropriate geographic area is. A definition of geographic areas as units of analysis highly depends on the health resource the inequality of which is to be evaluated. Generally, geographic areas are smaller for an analysis of distribution of outpatient services, larger for an analysis of distribution of inpatient services, and very large for highly specialized services. National statistical offices usually collect data for administrative units, so the areas that researchers analyze are states, provinces, regions, counties, districts. But those administrative units do have to be related to hospital service areas.

The objective of this study is to measure and evaluate development of the geographic inequality in the distribution of physicians and nurses between the regions of the Czech Republic during the period 2005-2015.

Data

The Czech Republic is a Central-European country with 10.5 million inhabitants (2015). The Czech Republic is administratively divided into 14 regions with populations (2015) ranging from 298,506 inhabitants in the Karlovarsky region to 1,320,721 inhabitants in the Stredocesky region. The data of two regions, Prague and Stredocesky regions, were joined together because the Prague region, the capital, is located inside the territory of the Stredocesky region. We assume that the population of the Stredocesky region use frequently health services in the capital. In the Czech Republic, the health services are financed by public health insurance which should guarantee equal access to health services for the whole population. Equal distribution of physicians and nurses is thus an important health policy issue. The data come from the years 2005 and 2015 and were obtained from the Czech Health Statistics Yearbook that are published by the Institute of Health Information and Statistics of the Czech

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Republic (ÚZIS ČR, 2006, 2016). In this study we consider two inputs: the number physicians in full-time equivalents and the number of nurses in full-time equivalents. The single output that is used a proxy for health need is the regional population.

Methods

3.1 Inequality Measures

Measures of inequality express the variation in observed variable by a single number. There is a variety of inequality measures described in the literature (e.g., Kawachi and Kennedy, 1997, De Maio, 2007) and one cannot say that one inequality measure is clearly better than the other. The simple measures of inequality are the ranges, which use only data on the extreme values. The absolute range is defined as a difference between the maximum and minimum observed values per capita. The relative range is defined as the absolute range divided by the average number of units per capita for the entire population. Other measures of this type are decile ratios. By concentrating on the geographical areas with extreme or selected values only, all these indices give a limited view on the overall distribution.

The most popular measure of inequality that uses all observations is the Gini coefficient. The Gini coefficient is derived from the Lorenz curve, a cumulative frequency curve that compares the empirical distribution of the studied variable with the uniform (egalitarian) distribution that represents perfect equality. The Gini coefficient ranges between 0, which occurs in the case of perfect equality, and 1, which occurs in the case of perfect inequality. The Robin Hood Index (RHI) measures what proportion of resources has to be moved from areas with above-average provision to areas with below-average provision to achieve equal distribution. In my view, the advantage of the Robin Hood Index over the Gini coefficient and other inequality measures, such as the Atkinson index, coefficient of variation, and the generalized entropy measure, is its clear practical interpretation. The Robin Hood Index is calculated by the formula:

$$RHI = \frac{1}{2}\sum_{i=1}^{n}\left|\pi_i - \rho_i\right| \qquad (1)$$

where π_i is the population proportion, ρ_i is the resource proportion, and n is the number of geographic areas. The index is usually multiplied by 100 to be in percentages.

Suppose that we want to measure inequality in geographic distribution in the case of multiple health resources. The health resources as physicians and nurses are, at least to some extent, substitutes. Hence the region with fewer physicians may compensate such disadvantage by a larger number of nurses. In such a case, the total inequality is lower than expected from separate measurement. To cope with cases with multiple health resources, one can use multiple criteria decision making for setting relative resource weights. Such weights are then used nationwide for all regions. The question is how to obtain such weights. More flexible approaches to estimate resource weights and the rate of substitution can be based on the production function. Health resources are inputs and population (as a measure of health need) is the single output. The production function can be estimated by econometric methods or by data envelopment analysis (see section 3.2).

Suppose a situation with two resources (inputs) and one output (the regional population that serves as an estimation of health need). Let us have regions A, B, and C. Regions A and B lie on the production frontier are technically efficient, and region C is inefficient, having the input-oriented efficiency score $\varphi_3 = 0.8$, which was estimated by data envelopment analysis (see section 3.2). A lower level of inefficiency in this situation represents a higher level of resources that are available for regional population. The efficiency score of the input-oriented constant returns-to-scale model, which is lower than one, expresses the excess of resources above the most badly served regions that are represented by the set of DEA efficient units. This means that it is better for you to live in inefficient regions! The efficiency score 0.8 means that there is a possibility of 20% resource reduction in the given region or that the given combination of health resources is able to serve a 25% larger population (1/0.8 = 1.25).

By the efficiency scores for regions, multiple health resources are transformed into a single virtual resource the amount of which is calculated as a regional population (or a proportion of regional population) multiplied by reciprocal value of the efficiency ratio φ_i. The following method of inequality measurement was proposed in Dlouhý (2018):

1. For each region, calculate the efficiency score by the input-oriented version of the constant returns-to-scale DEA model (see section 3.2) with health resources as inputs and the regional population (or any other measure of health need) as single output.

2. Calculate the value of virtual health resource $\rho_i^* = \pi_i/\varphi_i$ for each region.
3. Calculate the Robin Hood Index for the virtual health resource.

Although the value of the Robin Hood Index cannot be directly interpreted as in the case of original health resources, it has an advantage that it combines all health resources in one dimension. If all regions are technically efficient by the DEA model, then the Robin Hood Index is 0. On the other hand, the maximum theoretical value of the Robin Hood Index is 1. Note that a virtual resource can also be interpreted as a virtual population in the constant returns-to-scale DEA model. The inequality measure can be thus interpreted as the percentage of the population that has to move from more technically efficient regions to less technically efficient regions to achieve technical efficiency (i.e. geographic equality).

3.2 Data Envelopment Analysis

Data envelopment analysis (DEA) was originally developed to construct the production frontier and evaluate the technical efficiency of production units (Charnes, Cooper, and Rhodes, 1978). DEA is a method based on the theory of mathematical programming that estimates the production frontier as the piecewise linear envelopment of the observed data. A variety of DEA models with many extensions and modifications has been developed that can be found in textbooks that also present many examples of applications from both private and public sectors (Charnes, Cooper, Lewin, and Seiford, 1994, Cooper, Seiford, and Zhu, 2004, Jablonský and Dlouhý, 2015).

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 allows each unit to choose its own weights of inputs and outputs in order to maximize its efficiency score. A technically efficient production unit is able to find such weights that it lies on the production frontier. The production frontier represents the maximum amounts of output that can be 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).

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

$$
\begin{aligned}
&\textit{Maximize} && \phi_q = \sum_{k=1}^{r} u_k y_{kq}, \\
&\textit{subject to} && \sum_{k=1}^{r} u_k y_{kj} - \sum_{i=1}^{m} v_i x_{ij} \le 0, \quad j = 1, 2, \ldots, n, \\
& && \sum_{i=1}^{m} v_i x_{iq} = 1, \\
& && u_k \ge \varepsilon, \quad i = 1, 2, \ldots, r, \\
& && v_i \ge \varepsilon, \quad j = 1, 2, \ldots, m,
\end{aligned}
\tag{2}
$$

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_i and input weights v_j 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 measures 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) has to be solved for each unit.

The DEA model calculates for each production unit efficiency score and the relative weights of inputs and outputs. The DEA model also identifies peers for each production unit that is not technically efficient. The peers of an inefficient unit are efficient units with similar combinations of inputs and outputs that serve as benchmarks showing potential improvements that the unit can attain. Since the peers are real production units, one can expect that the suggested efficiency improvements should be attainable by the inefficient units.

Results

The regional characteristics of 13 Czech regions (population, number of physicians, and number of nurses) are presented in Tables 1 and 2. The data of Prague and Stredocesky regions were joined together. In 2015, the number of physicians per 10,000 inhabitants ranged from 28.98 to 43.50, with the national average being 36.30. This is an

increase in comparison to 33.46 physicians in the year 2005. In 2015, the number of nurses per 10,000 inhabitants ranged from 63.20 to 83.83, with the national average being 77.48. This is a decrease in comparison to 80.37 nurses in the year 2005. It is assumed that substitution between physicians and nurses is possible. In a region with more physicians, the intensity of care is higher, so a lower number of nurses is needed, and vice versa, in a region with more nurses, a lower number of physicians is needed. In this case, in which the relative number of physicians increased and the relative number of nurses decreased, is not clear whether the access to health services improved or not.

In the first step of inequality evaluation, we measured the distribution of physicians and nurses separately. In 2015, the values of individual Robin Hood Indexes were 6.64% for physicians and 3.96% for nurses. Thus, more than 6% of Czech physicians should be reallocated between the regions. The situation in the case of nurses is better than for physicians and in fact it is not so far from equal distribution. In 2005, the values of individual Robin Hood Indexes were 7.18% for physicians and 4.52% for nurses. So we observe an improvement in the distribution of both physicians and nurses during the years 2005 and 2015.

In the second step, we used the combined Robin Hood Index for both health resources. First, the technical efficiency scores were calculated by the input-oriented constant returns-to-scale DEA model (2) with two inputs (the number physicians and the number of nurses) and one output (the regional population). The efficiency scores are presented in Tables 1 and 2. Second, the values of virtual health resource for each region were calculated (Tables 1 and 2). Third, the Robin Hood Index was applied to virtual health resource. The Robin Hood Index values 4.58% (2005) and 5.06% (2015) take into account that the combinations of two health resources (and not each resource separately) serve regional populations. Paradoxically, we obtained an opposite result, the inequality during the observed decade increased. However, the differences between the RHI values is not large.

Table 1: Regional Input Data, Efficiency Score and Virtual Resource, 2005

Region	Population	Number of physicians	Number of nurses	Efficiency Score	Virtual Resource
Prague + Stredocesky	2 326 244	9 778	21 396	0.745	3 121 951
Jihocesky	626 766	1 834	4 374	0.982	638 271
Plzensky	550 371	1 967	4 697	0.803	685 354
Karlovarsky	304 587	939	2 489	0.854	356 774
Ustecky	822 977	2 317	5 964	0.946	870 239
Liberecky	428 268	1 219	3 099	0.947	452 234
Kralovehradecky	547 849	1 824	4 532	0.829	661 236
Pardubicky	505 553	1 400	3 511	0.987	512 313
Vysocina	510 000	1 401	3 798	0.958	532 226
Jihomoravsky	1 130 282	4 116	9 654	0.802	1 408 593
Olomoucky	638 981	2 144	5 078	0.862	740 928
Zlinsky	590 447	1 554	4 047	1.000	590 447
Moravskoslezsky	1 251 767	3 750	9 611	0.893	1 402 373
Czech Republic	10 234 092	34 242	82 249	x	11 972 941

Source: ÚZIS ČR (2006) and own calculations.

Table 2: Regional Input Data, Efficiency Score and Virtual Resource, 2015

Region	Population	Number of Physicians	Number of Nurses	Efficiency Score	Virtual Resource
Prague + Stredocesky	2 583 228	11 237	21 654	0.754	3 426 536
Jihocesky	637 292	2 030	4 288	0.943	675 779
Plzensky	575 665	2 181	4 575	0.795	723 897
Karlovarsky	298 506	1 019	2 337	0.860	347 233
Ustecky	823 381	2 386	5 713	1.000	823 381
Liberecky	439 152	1 321	2 775	1.000	439 152
Kralovehradecky	551 270	1 948	4 424	0.833	661 880
Pardubicky	516 247	1 523	3 449	0.998	517 049
Vysocina	509 507	1 566	3 945	0.943	540 448
Jihomoravsky	1 173 563	4 695	9 809	0.756	1 552 184
Olomoucky	635 094	2 458	5 505	0.764	831 586
Zlinsky	584 828	1 729	4 011	0.990	591 015
Moravskoslezsky	1 215 209	4 172	9 203	0.865	1 405 613
Czech Republic	10 542 942	38 268	81 688	x	12 535 755

Source: ÚZIS ČR (2016) and own calculations.

Conclusion

The Robin Hood Index and the new inequality measure that is able to deal with multiple health resources by transforming them into a single virtual resource (Dlouhý, 2018) were used to evaluate geographical inequality. The inequality was calculated for the regions of the Czech Republic in order to measure the change in inequality between the years 2005 and 2015. The values of separate Robin Hood Indexes in all cases are not so high. The values of the combined Robin Hood Indexes were 4.58% and 5.06%. It is evident that the value of the Robin Hood Index cannot be zero in the reality and the Czech values are not far from equal distribution. The health system of the Czech Republic is performing relatively well in the international comparison (Dlouhý, 2017).

The existence of geographic differences in the distribution of health resources is a reality in both developing and developed countries. So the inequality measurement is an important tool that helps both policy makers and researchers in evaluating the degree of inequality. The important issue in any measurement of inequality is dealing with cases of metropolitan regions surrounded by rural regions.

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Changes in consumer behavior when armed soldier is present in front of Museum Louvre

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Abstract. Policy-makers around Europe have an increasing tendency to spend financial resources on visible presence of armed police officers and soldiers in the popular tourist destinations. The main question of this research is whether the presence of armed soldiers and police officers is also reflected in the revenue from the admission, precisely whether due to the feeling of supervision tourists are rather willing to visit a tourist facility compared to situation when such a supervision is missing. To find out electronic questioning among 437 Czech respondents was used. All respondents were asked the same question about the entrance fee they are willing to pay as an entrance fee to Museum Louvre, with the difference that they were randomly split into three groups and presented with different pictures when answering. There was not found out a significant difference in these three scenarios and therefore we cannot say that armed soldiers have an impact on consumer behavior of tourists and that this public counterterrorist measure influences tourist´s willingness to enter Museum Louvre in Paris.

Keywords: security, consumption, public policy

JEL Classification: D91, F18

1 Introduction

Although there has been no single terrorist attack in the Czech Republic, and even in Western Europe, such deaths are rare (about 38 deaths per year) European population suffers from a disproportionate fear of terrorism. (Havlíčková, 2017)

Therefore, European public institutions are recently spending funds for heavily armed police officers and soldiers in European streets, since they believe that this measure will help them most effectively and efficiently keep its people safe, divert life-threatening risk of terrorism and calm down nerves of the stressed population. In Paris we can see armed soldiers around government buildings, major transport hubs, synagogues, galleries and main tourist landmarks. These soldiers or armed police-officers are not only sitting in cars equipped with cameras, which enable concentration and precise monitoring of surrounding area. Completely the opposite the troops are quite often standing on one spot mainly attracting the attention of the crowds and present public safety. (Chrisafis, 2016; Carbonnel, Bartunek, 2017, Bohlen, 2016)

We can say that the visible presence of armed police officers and armed soldiers is caused mainly by public and personal emotion and from political pressures, which evolve from terrorism. Fear and anxiety of general public is also transmitted also on decision-making of public institutions which can therefore spend on counterterrorist measures disproportional amount of money. (Mueller, Stevart, 2014; Kahneman 2011)

These services of armed soldiers in city centre are paid by public money with not much investigation on its impact (if it really helps to calm down the nerves of the stressed population and if it has side effects). To find out the impact of the above mentioned public policy we can use the approach of behavioral economics, which could be able to compare different scenarios – with and without armed soldier´s presence in Paris City Centre.

The following study tries to find out, if the public policy of presence of armed soldiers in Paris, precisely in front of Museum Louvre, influences consumer behaviour of tourists.

The initial hypothesis of this study is that presence of armed soldiers could increase the proportion of Czech tourists, who are willing to enter the Museum Louvre in Paris and therefore lead to an increase of total customer spending.

Until now there have not been studies, which would focus precisely on this topic. We know that the safer people feel the higher is their tendency to spend and visit certain places. Previous studies have pointed out that certain behavioral and physical devices could have a stronger impact on tourists´ overall perception of safety and therefore they tendency to visit certain places. The already tested measures included deadbolt locks, closed-circuit TV cameras, and door view ports, as well as caller screening by the hotel's telephone operators, locking side hotel

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entrance doors at night, and routine visits by law enforcement agencies. These all have according to research helped the tourists to feel safer and increased their willingness to visit tourist facilities. The effect of current deployment of armed soldiers in European cities has not been studied yet. (Milman, Jones, Bach, 1999)

Previous studies from Israel on the effect of terrorism on consumer behavior came to conclusion that Israeli consumers (largely effected by terrorist attacks) engaged in a variety of avoidant behaviors, disrupting their normal buying habits and avoid risky situations. A common strategy was to replace shopping in stores and malls by shopping online. Israelis also in the fear of terrorism visited less restaurants, tourist facilities and move more consumption into the home. (Herzenstein, Horsky, Posavac, 2015) The same coping strategy followed after the attack on the World Trade Centre in 2001, when Americans decreased the going to bars and restaurants. (Marcus, Dockser; Shekter-Porat, 2001) Our research tries to find out if the presence of armed soldiers has an effect on decrease of avoidance strategies and leads to increase of proportion of population, which is willing to enter the museum and thus also the increase in amount of money spent on the entrance fees.

2 The Effect of Armed Soldiers Presence

We know that the effect of armed soldier's presence depends on perceived risk or shortly perception, which is defined as "the process by which an individual select organises and interprets stimuli in a meaningful and coherent way. A stimulus is any unit of input affecting any of the senses. " (Moutinho, 2007) The concept of perceived risk, or subjective risk, in social scientific literature is commonly agreed to mean „the processing of physical signals and/or information about potentially harmful events or activities, and the formation of a judgement about seriousness, likelihood and acceptability of the respective event or activity." (Kapuscinski, Richards, 2016) We know from previous studies that the subjective risk perception and therefore also the reaction on the armed soldier´s presence can differ among people of different age and different gender. Gender differences in risk perceptions are prevalent already in children. Generally, we can say men engage in riskier behaviours than do women as well as men are more often the victims of accidents than are women. (Harris, Jenkins, 2006)

At the same time, we know that some research has found that older adults are less risk seeking and other research has found the opposite or no differences. Age differences in risk preferences may vary across domains and may result from differing motivations. (Bonen, Ellsworth, Gonzalez, 2015; Ferraro, LaGrange, 1992; Ray, Parker, 2010)

When studying the effect of armed soldier´s presence we will therefore focus on its effect on men, women and younger population (at the age of 35 or younger) and older population (older than 35 years).

3 Data and Methodology

For the investigation of the effects of security guards, the electronic questioning was used, in which 437 respondents were supposed to indicate how much they are willing to pay for entering Museum Louvre in Paris. When stating the answer first group of respondents (n = 136) was presented with the picture of Museum Louvre with tourists and three soldiers standing in front of the entrance. (Picture 1)

Picture 1: This picture was presented to Group 1 when answering the question about entrance fee the respondents are willing to pay

Source: The National

The second group of respondents was presented with a picture of Museum Louvre with tourists in front of the entrance. There was no soldier represented on the picture (Picture 2).

Picture 2: This picture was presented to Group 1 when answering the question about entrance fee the respondents are willing to pay

Source: The National

The third group was the control group and these respondents were presented with no picture when asked about the entrance fee they are willing to pay.

Regarding the respondent´s structure 71, 62 % of respondents were females and 28, 38 % were males. 64, 5 % of respondents indicated to be aged between 19 and 35 years. Only 3, 89 % of respondents were older than 56 years. Because of the young age of respondents 70, 94 % of them indicated not to have a child or children. 46, 22 % of respondents have a university degree, 41, 88 % of respondents indicated secondary education as their highest accomplished education. Only 11, 9 % of population indicated to have primary education as their highest achieved education. The survey return´s rate was 67, 9 %.

To make sure the electronic questionnaire really reaches the group of respondents, which could be interested in entering the Museum Louvre in France, our research questions were part of research on the knowledge of famous paintings, in which respondents were supposed to write to every painting its author. By this approach we wanted to minimalize the number of respondents, who are actually not interested in art and would not consider entering the Museum Louvre in France anyway. Sample is therefore based on all responses, who decided to voluntarily find out their knowledge about authors of famous paintings, which was published at the portal Vyplnto.cz

Results of this research are based on the comparison between proportion of respondents, who are willing to enter the Museum Louvre in Paris when asked about the amount of money they are willing to pay as an entrance fee in Group 1 and in Group 2. For finding if there is a statistically significant difference we use Z-Score calculator for two population proportions. This study compares not only the proportion of visitors, who are willing to enter the Museum Louvre in different treatments, but also the average amount of money respondents in these treatments are willing to pay as entrance fee. For the purpose of comparison of the different amount of money respondents are willing to pay as entrance fee in price-levels we work with the mean values (MV) of money visitors are willing to pay.

4 Results

The following table presents results in percentages and illustrates how much euros the respondents in Group 1, Group 2 and Control Group were willing to pay for entrance fee to Museum Louvre. In Group 1, which was presented with picture of three soldiers standing in front of Museum Louvre, higher proportion of respondents (94,12 %) decided to enter the Museum Louvre than in Group 2 (93,55%). When calculating the Z-Score test, which decides about statistical significance between two population proportions, we get that the Z-score is -0.2825 and the p-value is 0.38974 and the result is therefore not significant at $p < 0.05$. Therefore, we can say that there is not a statistical significant difference in the proportion of visitors in scenario with armed soldiers and scenario

without armed soldiers. When calculating the mean values for every entrance fee scale category and then calculating the average value of entrance fee paid by respondents in Group 1 and Group 2, we get also very small difference of 0,35 euro.

Table 1: Comparison of entrance fee respondents in Group 1, Group 2 and in the control, group are willing to pay as the entrance fee to Museum Louvre

Willingness to pay	N1	Group 1	N2	Group 2	N3	Control Group
Nothing	8	5,88 %	10	6,45 %	8	5,48 %
1 – 25 eur (MV = 13 eur)	84	61,76 %	92	59,35 %	84	57,53 %
26 – 50 eur (MV = 38 eur)	36	26,47 %	46	29,68 %	46	31,51 %
51 – 75 eur (MV = 63 eur)	5	3,68 %	6	3,87 %	7	4,79 %
76 euro -100 eur (MV = 88 eur)	3	2,21 %	1	0,65 %	1	0,68 %
N respondents	136	100 %	155	100 %	146	100 %
Average amount of entrance fee paid		22,35 eur		22,00 eur		23,08 eur

Source: Author

When looking at the general comparison of all respondents in Group 1 and Group 2 we cannot see a significant difference. From previous studies we know, that the effect of armed soldier´s presence can also differ based on gender and therefore the next tables focuses only on the effect of armed soldier´s presence on men and women.

From the next table, which focuses only on women, we can see that in the Group 1 (presence of armed soldiers) is the willingness to enter the Museum Louvre Paris only slightly higher (96,91 %) than in Group 2 (98, 22 %). When calculating the Z-score test, which decides about statistical significance between two population proportions, we get that the Z-score is -0.0986 and the p-value is 0.46017, the result is therefore not significant at $p < 0.05$ and therefore we can say that changes of women´s behavior when armed soldiers are present in front of Museum Louvre, are not statistically significant. When comparing the average amount of entrance fee paid (after calculation of mean values of all entrance fee categories) we get the difference of only 0,134 euro between women in Group 1 and women in Group 2.

Table 2: Comparison of entrance fee women in Group 1 and Group 2 are willing to pay as the entrance fee to Museum Louvre

Willingness to pay	N1	Group 1	N 2	Group 2
Nothing	3	3,09 %	3	2,78 %
1 – 25 eur (MV = 13 eur)	63	64,95 %	65	60,19 %
26 – 50 eur (MV = 38 eur)	27	27,84 %	33	30,56 %
51 – 75 eur (MV = 63 eur)	2	2,06 %	6	5,56 %
76 euro and more (MV = 88 eur)	2	2,06 %	1	0,93 %
Total	97	100 %	108	100%
Average amount of entrance fee paid		22,134 eur		22,00 eur

Source: Author

Regarding male respondents the differences between groups presented with armed soldiers and without armed soldiers the differences are higher. In Group 1 higher number of respondents was willing to enter the Museum Louver (81,18 %) than in Group 2 (85,11 %). When calculating the Z-test, which decides about statistical significance between two population proportions, we get that the Z-score is - 0.2762 and the p-value is 0.38974, the

result is therefore not significant at p <0.05 and we cannot say that the behaviour of male respondents have significantly changed because of armed soldier´s presence. The average amount of entrance fee paid by male respondents in Group 1 and Group 2 differs almost by 5 euro.

Table 3: Comparison of entrance fee men in Group 1 and Group 2 are willing to pay as the entrance fee to Museum Louvre

Willingness to pay	N1	Group 1	N 2	Group 2
Nothing	5	12,82 %	7	14,89 %
1 – 25 eur (MV = 13 eur)	21	53,85 %	27	57,45 %
26 – 50 eur (MV = 38 eur)	9	23,08 %	13	27,66 %
51 – 75 eur (MV = 63 eur)	3	7,69 %	0	0 %
76 euro and more (MV = 88 eur)	1	2,56 %	0	0%
Total	39	100 %	47	100%
Average amount of entrance fee paid		22,87 eur		17,98 eur

Source: Author

From previous studies we know that not only gender, but also the age can play a significant role in subjective risk perception and behaviour connected with subsequent decision-making. Therefore, in the next two tables we focus on respondents at the age of 35 or younger and on respondents, who are above the age of 35.

When looking at the younger group of respondents we do not find a significant difference in the proportion of visitors in Group 1 (93,68 %) and Group 2 (93,44 %). When calculating the Z-test, which decides about statistical significance between two population proportions, we get that the Z-score is - 0.0719 and the p-value is 0.4721, the result is therefore not significant at p <0.05 and we cannot say that the behaviour of respondents below 35 years have significantly changed because of armed soldier´s presence. The average amount of entrance fee paid (after calculating mean values for entrance fee categories) differs by 0,73 euro.

Table 4: Comparison of entrance fee people at the age of 35 or younger in Group 1 and Group 2 are willing to pay as the entrance fee to Museum Louvre

Willingness to pay	N1	Group 1	N 2	Group 2
Nothing	6	6,32 %	8	6,56 %
1 – 25 eur (MV = 13 eur)	57	60,00 %	73	59,84 %
26 – 50 eur (MV = 38 eur)	27	28,42 %	35	28,69 %
51 – 75 eur (MV = 63 eur)	2	2,11 %	5	4,10 %
76 euro and more (MV = 88 eur)	3	3,15 %	1	0,82%
Total	95	100 %	122	100%
Average amount of entrance fee paid		22,71 eur		21,98 eur

Source: Author

Regarding older respondents there is a higher proportion of respondents willing to enter Museum Louvre in Paris in Group 1 (95,12 %) than in Group 2 (93,44 %). When calculating the Z-test, which decides about statistical significance between two population proportions, we get that the Z-score is 0.0719 and the p-value is 0.4721, the result is therefore not significant at p <0.05 and we cannot say that the behaviour of respondents above 35 years have significantly changed because of armed soldier´s presence. The average amount of entrance fee paid by

respondents in Group 1 and Group 2 (after calculating mean values of all entrance fee categories) differs by 0,45 cents.

Table 5: Comparison of entrance fee people above the age of 35 in Group 1 and Group 2 are willing to pay as the entrance fee to Museum Louvre

Willingness to pay	N1	Group 1	N 2	Group 2
Nothing	2	4,88 %	2	6,56 %
1 – 25 eur (MV = 13 eur)	27	65,85 %	19	59,84 %
26 – 50 eur (MV = 38 eur)	9	21,95 %	11	28,69 %
51 – 75 eur (MV = 63 eur)	3	7,31 %	1	4,10 %
76 euro and more (MV = 88 eur)	0	0 %	0	0,82%
Total	41	100 %	33	100%
Average amount of entrance fee paid		22,51 eur		22,06 eur

Source: Author

5 Discussion

It is important to note that there were 437 respondents in this study and therefore the differences could be statistical significant if more respondents participated in the study. It is important to note that unfortunately only 28,38 % of respondents were male respondents. Even though the current results suggest that the presence of armed soldiers could have an effect only on males, we have to keep in mind that these results may be due to the relative small sample of male respondents in this study. Also, it is important to note that the study was run exclusively among Czech respondents and therefore the results could be different for other nationalities. The research was also run in the period, when no major terrorist attack happened in France or rest of Europe and therefore the population probably was not about this topic so emotional. It is also possible that the presence of armed soldier does not have a significant effect on respondents of certain age group or gender, but rather on very different subgroup.

6 Conclusion

Previous studies showed that certain behavioral and physical devices as - deadbolt locks, closed-circuit TV cameras, and door view ports, as well as caller screening by the hotel's telephone operators, locking side hotel entrance doors at night, and routine visits by law enforcement agencies - can have a stronger impact on tourists´ overall perception of safety and therefore they tendency to visit certain places. This study tried to find out if the presence of armed soldiers could also increase the tendency of visitors to visit the Museum Louvre in Paris and overcome avoidant behaviors well described in consumer behavior studies from second intifada in Israel and post 9/11 attack in the United States.

Our initial hypothesis was that the presence of armed soldiers could increase the proportion of Czech tourists, who are willing to enter the Museum Louvre in Paris and therefore lead to an increase of customer spending.

The results of this study combat this hypothesis and show that the presence of armed soldiers generally does not lead to overcoming the avoidance behavior, since there was not found a significant difference in proportion of visitors of Museum of Louvre in Paris, when armed soldiers are present in front of this tourist facility. Difference in proportion of visitors of Museum Louvre in Paris in Group 1 and Group 2 (group of respondents, which was presented with a picture with armed soldiers and group of respondents which was presented with a picture without armed soldiers) is not statistically significant and therefore the hypothesis about the impact of the presence of armed soldiers in front of Museum Louvre on the change of proportion of visitors entering the Museum Louvre in Paris (connected with a significant increase of expenditure for entrance fees) when armed police officer is present, cannot be confirmed on the significance level 5 %. There also has not been found a significant effect of armed soldiers presence on respondents, who are younger than 35 years or older than 35 years. Also, there has not been found an effect of armed soldier´s presence on men and on women. The only bigger difference in the paid average amount of entrance fee was found among male respondents. It is important to note that the difference of total of almost 5 euro between male respondents in Group 1 and Group 2 (group of respondents, which was presented with

a picture with armed soldiers and group of respondents which was presented with a picture without armed soldiers) can be caused by underrepresentation of male respondents in our sample, which was based on participant´s interest in art and matching of famous paintings with their authors.

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Government Incentives and Charitable Donations: Analysis of the Crowding-out Hypothesis in the Czech Republic

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Abstract. Due to their heavy dependence on financial support from the public sector and close links to a wide range of government policies, non-profit organisations are becoming increasingly state-oriented. One significant impact of public subsidies may be identified in case of changing scope of private giving. There are robust evidence on the effects of public funding on nonprofit revenues, however, studies on crowding-out/in present inconsistent results. The results are strongly shaped by the research methods that are used. Although economic experts have striven to empirically test crowding theories, there is no comprehensive research of this type within the Czech Republic. The objective of this paper is to use a regression model to test whether government funding in the Czech Republic encourages or discourages private gifts. Our results demonstrate a crowding-out effect for public resources but not for other types of financing sources, such as revenues from the organization's own activity and commercial revenues. Answering these questions can contribute to the current knowledge and may have a real impact on both non-profit organisations and government representatives who make decisions about aid.

Keywords: crowding-in, crowding-out, non-profit organisation; non-profit funding, public subsidies.

JEL Classification: H31, H71, D14

1 Introduction

The non-profit sector (NPS) and non-profit organisations (NPOs) are often subject to research conducted in particular by social scientists and economists because they represent democratic values and are an expression of solidarity and social conscience as well as the advanced level of a country's economic development. The NPS's form and scope differ by country, but it is certain that the government and this sector influence one another (Young, 1983; Hyánek, 2011). Theories regarding the importance of the NPS as well as theories about the relationships between the government and the NPS have led to the conclusion that public policy towards the NPS is carried out in particular through financing and legal regulations (Andreoni and Payne, 2003; Stadelmann-Steffen, 2011; Verschuere and De Corte, 2014). The government supports the NPS through financing and by creating a legal framework that enables the activities, operations, and status of NPOs. At the same time, the participation of representatives of NPOs is required in the processes of developing such policy.

Issues related to the financing of NPOs must be perceived as issues related to typical multi-source financing (Salamon, 1997; Froelich, 1999; Sokolowski, 2013). To fund their activities, these organisations use their own resources (e.g. membership fees, revenues from their activities), sponsors' donations, and subsidies from national or municipal budgets or private entities. It is not easy to bring the long-term sustainability of a NPO into accord with this variability of financing sources and financial management, and so this is rightfully one of the key areas of successful management of NPOs (Bowman, 2011). Government activities can influence private charitable giving in two ways. First, tax incentives can stimulate private charitable giving. Second, contributions made by private donors can be influenced by government funding of public goods and services. There have long been economic debates over the relationship between government funding of the NPS and private donations. The first hypothesis suggests that government funding substitutes for (*crowds-out*) private charitable donations (Andreoni and Payne, 2003; 2011; Isaac and Norton, 2013). However, a contrasting hypothesis claims that governmental support attracts (*crowds-in*) private giving (Okten and Weisbrod, 2000; Sokolowski, 2013). This question has a real impact on both NPOs and government representatives who make decisions about aid. Tinkelman (2010) argues that findings regarding the relationship between governmental financial support and private donations depend strongly on research design. The variety of findings encourages the question of which conditions influence the relationship between government funding and private donations. De Wit and Bekkers (2016) state that different results arise partly from methodological differences and partly from contextual differences.

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This paper contributes to *crowding theories* as follows. First, it summarizes the aforementioned issues within the context of the Czech Republic. Second, it presents a new macro-level dataset and tests *crowding theories* on the basis of an aggregate model that includes all sub-sectors of the NPS in the Czech Republic.

The objective of this paper is to use a regression model to test whether government funding in the Czech Republic encourages or discourages private gifts. The aim of the paper is to answer to the following research questions.

RQ1: *How does public financing of NPOs in the Czech Republic influence the amount of private donations that these organisations receive?*

RQ2: *What other factors influence private charitable giving in the Czech Republic?*

Multi-source Financing of Non-profit Organisations and Crowding Theories

Non-profit organisations make use of various sources of income to achieve their mission and carry out activities related to it. Some NPOs depend significantly on income from private donations, others on income from public budgets or fees received for services rendered or products delivered (Kuvíková and Vaceková, 2009). Representatives of many organisations think that diversification of their income portfolio will help them through hard times when one of their sources of revenue may be considerably diminished (Froelich, 1999). For this reason, economic experts as well as others have for several decades been posing the question of how these varied sources influence one another.

Generally, financing sources for private NPOs can be divided according to various criteria and classifications. Examples of such classifications include distinguishing between domestic and foreign sources, financial and in-kind resources, and revenues from external sources and those from the organisation's activities. For our purposes, we will divide funds for NPOs into three major categories of financing sources: public sources, private sources, and revenues from the organisation's activities. As some authors (Froelich, 1999; Anheier, 2005) have indicated, variability of financing sources is characteristic for NPOs, thus distinguishing the NPS from governmental organisations that are largely funded from public budgets, meaning from taxes and fees, and profit-making organisations that mostly depend on payments from customers. While the variability of financing sources can protect NPOs from excessive dependency on a single source, it can also give them less power to control their sources of revenue in comparison to governmental and profit-making organisations (Gronbjerg, 1991).

The amount of charitable giving may be influenced by the public financing provided to NPOs. Studies have confirmed that public subsidies can *crowd-out* private donations. Nevertheless, the importance of this influence differs across studies (Andreoni and Payne, 2003). While some authors have argued that private donations are *crowded-out* by public financing (e.g. Andreoni and Payne, 2003; Andreoni, 2004; Simmons and Emanuele, 2004), other authors hold the opinion that such support is necessary for the existence of NPOs because it contributes to the growth of private philanthropy.

The *crowding-out* effect has two causes (Lammam and Gabler, 2012). The more funds obtained from tax revenues are provided by the public sector to NPOs, the more donors from the private sector feel that their duty or personal desire to contribute has been met. This result is defined as *classic crowding-out*. This phenomenon occurs in situations where NPOs seeking to obtain public financing require fewer resources (both financial and human) to obtain financial means from private donors. The more public funds a NPOs obtains, the less it is motivated to try to obtain private financial resources.

On an aggregate level (nationwide government spending and the nationwide level of private charitable giving), these theories have been tested since the 1970s, for example by Abrams and Schitz (1978), Schiff (1985), and Kingma (1989). Emphasis was initially placed on full *crowding-out*, and such studies tested whether government funds *crowd-out* private charitable giving on a dollar- -for-dollar basis. The results showed that *crowding-out* was only partial, and so subsequent research focused on the conditions under which such *crowding-out* might occur.

Brooks (1999; 2000a; 2003; 2004) followed on this initial research at an organisational level, presenting the idea of a *curvilinear relationship* – public financing supports private charitable giving only to a certain level, after which the amount of private donors' contributions starts decreasing (Brooks, 2000b). Such a curvilinear model for how public financing affects private charitable giving has not been tested empirically as often as the simple linear model has. Given that it expects that the *crowding-in* and *crowding-out* effects are not necessarily incompatible, the model thus presents several consequences (Brooks, 2000b) for representatives of public policy and the NPS. First, it claims that either of these two effects can occur and NPOs should steadily substitute one for the other. Second, it expects that both unearned income and private donations can be maximized concurrently. Third, it

explains the "subsidy trap" in which some NPOs get gradually bogged down as a result of illiquidity and administrative short-sightedness due to a reliance on public financing levels corresponding to their total income.

Methodology and Data

In general, four types of data are used to test the relationship between public support and private giving, namely data from laboratory experiments, data from survey experiments, archival data (financial information), and micro-level survey data (De Wit and Bekkers, 2016). To explore *crowding theories* in the Czech Republic, we decided to use our own survey data. Based on the potential of these data, we built our own research design.

This article presents some results from an extensive project aimed at determining the influence of public financing on the structure of resources and production of NPOs in the Czech Republic. This project used a quantitative questionnaire submitted by NPOs (panel data). Generally, the project studies how changes in revenues from public sources influence the operations and sustainability of NPOs in the Czech Republic.

A questionnaire was used to collect information directly from NPOs about the amount of their total revenues. Special attention was paid to the division into public and private sources as well as revenues from capital and from the organisation's economic activity, including non- -financial revenues. We investigated NPOs' total revenues in 2013 and retrospectively for 2008. The basic sample consisted of all NPOs that were active as of 31 December 2013 and that had existed in 2008 (105,522 organisations in total). After those organisations that did not meet the basic characteristics of a had been removed, we obtained a new sample of 80,000 organisations. Due to the high heterogeneity of non-profit organizations, we decided to divide this basic set into six subgroups according to IC-NPO classifications based on spheres of activity. Using the method of quota sampling we chose an appropriate number of units in each of these categories to obtain practically comparable groups of organizations. This methodology produced the so-called quasi-representative sample, which means that the representativeness of the sample is not derived from the same probability levels of selection among all units but from non-random unit choice based on the presumption of knowledge of the distribution of particular characteristics in the basic population. In total, we obtained information from 483 NPOs.

Although our research was focused in particular on the impacts of public financing on private giving, it is obvious that the amount of private donations is influenced by many other variables (De Wit and Bekkers, 2016). These factors include in particular other revenue sources (see Heutel, 2012; Sokolowski, 2013) and organisational factors treated herein as control variables (Stadelmann-Steffen, 2011; De Wit and Bekkers, 2016). Although we tested a variety of possible control variables, there are many other relevant conditions that we were not able to test (they were not included in the survey). We included five control variables in the analysis (employee, volunteer, fundraiser, origin, assets). Table 2 outlines the relevant factors included in the aggregate model.

Table 1: Independent Variables in the Model

	Variables	Conceptual Model Factors
Funding source variables	$Donations_t$	Private donations in 2013 (CZK thous.)
	$Public\ financing_t$	Public financing in 2013 (CZK thous.)
	$Public\ financing_{t-1}$	Public financing in 2008 (CZK thous.)
	$Market\ revenues_t$	Revenues from sales of assets, services, and goods (CZK thous.)
	$Membership\ fee_t$	Membership fee (CZK thous.)
	$Commercial\ revenues_t$	Income from commercial activities (CZK thous.)
	$Other\ revenues_t$	Income from other revenues (CZK thous.)
	$Total\ revenues_t$	Total (unearned + earned) revenues (CZK thous.)
Control variables	Employee	Number of employees (full-time equivalent); categorized into four categories
	Volunteer	Number of volunteers (full-time equivalent); categorized into four categories
	Fundraiser (dummy)	The organisation's fundraiser
	Origin	Date of organisation's establishment; categorized into six categories
	Assets	The organisation's total assets; categorized into ten categories

Note: Categories for Employee and Volunteer: 0, 1 – 9, 10 – 49, 50 and above.
Categories for Origin: before 1990, 1990 – 1994, 1995 – 2000, 2001 – 2004, 2005 – 2008, 2009 – 2012.
Source: Authors

As noted above (Sokolowski, 2013), NPOs depend on three primary revenue sources – governmental sources, private sources, and earned income. Each of these sources may influence private charitable giving. The present

paper devotes its attention to an analysis of governmental funding, and potential impacts from governmental funding have been described herein above.

An analysis based on multiple regression (ordinary least squares; OLS) was used to find values of the dependent variable among a linear combination of values of independent variables. The goal of the regression analysis was to describe this dependency by means of a suitable (mathematical) model using the following formula: $Y = b_0 + b_1X_1 + b_2X_2 + ... + E$, where Y is a dependent variable and X is an independent variable. Here, we mark the parameter representing the position of the straight line as b_0, while E represents the model's accidental error.

Ordinary Least Squares regression was processed for 4 models, which differed at two levels: 1) whether they included *Total revenues*, and 2) whether the data was transformed using the *natural logarithm* (*Ln*).

Regression outputs were tested against the following indicators:

1. Accuracy of regression coefficients: first, the model was tested as a whole (overall F-test); second, individual regression coefficients were tested with t-tests.
2. Multicollinearity: testing of pairwise correlation coefficients (data not shown), partial coefficient of multiple determination, colinearity statistics – the values of Tolerance and variance inflation factor (VIF).

Empirical Evidence and Interpretation

The following section presents descriptive statistics and regression results of the factors entering the OLS model, namely the statistical indicators of the funding sources variables and some control variables. Descriptive statistics provide information about the data set obtained from a total of 483 responses.

Table 2: Descriptive statistics

	Minimum	**Maximum**	**Mean**	**Std. Deviation**
Public Financing$_t$	0.00	34,298.00	1,121.52	3,750.47
Public Financing$_{t-1}$	0.00	36,435.00	804.34	2,904.80
Private Donations	0.00	13,600.00	111.67	720.94
Market Revenues	0.00	29,700.00	626.33	2,549.74
Membership Fee	0.00	19,996.00	101.19	1,058.93
Commercial Reve-	0.00	1,930.00	33.02	162.15
Other Revenues	0.00	734.00	4.21	40.36
Total Revenues	0.00	49,903.00	2,088.02	6,127.89
Employee	0.00	3.00	0.58	0.79
Volunteer	0.00	3.00	0.99	0.97
Origin	1.00	6.00	2.99	1.08
Assets	1.00	10.00	4.10	2.07

Source: Authors

The data show that public financing was the predominant source of funds for NPOs, both in absolute terms (expressed as the maximum) and in relative terms (expressed as the mean). Organisations that had entered the market of goods and services and thus obtained significant market revenues made up a significant proportion of the studied sample. In contrast, the sample contained a very small proportion of private charitable giving in total revenues. The organisations represented in the studied sample have a rather long history, with the average year of establishment falling within 1995 – 2000. The organisation with the highest number of volunteers (3,500) is the Czech Tourist Association. The organisation with the highest number of employees (1,380) is the Diaconia of the Evangelical Church of the Czech Brethren.

The regression model included a formal test of the relationship between public financing and private donations. OLS regression was processed for 4 models:

1. Model A: Includes *Total revenues;*
2. Model B: Does not include *Total revenues;*

3. Model C: Includes *Total revenues*; data Ln transformed;
4. Model D: Does not include *Total revenue*; data not Ln transformed.

Table 3 presents all regression results for all four models. The results show that models including *Total revenues* (models A and C) are not suitable. This variable causes critical collinearity in the model (VIF > 10, Tolerance < 0.2). The last model (Model D) is similarly not suitable. Testing the partial regression coefficients via a t-test shows the unsuitability of Model D, as the model parameters are not significant.

The model most suitable to describe the data thus appears to be ***Model B***. According to the OLS model, the adjusted R squared shows that Model B explains 35% of the dependent variable's variability. This means that the model manages to explain more than one-third of the variability in donations provided; it is necessary to explain the remaining variability through other variables. Because R^2 can be artificially increased by increasing the number of variables used the analysis, we have stated adjusted R squared, which takes the number of variables into consideration. The result of the analysis of variance (ANOVA), the second output from the regression analysis, shows us whether or not the model is suitable for the data because it measures the difference between the actual data and the data generated by the regression model. Table 3 presents F values (should be > 1) and their significance (should be < 0.05). In our case, the F-test for Model B resulted in a test statistic of 6.8 that was significant, which means that the calculated regression model is suitable.

Table 3 shows the regression results and captures the relationship between the tested variables and private charitable giving. Model B demonstrates a *crowding-out* effect for public financing and the amount of donations. The rate of this relationship is minimal (−0.0001). Thus, it cannot be claimed that governmental financing plays a key role in *crowding-out* private charitable donations to the NPS in the Czech Republic. If we relate the regression results to the aforementioned hypothesis of a curvilinear relationship (Brooks, 2000b), we would place these empirically tested NPOs in the descending section of the curve P(G), but just beyond the curve's local maximum. The relationship between total revenues (captured in Model A and Model C) and revenue from private charitable giving is positive, from which it is possible to derive the position of TR as between G* and G**.

Nearly all of the sources of revenues (apart from revenues from public charitable fundraising and public financing from previous years) also significantly contributed to the model. We can see *crowding-in* effects for all variables except for revenues from other sources. When organisations obtain sufficient income from their revenues, membership fees, or commercial income, a similar level of *crowding-in* occurs. If a NPO in aware of the fact that the *crowding-in* effect is comparable for individual alternative sources (outcome), it should consider the costs of obtaining an alternative source (input) when making decisions regarding diversification of sources.

The model also included control variables that define an organisation's basic characteristics and can influence the amount of private donations. It is an aggregate model that includes all sub-sectors of the NPS. The key factor is whether an organisation employed a paid fundraiser (or had a volunteer in the position of fundraiser). Such a position significantly influenced the obtaining of private donations. Another significant factor was the organisation's age as expressed by the year of its establishment. The younger the organisation was (with categories comprising 4-year periods), the more (CZK 12,000) private donations it obtained. The model captures a negative relationship between private donations and the level of the organisation's donor base. The more an organisation was based on volunteers, the less (CZK −21,000) donations it obtained. The result regarding the relationship between private donations and the amount of assets was not surprising. According to the regression model, there was a positive relationship between an increasing amount of assets and the amount of donations.

When NPOs obtain financing from public budgets, contributions from private donors may decrease for two reasons. The first is as a consequence of the *crowding-out* effect as described in this paper. The second reason is decreasing efforts by fundraisers to raise money from private donors. Theoretical models have been used to study whether it is fundraisers rather than donors who are *crowded-out* by public subsidies (Andreoni and Payne, 2003).

Table 3: Aggregate Regression Models

Independent variables	MODEL A (with TR)					MODEL B (without TR)					MODEL C (LN - numexpr, with TR)					MODEL D (LN - numexpr, without TR)				
	Unstandardized Coefficients			Collinearity Statistics		Unstandardized Coefficients			Collinearity Statistics		Unstandardized Coefficients			Collinearity Statistics		Unstandardized Coefficients			Collinearity Statistics	
	B	t (Sig t)	Partial Correl.	Toler.	VIF	B	t (Sig t)	Partial Correl.	Toler.	VIF	B	t (Sig t)	Partial Correl.	Toler.	VIF	B	t (Sig t)	Partial Correl.	Toler.	VIF
(Constant)	−96.035					−103.528					1.484					.860				
PUBLIC FINANCING$_t$	−.229	−9.382 ***	−.446	.034	29.779	−.001	−.075 ***	−.004	.221	4.522	−.001	−5.517 ***	−.487	.014	71.404	−1.928E−05	−.293	−.029	.162	6.179
PUBLIC FINANCING$_{t-1}$	.011	.828	.044	.170	5.899	.009	.628	.033	.170	5.898	3.030E−05	.415	.042	.139	7.180	−5.849E−06	−.070	−.007	.140	7.125
MARKET REVENUES	−.247	−8.389 ***	−.407	.068	14.612	.031	2.517 ***	.132	.506	1.977	−.001	−5.556 ***	−.489	.033	29.872	−4.577E−05	−.555	−.056	.300	3.331
MEMBERSHIP FEE	−.249	−4.836	−.249	.291	3.440	.092	2.074 **	.109	.506	1.977	−.002	−4.012 ***	−.376	.114	8.742	.000	.949	.095	.346	2.890
COM. REVENUES	−.046	−.356 ***	−.019	.892	1.121	.173	1.200 **	.063	.918	1.089	−.001	−1.074	−.108	.871	1.148	.000	.234	.024	.922	1.084
OTHER REVENUES	.127	.315	.017	.804	1.244	−.209	−.458	−.024	.809	1.236	.002	.786	.079	.713	1.402	.000	−.052	−.005	.729	1.371
TOTAL REVENUES	.233	10.151 ***	.474	.016	63.949						.001	5.669 ***	.497	.006	170.195					
EMPLOYEE	31.039	1.016	.054	.504	1.983	19.685	.569	.030	.505	1.981	.004	.166	.017	.135	7.428	.050	1.899 *	.187	.151	6.605
VOLUNTEER	−16.430	−.894	−.047	.912	1.096	−20.732	−.995	−.053	.913	1.096	.295	1.752	.174	.837	1.195	.265	1.374	.137	.838	1.194
FUNDRAISER	69.265	1.793 *	.095	.841	1.189	72.295	1.650 *	.087	.841	1.189	.284	.889	.089	.781	1.281	.328	.895	.090	.781	1.280
ORIGIN	14.580	.893	.047	.898	1.114	12.000	.648*	.034	.898	1.113	.325	2.184 **	.215	.836	1.196	.407	2.394 **	.234	.844	1.185
ASSETS	16.143	1.499	.079	.637	1.569	26.828	2.207 **	.116	.643	1.554	.091	.915	.092	.561	1.784	.230	2.088 **	.205	.597	1.674
R	.600					.417					.691					.553				
Adjusted R^2	.338					.348					.413					.229				
ANOVA - F statistic	16.599***					6.794***					7.46***					3.969***				

* p<.0.1, ** p<.0.5, *** p<.01
Dependent Variable: Private Donations
Source: Authors

Conclusion

The current paper posed the question of how public funding of NPOs in the Czech Republic influences the amount of private donations that these organisations receive. The answer was given by testing *crowding theories* empirically. The testing was based on the assumption that the *crowding-in* and *crowding-out* effects are not mutually incompatible. A low level of public subsidies has the potential to stimulate private philanthropy while a high level might have the opposite effect. The relationship between public subsidies provided to the NPS and private charitable giving depends on their mutual relative importance.

Based on the empirical results presented herein, we can say that the *crowding-out* effect occurred with respect to the selected sample of Czech NPOs. Government financing played a decisive role in the diversification of financing sources of NPOs. The high level of government financing to the NPS is likely based on the assumption that expenses are not influenced by private donors' behaviour. There are many potentially acceptable reasons why the given *crowding-out* effect might have occurred. First, the general public wants to support projects and organisations and weaken the government's responsibility for their financing in this manner. If a substantial part of an organisation's income is comes from public funds, it starts to become a quasi-public agency (Friedman and Friedman, 1980) in donors' eyes. Second, support to NPOs makes them "*non-mainstream*" and so it becomes not absolutely necessary to support them in a non-market manner. Donors, and in particular corporate donors, might be discouraged from making a donation by the perception of NPOs as strong and independent entities (Laurie, 1994). Third, many private donors continue funding NPOs only for such time as they are able to control the given organisation (Odendahl, 1990), and governmental interventions can threaten this mechanism of control. Finally, taking into account the fact that government subsidies are based on taxes, an increase in such support to NPOs might lead to fewer resources available from individuals.

Of course, there are limitations to the results of the OLS model. First, the model was constructed from a sample size of 483, which is approximately 0.6% of all organisations in the core sample. For this reason, the results cannot be related to the entire NPS. It is not a representative survey, but rather a research probe, mapping the empirically lacking area of scientific interest in the Czech Republic. Second, the research method did not make it possible for data to be submitted for several calendar years in sequence. Therefore, the model does not include the important factor of time. In the real economy, a time shift occurs when a behaviour is changed in response to an economic incentive. If the government finances a NPO in year *t*, the effect from *crowding theories* will probably be known no sooner than in the subsequent year $t + 1$. Donors will not respond simultaneously to an increase in public support by changing their behaviour as donors. (The model includes only *public financing*$_{t-1}$, meaning public financing in 2008). Third, an aggregate micro-economic model has been submitted but was not included in the model. The authors did not have macro-economic data available for the entire NPS. Because we did not have any results available from longitudinal research, it was not possible to include other factors potentially influencing the amount of private donations. Such factors would include indicators characterizing the country's political climate and economic conditions.

Finally, this article brings new information, thus contributing to the public debate about multi-source financing of the NPS. Of course, our conclusions are preliminary and it is necessary to continue testing them in future. However, we believe that the results of our work could serve as the basis for a proper understanding of mutual relationships among individual sources. It is important that donors, NPOs, and government representatives (politicians) be aware of possible impacts resulting from public financing of the NPS. If governmental support is to complement private donations and non-profit managers are aware of this fact, this mutual relationship can be used in a strategic manner (ignoring it would mean wasting an opportunity). It is important to understand this stimulation effect and take optimal advantage of it. Government representatives enriched with this information can better aim their budgets at specific outcomes (De Wit and Bekkers, 2016).

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100 years of the public finances and 100 years of the tax reforms in Czech Republic territory

Roman Horák*

Abstract. The author deals with the development of taxes and tax reforms implemented in the Czech Republic and Slovakia for the period from 1918 to 2017. He focuses on achieving of the objectives of tax reforms in the historical context of the previous tax reforms and their political support. The author considers the development of taxes, tax policy and tax reforms for 100 years of Czech territory.

Keywords: tax reform, public finance, financial science, VAT, tax administration.

JEL Classification: B22

1 Introduction

The anniversary 100 years of Foundation of the Czechoslovakia and its public finances calls for reflection. The first twenty years of the 20th century signaled a turbulent time full of wars, disasters, revolutions and crises, the rise and fall of the socialist social order also the expansion of public expenditure requiring the growing financial sources. I will deal with the income side of the public budget i.e. tax policy and tax reforms in the lands of the Czech Crown, Slovakia and partly Carpathian Ruthenia. Given the scope of the article, I described of historical events only briefly.

Basic theoretical and practical points

Goal of my research was to analyse significant tax reforms which were implemented according to their objectives and results. For fullfilling research goal were used research methods, as well as, analysis of oficial documents, tax legislation and theoretical works of the Czech and Slovak economists according to the general tax principles of Equality, certainty, convenience of payment and low cost tax colection. (Smith, 2001)

I used two definitions of the term "tax reform". The first is quoted by Kubátová: "Substantial change in tax acts. The fiscal reform is supposed positively affect economic growth and to redistribute the tax burden more equitably than before the reform." (Kubátová, 2010) And Vančurová defines tax reform as "a systematic change in multiple tax parameters triggered by newly formulated tax policy objectives. "She defines tax reform as a process that consists of a preparatory and implementation. An important part is also evaluation process. Tax reform should reduce tax administration, which is triggered by the formulated objectives of tax policy and of their implementation. It should meet some of the following characteristics:

- significant change of the mix of tax,
- the proposed change in the tax incidence,
- implemented new taxes or cancellattion of existing ones. (Vančurová, 2008)

Retrospective of 100 years of tax reforms

Tax reform of the First Republic to the Munich Agreement

Czechoslovakia took over tax system of the part so-called the Cisleithania countries that relied on tax reform by Austrian Minister of Finance, E. Bohm-Bawerk in 1896, was gradually adjusted mainly for fiscal reasons not for support of business and development. The second part of the Austro-Hungary Monarchy, the so-called Transleithania, Hungary, i.e. territory of Slovakia and the Carpathian Ruthenia, had different tax laws. Tax system in Austro-Hungary monarchy is showed in Table 1.

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Table 2: Tax system of the Austro-Hungary Monarchy

Real estate taxes	Personal taxes	Indirect taxes	Territory taxes
Land tax	Generally earned tax	Special payment from the bar and fired spirits sales and trade	**Taxes other public corporations and local taxes**
		Duty	
Residential taxes	Rent tax	Consumption taxes	meat, wine, beer, petroleum, sugar, spirituous, food tax on the line
Apartment tax	tax on nomadic trades	Fees	
Class tax	tax earnings of companies publicly keeping accounts		
	Income tax		
	Higher service income tax		

Source: Vítek, L (2001)

In comparison year's 1911 – 1913 and 1922 average tax burden of the territory of the Czechoslovakia was increased total by 14.85 % (in Golden pre-war Crowns per head). In the Czech countries average tax burden increased by 22.67 % and in the Slovak and in the Carpathian Ruthenia was decreased by cca 6%. Tax system was complicated, difficult to control, did not support the recovery of the economy. Austrian tax system was deformed by war fiscal measures.

Tax reform in period 1918 – 1927

Drachovsky commented on the first period of the state establishment:" National defence and financial strength integrated in the hands of organizational elements are the first ground and practical basis for the possibility of each and every objective pursuing the whole of the state…" He declared two main tasks of the new financial state economy:

1. Provide the material needs for state.
2. Socio-political (national economy) policy – to protect the weak, support business activity, to improve domestic economic activity and help regulate property and income among the population.

He submitted a request for financial administration (administration of taxes):

1. Realize financial measures in accordance with current (Austrian) legislation.
2. Complete a staff of the financial and tax administration.
3. Establish changes by the constitutional and approved a new financial legislation.
4. Provide finished financial liquidation of the Austro Hungary monarchy.
5. Solve monetary questions.
6. Take tax and financial measures for ensure of income. (Drachovský, 1919)

From 1918 to 1926, were adopted a total of 41 tax regulations regarding war, postwar situation and depression. Czech tax officials went to Slovakia and Carpathian Ruthenia to help implement the Austrian, Cisleithania, tax system. They supported and saved financial interests of the young Czechoslovakia and trained local tax officials. Members of the National Assembly already in 1921 asked the government for the preparation and submission of new tax reform. In 1924 Minister of Finance, Bečka, submitted the Draft of Direct Taxes Act. The Draft was prepared by expert group of the Ministry of Finance and discussed with economists and lawyers. It reflected high level of commitment and willingness of officials, government and opposition politicians, as well as national economists, to create a new modern tax system that tends to comply with general tax principles. This Draft was finalized by the Minister of Finance, K. Engliš in to three Acts. Acts were approved by the Parliament in 1927. K. English presented this Draft as the Public Reform Acts in line with his teleological theory. His reform consisted of Budgetary and Tax reform including so called Stabilization Balances. New budget structure consisted of State budget, Economic results of the state enterprises, Budgets of municipalities and State debt. Concept of stabilization balances was the Instrument for the Stabilization of Monetary Policy for Enterprises. It consisted of evaluation of assets by depreciation for the tax base which controlled by financial offices. Surplus of assets valuation served as a reserve and the distribution of surplus was forbidden. Decreases were financed by the reserve funds of enterprises. Tax system after tax reform in 1927 is listed on Table 2.

Tax reform was consisted of three objectives:

1. Unify tax law in the field of direct taxation in a single authentic text. The main tax became Income tax.
2. Reduction of tax burden and better regulation of construction and tax administration.
3. Support the economic policy of the state and business. (Vencovský, 1992)

Table 3: Tax system after Tax reform 1927 (tax rate of the tax base)

<table>
<tr><th colspan="3">Direct taxes (new)</th><th colspan="2">Indirect taxes</th></tr>
<tr><td colspan="3">Land tax 2 % and coefficient</td><td colspan="2">Turnover tax 2 %</td></tr>
<tr><td>Residential taxes
8 – 12 %</td><td colspan="2">Apartment, class
Rate in CSK</td><td colspan="2">Duty</td></tr>
<tr><td colspan="3">Income tax 1 – 28 % with progression</td><td colspan="2">Luxurious tax 2, 10, 12 % by type and purpose of the goods</td></tr>
<tr><td colspan="3" rowspan="2">Generally earned tax 2,5 – 4 %</td><td rowspan="2">Consumption taxes</td><td>Coal, meat, wine, beer, mineral oil, alcohol, matches, sugar, hunting weapon, food tax on the line</td></tr>
<tr><td colspan="2">Stock exchange tax by type of the shares</td></tr>
<tr><td colspan="3">Special earned tax 8 %</td><td colspan="2">Fees</td></tr>
<tr><td colspan="3" rowspan="2">Rent tax (support tax, withholding tax on profits)</td><td colspan="2">Payments</td></tr>
<tr><td rowspan="2">Monopoly</td><td rowspan="2">salt, sweeteners, tobacco, lottery, explosives</td></tr>
<tr><td colspan="3">Royalty tax 10 % and additional charge From higher salary 3 % over 100 000 CSK per year</td></tr>
<tr><td colspan="3">Enrichment taxes: Inheritance, gift
2 – 55 % with progression</td><td colspan="2"></td></tr>
</table>

Source: Vítek, L.,Daňová politika České republiky,
Studie národohospodářského ústavu J. Hlávky, 2001, Praha, p.12, 16

Results of the tax reform: The rate of the Income tax was reduced by cca. 40%. The rate of both tax earnings were reduced and was implemented a limit to surcharges of the local government. The tax administration and tax collection was improved. The proportion of arrears of direct taxes on total tax arrears was 69.1% in 1927. This percentage decreased every year until the year 1936 and it was 41.6% of total taxes arrears. In this period was to improved tax legislations step by step and to cope with the consequences of the Great Depression. Since 1935 the main objective of the tax policy was to create favorable tax conditions for the preservation of national identity, ie preparation for the national defense.

The Tax reform of 1927 in accordance with the above definitions and tax canons by Smith and their positive impact on the economy of the Czechoslovakia filled the attributes of the tax reform. It can be clearly declared that this reform of direct taxes was by way of preparation, discussion and implementation as an example of a successful tax reform.

Period after the Munich Agreement and of the World War II in 1938 – 1945

This period is characterized by short-term measures to address issues related to the consequences of the Munich Agreement. Results were critical: the loss of 38% of the territory and 36% of the population, with almost irresolvable economic, political and social consequences, assistance to Czech refugees from Sudety, from Slovakia and from the Carpathian Ruthenia, increased autonomist pressures of nationalist politicians. On 19 November 1938, were adopted constitutional laws on the autonomy of Slovakia and the Carpathian Ruthenia.

Customs and financial administration in the occupied territory was subject to the Reich Mark. The CZK lost of convertibility for gold, .exchange rate to the Reich Mark was artificially set in favor of the Reich Mark 10: 1, The British and French investment capital left the Czech countries. The Jewish emigration transferred of their property abroad or to the Czech hands. Finally, on March 14, 1939, Slovakia and declared independence.

Germany declared the Protectorate of Bohemia and Moravia, which did not international legal personality, without own National Assembly, with the protectorate government and the president, only. The Reich Protector and the German administration performed the main role. The German population in territory of the Protectorate was under the German jurisdiction, the Czechs were subject to the protectorate jurisdiction. The Jews were de facto without rights.

German tax system was implemented into legislation. The financial guard was canceled. Financial sources were transferred to Germany. A customs union was established. Administration of consumption taxes and state monopolies on the territory of the Protectorate was carried out by the Czech administration. The German administration controlled taxes abroad. The proceeds of excise duties, customs and monopolies from abroad became the income of the Germany. In September 1939 was introduced a military charges for smoking and alcohol. German

tax rules on indirect taxes (turnover tax) and new taxes have been introduced: property tax, fire protection tax, rail and vehicle transport tax, corporate tax, etc. The withholding tax was replaced by wage tax, eviction tax, a military contribution to the income tax, and a charge for the Jews, Poles and Gypsies. Existing taxes were increased. Income tax revenue increased in 5 years almost quadrupled, and revenue from general tax earnings doubled.

In Slovakia continued to used pre-war Czechoslovak tax system. The Slovak economy took advantage of the situation outside the area of operations and partly by seizure of Jewish property. The Slovak economy was increased. Despite the efforts of Slovak economists increased the German economic and political pressure was gradually. Part of Slovak well-known economists supported the resistance movement (Karvaš, Zaťko) in Slovakia. The War II did not avoid Slovakia and caused economic difficulties for the Slovak state as well.

It is admirable that people in the protectorate governments participated in the Anti-Nazi Resistance, including Minister of Finance, J. Kalfus. The Czechoslovak tax system was completely destroyed in Protectorate but continued in territory of Slovakia. Objectives of the protectorate tax system were maximize tax revenue for the benefit of the German Reich. The changes 1939 in tax system and their negative impact on the economy of the Czech territory does not reflect both definitions and the tax canons by A. Smith.

The Czechoslovakia in period 1945 -1947

The restoration of the country began. It was necessary to create conditions for the implementation of the tax policy that followed the pre-war phase for the Czech lands and Slovakia. Carpathian Ruthenia was annexed to the USSR by manipulated referendum. The revival of the devastated country was accompanied by post-war chaos, nationalization, the expropriation of property and the expulsion of citizens of German and Hungarian nationality. The Minister of Finance of the Exile Government in London, L. Feierabend prepared economic and financial measures (f. e. monetary reform in November 1945). It was modified by the Communist party and declared in the Košice government program in 1945. Was prepared a two-year plan of the economy recovery for 1947- 48. It was partially fulfilled.

President Beneš restored by presidential decrees material and procedural tax regulations with changes linked to the situation. E.g. the food tax on the line was abolished. The pre-war customs administration, as well as the financial guard, was restored. First Slovak Minister of Finance, V. Šrobár prepared between 1946 and 1947 changes in taxation in connection with nationalization processes. Gradually, new taxes were introduced (e.g. wage tax). The unified tax adjustment from 1927 was changed. There was a new adjustment of indirect taxes and monopolies. Given the development of the political situation in favor of the Communist Party, there were political conflicts between the political parties over the principles of the tax reform of 1927. It was introduced dose from asset growth and wealth. They were destined for the restoration of the country. A turnover tax with rates 3 and 5% was introduced. Consumption taxes (yeast, acetic acid, mineral oil, beer, sparkling wine, soft, and fruit juice and cigarette paper), monopolies (tobacco, salt, explosives, artificial sweeteners and liqueurs) were introduced. A so-called compensatory amount (0.5-10% of gross sales) was introduced for consumer goods. Wage tax had a high progression of up to 85% of high wages. In 1947 were introduced so-called millionaire a luxury taxes on consumer goods, rates of 10-100 %. (Vítek, 2001)

According to the theoretical definitions of tax reform and compliance with A. Smith, it can be said that this was a tax reform to set the conditions for a peaceful life. On the other hand, it was a reconstruction of the former Czech tax system with elements of socialization.

Period of the socialismus 1948 -1989

The period consits of the onset of a new economic and social system, its functioning, a short period of reform time, a long period of real socialism, and a subsequent insoluble crisis. It included a solution to the consequences of the World War II (war reparations, monetary gold negotiations and issue of compensation for post-war nationalization, etc.). The difficult economic situation was complicated by a lack of food. Experts from the pre-war republic incl. former Ministries of Finance were transferred to working-class professions, arested or emigrated abroad. Companies were controlled by the unprofessional management on the basis of party membership of the Communist Party. In 1952, military production accounted for 30% of all industrial production. Other industries and agriculture stagnated. They were supported by huge investment structure. Housing construction was limited.

During 1946 started a discussion between pro-continuity pre-war leaders and economists and the Communists party about financial and tax policy. This process culminated in 1948. An agricultural tax was introduced, which was fixed with a lump sum according to the area and the average cadastral yield. This tax supported small and medium-sized farmers. It was about 10-15% of the farmers. A solo trader tax was introduced. It supported a small business. The rate of tax was 2.7-22.5% of the surcharge of employees' wages and the surcharges of goods and material costs. The new withholding tax on the savings rate was 14%. A new tax on literary and artistic activities

to support workers in culture area and the tax rate was 10% of the royalties. The new tax on self-employment taxed income from the liberal professions (doctors, lawyers, notaries, etc.). The rate was highly progressive and focused on high income taxation. Since 1. 1. 1949 was abolished the system of indirect taxes. It was replaced by a general shopping tax. This tax simplified administration and tax collection and became the main revenue of the budget and the market regulator.

The monetary reform was implemented on 1 June 1953. State liabilities to citizens were recognized in an exchange rate 50:1, receivables between private individuals in a exhange rate 5: 1. In 1953, the content of 1 CSK was also set at 0.123426 grams of gold. According to The rationing economy was abolished. Was implemented market for all commodities. Monetary reform had hard impact on the savings and earnings people. It triggered demonstrations that were suppressed. Increased distrust of citizens in state administration.

In 1953 was introduced a new tax system, incl.the earlier substantive and procedural rules:

- Turnover tax. This tax with the system of levies of state and cooperatives, This Tax became the most important revenue of the state budget. It was determined by fixed amount of the product price and was differentiated by type and group of products uniformly for all producers but only once. It concerned only products of a consuming nature. It was determined on the basis of a number of extensive tariffs.
- tax on performance (since 1962 included in turnover tax),
- wage tax with progression (7 rates),
- agricultural tax with high progression 40 % for farmers,
- income tax of the population with progression (rates 5 – 80 %),
- solo trader tax (abolished in 1961),
- tax on literary and artistic activities,
- income tax of cooperatives and other organizations (the accounting profit was adjusted for items that are not deductible and deductible. Tax rates were set separately for manufacturing, consumer and other businesses and cooperatives),
- house tax,
- local, judicial, administrative, notarial and arbitration fees.

In 1953 was implemented the system of levy on profits and other state enterprise levies was changed. It was done centrally and eliminated control. It was canceled in 1955. (Vítek, 2001)

According to the theoretical definitions of tax reform and compliance with A. Smith, it can be said that this was a tax reform 1953 to set the conditions for a communist's regime. Was established the Czechoslovak socialistic tax system which should support socialist economy.

In 1964, was implemented changes of the income tax and tax on motor vehicles, tax on literary and artistic activities. In the second half of the 1960s, economic and political reforms were adopted. The system of payments to state budget was introduced in 1967 for state-owned enterprises that had profited differently according to the conditions of individual enterprises. Payments were made by gross income, for all state-owned enterprises. The basis was so crude income, ie wages and earnings, fixed assets, inventories and write-offs of capital assets, a stabilization payments. It served to influence wage and labor force developments.

After 1970 it was replaced by changed set of others like payments: profit, the free profit balance, the depreciation of fixed resources, the volume of wages, the increase in wages, the assets, taxes. Additional were payments based on a financial plan, regulatory and price charges, and beyond contribution to social security. Cooperatives continued to pay their income tax on the income tax, which had the same components. The system existed with partial modifications until the tax reform of the year 1992. The system of taxation of economic organizations since 1970 was following:

- Profit tax (rate 65 %, financial institutions and joint stock company 85%),
- Property tax (rate 5 % of the average capital of the organization for the period),
- Payroll tax (with progression rate),
- Contribution to social security (rate 25 %),
- Payments economic organisations: deprecitation of capital assets, from motor vehicles, removal of agricultural land from agricultural production, branch headquarters, aditional payments.

After 1970, the income tax of the population was as follows: wage tax, agricultural tax of citizens, tax on income from literary and artistic activities, special income tax, income tax, house tax, motor vehicles.

The invasion of the Warsaw Pact troops and the subsequent 20 year occupation by the Soviet troops preserved tax system. Followed by further purges in the Communist Party, state administration, higher education, culture, in the business sector. The extent of the values provided by Czechoslovakia to the USSR to date precisely is unknown. Nevertheless, the economy of Czechoslovakia was one of the most advanced in the socialist bloc countries that

joined the Council for Mutual Economic Assistance as the counterpart of the European Economic Community. The system of central planning of socialism failed. Political development after perestroika accelerated the political and economic crisis. (www.mfcr.cz, 2004)

Tax reform 1970 did not respond to the theoretical definitions of tax reform and compliance with A. Smith. Czech tax system supported central controlled economy, central plan, and tool to suppress the activities of people.

The velvet revolution and spliting of Czechoslovakia 1990 – 1992

After the Velvet Revolution started work on the new tax system, which would correspond to the new social and political conditions. The fundamental tax reform became an important part of the Czechoslovak transformation process. One of major barrier of the market economy was turnover tax. It was a complicated instrument of the state price dictate. In 1989, the turnover tax was in 1989 a total of 1506 items, of which 428 were negative, with tax rates ranging from + 88% to - 291%. (www.mfcr.cz, 2004) Since 1990-1993 were set new tax systems. The radical tax reform on 1 January 1993 prepared the eligible conditions for business, to eliminate the inequities of the existing tax system, to adapt tax system in line with the objective of the common European tax systems. The objectives of the fundamental tax reform were:

1. To increase consumption tax by introducing, in particular, VAT and other excise duties;
2. Separation of social security contributions and their financial self-sufficiency;
3. Implementing universal and uniform income taxation.

To establish new tax rules was complicated by the gradually changing competencies of the federation and republics. A number of tax Acts were adopted as federal in 1992 and in the Czech Republic never became effective and were replaced by the laws of the Czech National Council. As of January 1, 1993, in parallel with the division of Czechoslovakia was approved a new tax system that completely changed the material and procedural tax rules. Introduced were:

- Taxation natural persons (premiums for general health insurance, social security contributions to the state employment policy).
- Taxation business and premiums for general health insurance, social security contributions to the state employment policy.
- Property taxes (real estate, inheritance and gift, real estate transfer, road).
- Excise taxes (beer, hydrocarbon fuels and lubricants, wine, alcohol and spirits, tobacco and tobacco products).

At the same time, was adopted Act No. 337/1992 Coll., On the Administration of Taxes and Fees, which was a procedural regulation that replaced the fragmented legislation. On January 1, 1991, Act No. 531/1990 Coll. created system of the Territorial Financial Authorities, consisting of 8 financial directorates (for the capital city of Prague, in Prague, České Budějovice, Plzeň, Ústí nad Labem, Hradec Králové, Brno and Ostrava) as 218) of the tax authorities as the first instance authorities. Territorial Financial Authorities administer all taxes (today except excise duties) as well as other government revenue. (www.mfcr.cz, 2004)

The tax reform of 1992-1993 in accordance with the above definitions and tax canons by Smith and their positive impact on the economy of the Czech Republic filled the attributes of the tax reform. It can be compared with the Tax reform of 1927. Targets were fulfilled with the exception of streamlining tax administration. The tax system was repeatedly changed as early as 1993. (Vančurová, 2008)

The Czech tax system 1993 - 2018

The main objective of the 2004 tax reform was the implementation of the European Union's tax legislation into Czech tax legislation. The result was a new VAT Act and a new on excise duties Act. Implementation started tax principles in the area of capital transfers between the Member States of the European Union in the field of corporate income tax. With the accession of the Czech Republic to the European Union, customs controls were abolished at the borders within the EU. The network of customs offices reduced. The customs authorities took over the administration of excise duties from the Territorial Financial Authorities. The Customs Directorate of Customs became a subordinate body to the MF. The tax administration was managed by the Central Finance and Tax Directorate, which is an integral part of the Ministry of Finance as its internal organizational unit.

The tax reform of 2004 in accordance with the above definitions and tax canons by Smith had positive impact on the economy. Objectives of this tax reform were fulfilled.

The progressivity of direct taxes was increased in the period 2005 – 2006. In line with the definition of the concept of tax reform, these changes cannot be regarded as tax reform. Changes were related to the income tax of natural persons. Was changed of tax incidence and increased tax progressivity system.

Interesting development of the tax policy is last ten years. It is related to the political and economic development in the CR and in the world. It is linked to the different approach of right-wing and left-wing governments, especially with Ministers of Finance, M. Kalousek and A. Babiš.

M. Kalousek with the Prime Minister M. Topolánek enforced so-called consolidated public finance reform in 2008. The Parliament accepted new and changed 46 Acts (f.e. Labor Code). The basic idea of consolidating the public budget was to increase the state's revenue through, in particular, the tax reform, the establishment of healthcare fees. Main objective of this public reform was adapted the tax system a consolidation public budgets and harmonized tax system with the E.U. The reform introduced three environmental taxes – land, other natural gases, solid fuels and electricity. Were the reduction of direct and indirect taxes increased, the reduction of the nominal corporate tax rate, which was almost offset by tax base extensions (tightening of sub-capitalization rules). Was introduced a problematic so-called "super-gross wage" in wage tax, extension of employee participation in public health insurance, the introduction of a general maximum basis of assessment at the level of enterprises owned by natural persons other than employees. After the opposition entered to the government, measures were abolished, f.e. medical fees. Some measures would be later canceled (super gross wage).

Very significant was next so-called Kalousek tax reform 2008-2010 which was planned to finish in 2015. In 2010, a public debate on the reform of the tax system was launched. The main objectives were to reduce administrative burdens, i.e. simplification of legislation (recodification, principles based on principles and general rules, tax and levy reduction) and tax administration (single collection point, simplification and acceleration of the process - new tax rules, unification of assessment bases income and insurance, client access to taxpayers, centralization and electronicisation of processes of effective taxes and levies organization.) The reform contained three pillars:

1. New Income Tax Act;
2. Reform of the Tax Code;
3. One collection point.

Important element affecting taxes was the pension reform, as well as the implementation of data boxes. Financial Administration was currently organized in the sense of Act No. 456/2011 Coll., On the Financial Administration in the structure:

- General Financial Directorate, which is subordinate to the Ministry of Finance,
- The Appeal Finance Directorate is subordinate to the General Financial Directorate,
- The tax authorities are subordinated to the Financial Tax Directorate.

Both tax reforms were approved by Parliament with a close majority and strong opposition from the nongovernment parties. The tax reforms were in accordance with the above definitions. But their impact on the economy was controversial from the start. Objectives of this tax reforms were not fulfilled.

After the fall of the government of P. Nečas, who enforced the tax and pension reform, the laws were abolished in whole or in part by a new government of B. Sobotka. This was mainly about pension reform. Of the three pillars of tax reform remained new Tax Code, new structure of the financial administration and partial changes in the tax acts. One collection point project was very ambitious but was neither prepared nor effectively controlled. This project was cancelled. The National Audit Office provided financial control of this project. He found fundamental shortcomings in project management and budget failures in the amount of approx 41 million CZK. (www.nku.cz, 2018) On the other hand, the positive impact of digitization penetrated into the tax administration. Since January 1, 2010, a summary report has been submitted only in electronic form.

Ministers of Finance, A. Babiš and I. Pilný implemented significant tax measures for reduction of the tax evasion. Tax evasion in the Czech Republic was estimated at tens of billions per year, and in total it may achieve close to hundreds of billions. To limit VAT leakage as of 1 January 2016, the VAT payer must submit a so-called control report as a special tax claim for VAT. From 1 January 2016, the VAT payers have to administrate so-called control report as a special tax claim for VAT. From 1 December 2016 to 1.12.2017, the year-on-year VAT increased at the level of public budgets was 30.8 billion CZK. Subsequently, the EET Act, which focuses on income tax evasion, was adopted. Implemented of electronic payment records was strongly blocked by opposition in the Parliament. The Constitutional Court abolished some provisions of the EET Act. The Constitutional Court confirmed electronic records of payments as a legitimate tool for effective tax collection and settlement of the business environment. The government has to prepare adapt of this Act. The EET generated 3.6 billion CZK from January to October 2017. (www.mfcr.cz, 2018) For comparison revenue of taxes and duty in period 2007 – 2016 showed table 3.

The Ministry of Finance presented a new future tax reform "MOJE DANĚ (My Taxes)" as a new significant project in 2016. The project should simplify of the tax system and an extension of tax administration electronicisation. It should enter into force in January 2020. The Ministry of Finance also prepares so-called self-measurement of tax. This project should help solve the problem where taxpayers are waiting for the tax administrator to deal

with the tax return, for example, when determining the excess deduction. The latest news is the so-called tax kiosk, an electronic tax administration portal. It should be essentially a virtual financial office. The taxpayer will see a complete overview of his tax history obligations.

According to the theoretical definitions of tax reform and compliance with A. Smith, it can be said that this tax steps during years 2014 – 2018 was not characterized as a tax reform. On the other hand, tax measures adopted by governments after 2014, despite partial weaknesses, could be assessed as measures to increase tax discipline in the Czech Republic.

Conclusions

I made a short trip to the century of history of the Czechoslovak and Czech state. I focused on the tax reforms that have fundamentally influenced public finances of our republic. I came from the definitions of prof. Kubátová and prof. Vančurová. I evaluated tax reforms according to the fulfillment of the general tax principles.

The fundamental tax reforms include the reform of direct taxes of 1927, promoted by K. Engliš. It reflected high level of commitment and willingness of officials, government and opposition politicians, as well as national economists, to create a new modern tax system, which created the basic prerequisites for fulfilling the general tax principles. Direct tax reform 1927 supported Czechoslovak economy.

I appreciate the role of the people like J. Kalfus, who during the period of occupation by the Nazi Germany with the deployment of life, helped Anti-Nazi Movement. Accordance with definitions and tax principles changes during 1938 – 1945 were destructions tax system.

In this context, we are considering to focus on the period from 1938 to 1945 in the framework of the solution of our project intent, the study of the attitudes of the Czech and Slovak national economists at the time of dealing with tax matters, their mutual cooperation and possible support of the resistance movement.

The second fundamental tax reform in accordance with above definitions was the tax reform in 1992-1993, as part of the transformation processes of the Czechoslovak economy. This tax reform implemented modern tax system for the market economy. The third important tax reform was the harmonization of our taxes system with EU legislation, especially VAT. It has allowed our Czech Republic to enter the EU and had a positive effect on the economy.

Further tax reforms in the years 2008 – 2010 were implemented by right-wing parties in 2008 and 2010, which M. Kalousek. In both cases, the reforms met to strong pressure of opposition politicians' parties. Tax reforms were ambitious but not prepared and without political support of opposition. Applying general tax principles was a slogan only.

Tax reform will again be pushed and complicated in parliament and discussed with the public. In the last twenty years there have been hundreds of tax changes in line with the political priorities of the parties, as a rule but not in line with general tax principles.

100 years of the Czech public finance they are 100 years of experience and lessons for the present and the future. It is still true that taxes are losses of revenue of business, organizations and citizens obligatory and involuntarily. Taxpayers do not expect the state to handle economy and effectiveness. That's why he's trying to avoid pay taxes.

In the course of 100 years, the needs of the state have increased many times. With the growing wealth of citizens, we can expect further public spending growth. There is pressure on Ministry of Finance and political representation to look for further ways for better tax collection for state funding. On the other hand, the state should be better steward of taxpayers' money. But in new conditions of the virtual environment processes of globalization and electronisation give new possibilities for taxes evasion. The financial, tax administration adapt to new conditions step by step with delay.

Finally, let me introduce the words, former minister of tilth of the Austrian monarchy, the creator of the Czech economic terminology, prof. Bráf, quoted by another Czech national economist, prof. Macek: "When you decide to vote in election, choose the candidate not according to what he promises but according to what for which taxes he wants to vote in the parliament."(Macek, 1945)

Table 4: Revenue from taxes and duties

	Revenue from taxes and duties in bil. CZK									
Taxes	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**
VAT	236,4	255,2	253,6	269,5	275,4	278,2	308,5	322,9	331,8	349,7
Consumer, energy taxes	138,9	133	131,1	138,3	140,6	140,4	137,6	139,3	148,6	156,3
Duty	7,4	7,9	6,3	7,1	7,7	6,2	5,8	7,2	8,2	8
Corporate income tax	169,2	189,1	125,7	129,7	124	133,6	126,5	138,5	154,3	171,1
Income tax of natural persons:	152	143,3	126,7	130	133,4	136,3	141,6	146,8	154,4	172,4
in with tax return	17	17,7	5,6	8	2,9	3,3	2,7	1,1	2,5	6,8
employees	126,4	115,2	111	111,8	119,4	119,8	126,1	130,9	136,1	149,4
special rate	8,6	10,4	10,1	10,2	11,1	13,2	12,8	14,8	15,7	16,1
Inheritance, gift taxes1)	0,8	0,4	0,3	0,2	4,4	3,5	0,2	0,2	-4,4	-0,4
Transfer of real estate, immovable property, acquisition of immovable property2)	14,9	15,2	14,2	16,2	16	17,2	18,7	19,2	21,5	23,5
Road tax	5,9	6	4,8	5,1	5,2	5,2	5,3	5,5	5,8	6
Discharge electricity from solar radiation	0	0	0	0	5,9	6,4	5,8	2	1,9	1,9
Levy on lotteries	0	0	0	0	0	5,9	8,1	7,9	8,1	10,5
Other incomes	8	7,5	7	6,6	6,3	6,1	5	5,3	6,5	8,8
Total	**733,5**	**757,6**	**669,7**	**702,7**	**718,9**	**739**	**763,1**	**794,8**	**836,7**	**907,8**
year-on-year index in %	**112,95**	**103,29**	**88,4**	**104,93**	**102,3**	**102,8**	**103,3**	**104,1**	**105,3**	**108,5**
Remarks: 1) Innheritance, gifts taxes were incorporated in Income tax 2) Transfer of real estate was 1.1.2014 replaced of acquisition of immovable property										

Source: Ministry of Finance (2011, 2016)

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Microeconomic Model of Optimal Alcohol Taxation

Karel Janda*

Abstract. This paper describes a general equilibrium theoretical model of alcohol taxation suitable for the empirical analysis of optimal alcohol taxation in the Czech Republic. For this purpose, we use a model determined by both externality corrections and fiscal considerations as the tax increase is assumed to immediately change other governmental policies such as labour taxation or medical expenditures. Theoretical framework described in this paper presents improvement over the models which focus solely on Pigouvian taxation reflecting the externality effect of alcohol consumption. The model provides decomposition of optimal alcohol tax into the taxation of major alcohol beverages- beer, wine, spirits.

Keywords: alcohol, beer, wine, elasticity, price, tax

JEL Classification: H21, Q02, Q18

1 Introduction

This paper provides a contribution towards improved understanding of alcohol economics in the Czech Republic. It focuses on estimation of optimal beer, wine and spirit taxes, using an analogy to a methods developed by (Parry, et al., 2009) and Pogue and Sgontz (1989). Given the space limitation of this conference proceedings volume, we provide here only the theoretical model based on a simplification of a large model of Parry et al. (2009). The model presented here is used for empirical estimation of optimal beer, wine and spirit taxes in the Czech Republic. These Czech empirical results are provided in Janda et al. (2018).

Our project builds up upon a line of research by Janda and his co-authors (Janda, et al., 2010), (Janda & Mikolášek, 2011), who dealt with Czech beer industry and provided suitable empirical estimations of elasticities of Czech alcohol demand. However, their analysis was focused on balancing Pigouvian tax and dead-weight loss of taxation. The major contribution of our current article is the incorporation of those previous research results in fully specified general equilibrium theoretical framework which enables in depth economic discussion of taxation of beer, wine and spirit.

The Model

First, we present a model with a structure based on the one used in (Parry, et al., 2009). This static general - equilibrium model with a representative agent that assumes the agent's future costs of addiction are internalized and not undervalued and that efficiency determines optimality of policy. The fiscal system is highly simplified as government expenditures are financed only through labour taxes, excise taxes on alcohol and pecuniary penalties. By doing so, we silently use a simplifying assumption that both alcoholic goods and non-alcoholic goods are taxed with the same VAT rate, which is not technically correct as some consumer goods (including non-alcoholic beverages) are subject to lower tier of tax. The lower-bracket goods, however, account for only a small fraction of total tax revenue. In order to account for the lower VAT brackets, we'd need to include alcoholic/non-alcoholic goods elasticity of substitution for each VAT bracket, which would make our model much more complex.

A major advantage of general equilibrium approach presented in this model, as compared to partial equilibrium approach of Pogue and Sgontz (1989) and (Janda, et al., 2010) and (Janda & Mikolášek, 2011) is a possibility to consider indirect channels and interactions among alcohol consumption, taxation and social costs (or benefits) of alcohol.

Preferences

Let us assume that the agent, representing an aggregation over all households in the real economy, has a continuous, quasi-concave utility function:

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$$U = U(A, D, \tau_D D, C, l, G^P, H) \quad (1)$$

$$H = H(A, D, \overline{D}, M) \quad (2)$$

In (1) all variables are expressed on a per capita basis and the bar accent in (2) depicts a variable exogenous to our agent. U is a function increasing in all arguments except $\tau_D D$ and H. Agent can arbitrarily choose the consumed level of alcohol A and non-alcoholic goods C, number of driving trips under the influence of alcohol D and leisure time l. τ_D denotes non-pecuniary penalties (e. g. license suspensions, jail) per drunk-driver trip. G^P is government spending on public goods and H health risks, further explained in the next paragraph.

Health risks H comprise risks of becoming ill, injured, disabled or killed due to heavy-drinking or alcohol-involved traffic incident. These risks are defined in (2) by the continuous, quasi-concave function, increasing in agent's own alcohol consumption, drunk driving, drunk driving committed by others $\overline{D}$ and decreasing in agent's consumption of medical services M, as this mitigates health risks and improves the chance of recovery. While in the Czech Republic only 9% of traffic accidents are caused by people under influence of alcohol (Mravcik et al., 2014), the corresponding numbers for EU as a whole and for many other countries all over the world as noticeably higher. The health risks considered in this paper are strictly health risks related to the core topic of this paper – alcohol consumption. They do not include any other types of unrelated health risks.

Production

Let us assume there are no pure profits on the production side of the economy because alcohol, general goods, medical and automobile services are produced by competitive firms with constant returns to scale. Therefore, producer prices are fixed and firms pay a gross wage of w that is equal to the value of a marginal product of labour. Effective labour supply is defined as $W = wL$ where L is labour supply (time at work). Changes in H are assumed to have a negative impact on W ($\partial W/\partial H < 0$).

The government pays for fraction s of medical care costs, while the rest $1-s$ is paid for by private insurance and car insurance companies that cover their costs through charging a variable payment amounting to the fraction υ_M of medical expenses charged by insurance companies or υ_D per drunk-driver trip charged by automobile/insurance companies ($\upsilon_D < c_D$ where c_D is the cost of car repair) and also a lump-sum premium to households of K_M (respectively K_D). Insurance companies' profits are zero in equilibrium because υ_M and υ_D adjust, K_M and K_D are given.

Government

The government faces the following budget constraint:

$$G^P + G^t + sM = t_L W + t_A A + (t_D - r)D \quad (3)$$

The left-hand side of the equation (3) describes three kinds of government spending

G^P - spending on public goods,

G^t - lump-sum transfer spending

sM - government medical expenditures.

Medical expenditures considered in this model are medical expenditures related to the issues covered by this paper – traffic accidents and alcohol related health risks.

These expenses are financed by revenues, which are described on the right-hand side.

t_L - proportional tax on labour income

t_A - excise tax on alcohol

t_D - fine per drunk-driver trip.

$r = r(\upsilon_D, t_D)$ denotes resource costs expended by the government in order to enforce drunk driver penalties and it is increasing in both υ_D and t_D.

Agent Optimization

Agents face the following budget and time constraints:

$$\begin{gathered}(1-t_L)W + G^T = (p_A + t_A)A + C + K_M + \upsilon_M M + K_D + \upsilon_D D + t_D D \\ T(H) = L + l\end{gathered} \tag{4}$$

In the first equation, net of tax labour income and the government transfer spending cover expenditures on alcohol (p_A is the producer price of alcohol), general consumption, lump-sum and variable costs paid to medical and auto insurance companies and drunk driver fines. T is available time divided between leisure and labour, a function decreasing in health risks H.

The consumer's maximization problem yields the first order conditions:

$$\begin{gathered}\frac{U_A}{\lambda} = p_A + t_A + mpc\, H_A \qquad \frac{U_D}{\lambda} = \upsilon_D + t_D + \tau_D + mpc\, H_D \\ -mpc\, H_M = \upsilon_M \qquad \frac{U_l}{\lambda} = (1-t_L)w\end{gathered} \tag{5}$$

In (5) we have normalized $-\frac{U_{\tau_D D}}{\lambda} = 1$, where λ is the marginal utility of income and $mpc = -(U_H/\lambda + (1-t_L)(wT_H + W_H))$ denotes the marginal private cost of health risks, which consists of direct disutility from suffering $-U_H/\lambda$, the value of lost time from incapacitation or premature mortality $-(1-t_L)wT_H$ and forgone private earnings from lower workplace productivity $-(1-t_L)W_H$. We should note that our mpc is not in any way related to marginal propensity to consume, which is sometimes denoted by the same abbreviation in the literature.

It is seen from (5) that agents increase their alcohol consumption up to the point where the marginal benefit received from the last unit of drink is equal to the tax-inclusive alcohol price and the own-health cost. Similarly driving under the influence of alcohol is committed until the marginal benefit from drunk driving equals the out-of-pocket expenses for auto crashes, monetized government penalties, and own health risks. Individuals also equate the marginal private benefit from medical care with the variable cost and the marginal benefit from leisure with the net wage.

Marginal Welfare Effect from an Increase in Tax on Alcohol

Totally differentiating the indirect utility function, we obtain marginal welfare effect from an increase in t_A, accounting for any changes in t_L, G^T and G^P to maintain government budget balance.

$$\begin{gathered}(E^A - t^A)\left(\tfrac{-\partial A}{\partial t_A}\right) + t_L\left(\tfrac{\partial W}{\partial t_A}\right) + MEG_{G^P}\left(\tfrac{\partial G^P}{\partial t_A}\right) \\ E^A = (1-\upsilon_M)M_A + E^D D\eta_{DA}/A\eta_{AA} \\ E^D = mpc\, H_{\bar{D}} + c_D - \upsilon_D + (1-\upsilon_M)(M_D + M_{\bar{D}}) + r - t_D\end{gathered} \tag{6}$$

In these expressions:

$\eta_{AA} < 0$ - elasticity of alcohol consumption with respect to the price of alcohol

$\eta_{DA} < 0$ - elasticity of alcohol drunk driving with respect to the price of alcohol

$MEG_{G^P} = U_{G^P}/\lambda - 1$ denotes marginal efficiency gain/loss from spending on public goods and E^A stands for the marginal external cost of alcohol consumption. Finally, E^D denoting the external cost per drunk driver trip is independent of the non-pecuniary penalty τ_D, which implies that the optimal level of alcohol taxes will be independent of the level of non-pecuniary penalties as well.

The change in effective labour supply in (6) is defined as

$$\frac{\partial W}{\partial t_A} = \frac{\partial W}{\partial H}\frac{\partial H}{\partial t_A} + \frac{w\partial L}{\partial t_A} + w\left(\frac{\partial L}{\partial t_L}\frac{\partial t_L}{\partial t_A} + \frac{\partial L}{\partial G^T}\frac{\partial G^T}{\partial t_A}\right) \tag{7}$$

The change in effective labour supply has three components - the increase in productivity due to the effect of lower alcohol consumption on reducing illness or road injuries, the labour supply effect of raising the price of alcohol relative to leisure and the effect of revenue recycling (leisure is a normal good, so if we use revenues to decrease t_L, labour supply increases and it decreases if we use it to increase G^T).

Optimal Tax with Revenue Neutrality

Through the optimization, it is assumed that the government's goal is to maximize the utility of an agent by finding the optimal level of t_a, given the level of G^T and G^P, and keeping the budget balanced when using all the revenues to reduce the labour tax t_l. From the first equation in (6) and (7) we calculate the optimal alcohol tax :

$$t_A^* = PV^A + RR^A - TI^A + PR^A \tag{8}$$

Where:

$$PV^A = E^A; \quad RR^A = MEG_{t_L}\left\{\frac{p_A + t_A}{-\eta_{LL}} - t_A + g^A\right\}$$

$$TI^A = \frac{\left(1 + MEG_{t_L}\right)t_L(p_A + t_A)(\eta_{Al}^C + \eta_{Ll})}{(1 - t_L)(-\eta_{AA})}; \quad PR^A = \left(1 + MEG_{t_L}\right)t_L\,(-W_H H_A) \tag{9}$$

$$MEG_{t_L} = \frac{-t_L\frac{\partial L}{\partial t_L}}{L + t_L\frac{\partial L}{\partial t_L}} = \frac{\frac{t_L}{1 - t_L}\eta_{LL}}{1 - \frac{t_L}{1 - t_L}\eta_{LL}}$$

$$g^A = sM_A + \{s(M_D + M_{\bar{D}}) + (r - t_D)\}D\eta_{LL}/A\eta_{AA}$$

η_{Al} - elasticity of demand for alcohol with respect to the price of leisure

η_{LL} - labour supply elasticity. $\eta_{LL} > 0$

η_{LI} - income elasticity of labour supply. $\eta_{LI} < 0$

c denotes a compensated elasticity.

In equation (9), $MEG_{t_L} > 0$ is the efficiency gain from using a unit of revenue to cut the labour tax. It can be seen from (8) that the optimal alcohol tax consists of four components - the marginal external cost of alcohol consumption E^A and three other components that arise from various fiscal interactions.

PV^A (or E^A) is the Pigouvian tax, the marginal external cost of alcohol (for the detailed formula, see (6)). These costs are divided into two parts. First is the fraction of medical costs due to the health risks from alcohol

consumption paid by third parties (government and insurance companies). The second component accounts for drunk-driver trip costs.

The first extra component is the revenue - recycling tax (RR^A), that captures changes in both tax revenues and alcohol-related public expenditure induced by alcohol tax. It is equal to MEG_{t_l} times marginal revenue to the government from raising the alcohol tax, including indirect savings in government medical and resource expenditures g^A. Regarding the role of price elasticity of alcohol demand: the lower it is, the greater the tax revenue from alcohol taxation, as well as the revenue - recycling component.

The second extra component TI^A is the tax-interaction effect which arises from the change in labour supply as the alcohol price rises relative to the price of leisure, multiplied by $1 + MEG_{t_L}$ to account for the change in labour tax revenue. To maintain the government revenue balanced, t_L must be changed. When alcohol and leisure are complements ($\eta_{Al}{}^C < 0$), the alcohol tax increases the labour supply and the tax-interaction effect is positive. It also includes the income effect from higher alcohol prices, which reduces labour supply because leisure is a normal good $(\eta LI < 0)$. If alcohol and leisure were substitutes ($\eta_{Al}{}^C > 0$), the alcohol tax would decrease both labour supply and labour tax revenue, which implies the negativity of the tax-interaction effect. In reality, the relationship between alcohol and leisure may not be straight forward. There is a simple rationale behind the assumption of complementarity – alcohol consumption by definition takes time, especially if consumed in a gastronomic facility. On the other hand, alcohol consumption, especially of a lower level, may readily be complementary to time spent working (and thus a substitute to leisure). Either as a short-term relief from work-induced stress, or as a result of socializing with colleagues. As mentioned by (Institute for Fiscal Studies (Great Britain), 2009), the former effect may be underreported since heavy drinkers generally tend to underreport their consumption in official surveys and it is therefore possible, that some countries could report alcohol and leisure as mild substitutes.

Finally, as the third component, there is the productivity effect (PR^A), expressed in per unit reduction in alcohol consumption. Taxing alcohol reduces drinking and also drunk driving, resulting in better health of individuals and positive effect on effective labour supply. It equals the health-induced increase in productivity per unit reduction in alcohol $-W_H H_A = (\partial W/\partial H)(dH/dA)$ times the labour tax t_L, times $1 + MEG_{t_L}$ to account for the change in labour tax revenue.

Revenue neutral taxation is only one possible scenario. Parry et al. (2009) also consider an alternative scenario when higher tax revenues could be generated by alcohol taxation. In this paper we do not consider this possibility of enhancing the source part of government budget by higher alcohol taxation. We also do not consider other parts of Parry et al. (2009) modelling framework since our focus is on presenting a simplified model which will be further used for empirical estimation on original Czech data.

Taxation of Individual Beverages

Now, let us assume that:

$$\begin{aligned} A &= A_{BE} + A_{WI} + A_{SP} \\ E^{Ai} &= E^A \,;\; H^{Ai} = H^A \end{aligned} \tag{10}$$

where alcohol consumption A is a sum of individual beverages consumed: beer (BE), wine (WI) and spirits (SP). The second equation indicates that marginal external costs E^{Ai} and productivity effects H^{Ai} per unit of alcohol are the same across these beverages.

We calculate optimal taxes on these individual beverages as:

$$\hat{t}_i = t_i^* - \sum_{k \neq i} (t_k^* - \hat{t}_k)\left(\frac{\eta_{ki} A_k}{\eta_{ii} A_i}\right) \tag{11}$$

where $i,k = BE, WI, SP$ and η_{ii}, η_{ki} denote own and cross-price beverage elasticities. t_i^* is the optimal tax in the absence of cross-price effects among beverages and it is analogous to that in (8). Therefore the more elastic and complementary to leisure a beverage is, the higher an optimal tax on that beverage is likely to be.

As shown by empirical estimations of this model provided by Janda et al. (2018), the distinction between individual types of beverages is very important in the case of the Czech Republic. For historical reasons and also because of lobbystic pressures and possibilities allowed by European regulations, the taxations of different types of alcoholic beverages is widely different. Empirical results of Janda et al. (2018) show that Czech taxations is spirits is disproportionally high as compared to taxation of beer and wine. Therefore the presentation of separate optimal taxation rates for beer, wine, spirits may exercise important influence on the policy discussion about socially optimal alcohol taxation in the Czech Republic.

Other Considerations

Although the above model could be already considered quite complex, it does not and perhaps even could not capture all the effects that could potentially interact in the system. Let us mention at least one of these omissions that could be considered in the same time important as well as controversial. The fact that drinking could cause higher death rates (either by sudden deaths under influence of alcohol by one of the actors, or after a long-term alcohol-related health condition), also means that such deaths generally occur at lower age than if the individual were to abstain. This implies that there could be potential government savings (on retirement pensions and/or costs of future medical treatment unrelated to alcohol) in case a person died earlier because of his/her drinking habits. In fact, a study dealing with similar matter for the Czech Republic in detail (Hait, 2012) concludes that because of these effects, smoking really seems to be even beneficial for the Czech state budget (at the expense of the individuals affected). As analysing this problem would bring another level of complexity to the model, but result in only redistribution of the costs and benefits between individuals and the state budget, we treat this omission as justifiable.

Conclusions

Regardless of possible benefits of alcohol production and consumption, it has a significant negative external effect. The scale of costs is very broad, including medical expenditures, productivity loss, drunken driving accidents and police and law costs. Alcohol taxes seem to be a suitable means of addressing these externalities.

The use of the (Parry, et al., 2009) model presented in this paper implies the need for more empirical research on some model parameters, along the lines of the research of Jansky (2014, 2016). Besides externality correction, these optimal levels are also determined by fiscal considerations as increase of taxation is assumed to immediately change other governmental policies such as labour taxation or medical expenditures. By decomposing the estimated optimal tax into four components, we conclude that the fiscal component significantly affects the optimal tax rate as it may be as large as or even greater than the externality-correcting component. While the described model is just a simplification of already existing models (see Parry et al., 2009), the major purpose of this research project is to provide a model to be used with original Czech data.

In the future, this study could be extended in many different ways. As said above, more empirical research on some model parameters (e.g. leisure cross-price elasticities) is needed for a more accurate estimation of the optimal tax levels. Similarly to (Parry, et al., 2009), we could estimate the optimal tax levels decreasing public spending and increasing drunk driving penalties, as alcohol taxes are typically justified as means of raising government revenues. Intangible costs of alcohol consumption such as pain or psychical harm to families of alcohol abusers were not considered in our analysis - another expansion could therefore include these in our model. Finally, a similar type of analysis might be used to estimate the optimal taxes on other goods with negative external effects such as tobacco and cannabis.

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Apendix

List of variables

Variable	Description	Equation
A_i	Alcohol consumption (i ranges through individual types – beer/wine/spirit)	*(1)*
c_D	Cost of car repair per a drunk drive	*(3)*
C	Non-alcoholic goods consumption	*(1)*
D	Number of driving trips under influence of alcohol by the agent	*(1)*
$\bar{D}$	Number of driving trips under influence of alcohol by others	*(2)*
g^A	indirect savings in government medical and resource expenditures	*(9)*
G^P	Government spending on public goods	*(1)*
G^t	Government tax revenue	*(3)*
H	Health risk function	*(2)*
l	Leisure time consumption	*(4)*
L	Labour supply (number of hours worked)	*(4)*
E^A	marginal external cost of alcohol consumption	*(8)*
E^D	external cost per drunk driver trip	*(6)*
K_D	Lump sum coinsurance paid by the agent as a part of car repair costs	*(3)*
K_M	Lump sum coinsurance paid by the agent as a part of medical costs	*(3)*
mpc	Marginal private cost of health risks (this is not in any way related to marginal propensity to consume)	*(5)*
M	Agent's costs of medical treatment	*(2)*
$\bar{M}$	Others' costs of medical treatment	*(8)*
MEG_{G^P}	marginal efficiency gain/loss from spending on public goods	*(6)*
MEG_{t_L}	marginal efficiency gain cutting labour tax	*(8)*
PR^A	Productivity effect of alcohol tax given reduction in alcohol consumption	*(8*
PV^A	Pigouvian tax, equal to marginal external cost of alcohol consumption	*(8)*
p_A	producer price of alcohol	*(4)*
r	Cost for enforcing drunk-driving penalties paid by the government	*(3)*
RR^A	revenue - recycling tax	*(8)*
s	Share of medical costs financed from public budget	*(3)*
t_A	Tax on alcohol (in form of an excise tax)	*(3)*
t_D	Fine per drunk-driver trip	*(3)*
t_L	Effective tax on labour	*(3)*
T_H	Available time (that could be distributed between work and leisure), as a function of H	*(4)*
TI^A	tax-interaction effect from change in labour supply due to the alcohol price rise	*(8)*
U	Utility function aggregated over all households	*(3)*
w	Wage	*(3)*
W_H	Effective labour, as a function of H	*(7)*
η_{AA}	elasticity of alcohol consumption with respect to the price of alcohol	*(6)*
η_{DA}	elasticity of drunk driving with respect to the price of alcohol	*(6)*
η_{Al}	elasticity of demand for alcohol respect leisure	*(9)*
$\eta_{ii}; \eta_{ki}$	Own-price; cross-price elasticity of demand for individual beverage types	*(9)*
η_{LL}	Elasticity of labour supply	*(9)*
η_{LI}	Income elasticity of labour supply	*(9)*
η^c	Compensated elasticity (in general)	*(9)*
λ	Marginal utility of income	*(5)*
τ_D	Non-pecuniary penalties (e. g. license suspensions, jail) per drunk driver trip	*(1)*
υ_D	Variable payment charged by insurance companies as a fraction of medical expenses	*(3)*
υ_M	Variable payment charged by car-insurance companies per a drunk driver trip	*(3)*

Determinants of Fiscal Decentralization – the Recent Evidence in European Countries

Milan Jílek*

Abstract. The article deals with the issue of government expenditure decentralization in European countries. The aim of the article is to empirically verify the theoretical determinants of government expenditure decentralization. The analysis is based on the data panel of 31 European countries covering the period of 1995 to 2016. Upon these data the random effects panel regression model is built and estimated. The estimated equations provide support for the hypotheses that the countries with larger land area, population size and level of economic development tend to decentralize more government expenditure, whereas the higher urbanization supports more centralization. The heterogeneity of preferences measured by ethnical, language and religion fractionalization proved to be the significant factor of expenditure decentralization. From the institutional determinants, the voice and accountability, the government efficiency and the political stability were the most significant determinants of expenditure decentralization. Finally, the federated countries and countries with socialist or German legal origin are more decentralized, while the English legal origin countries are more centralized.

Keywords: fiscal decentralization, Europe, population, land area, preference heterogeneity, governance.

JEL Classification: H70, H77

1 Introduction

A decentralization is frequented term in public finance. The decentralization in government sector is restructuring of reorganization of governance in such a way, that the subsidiarity principle creates a system based on shared responsibility among institutions at the central, regional and local levels. The decentralization transfers competences and responsibilities of government from central government level to partly subordinated government units or to regional or local self-governments. This definition, used by the World Bank (Rondinelli, 2001), includes more mutually overlapping concepts, such as the political, administrative and fiscal decentralization. The fiscal decentralization, which is the focal point of this paper, is the key component of decentralization. Any consideration on restructuring or reorganization of government sector should follow also the criteria of effective and transparent financing. In order to fulfil its economic functions, the decentralized levels of government should be allowed to collect adequate revenue, either from local taxes or from intergovernmental transfers, and to make expenditure decisions.

The above mentioned requirements stem from the essence of the normative approach to public finances. However, the empirical evidence of fiscal decentralization is not clearly supporting it. What is the explanation of empirics in dynamics and cross country differences in the fiscal decentralization?

The aim of the paper is to empirically test the relevance of theoretical determinants of fiscal decentralization. Even though both sides of decentralization, expenditure and revenue decentralization are important in terms of generated net benefits, this study is concerned with the expenditure decentralization only. Geographically, the focus is on developed European economies. Recently, the issue of centralization versus decentralization of government in Europe have attracted attention. On the one hand, we can see an effort to federalize European Union, on the other hand we can hear voices against further integration, even, in case of United Kingdom, the exit from EU. Also some secession tendencies at the subnational level of individual countries are quite strong. In these cases, the argument behind is an insufficient (fiscal) decentralization in the country.

Stylized data

Before bringing some data, the indicators of fiscal (expenditure) decentralization should be defined. Due to the complexity of the issue, the task is extremely complicated. 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

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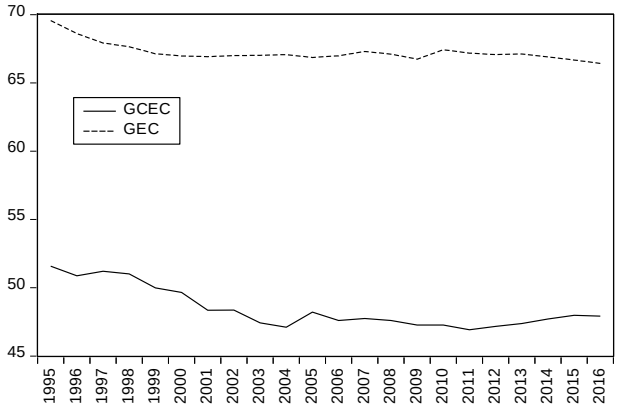
approach is that it avoids the problems with various and complicated structures of decentralized levels of governments.

Two measures are used. First measure (GEC) is the government expenditure centralization ratio. It is the share of central government expenditure to the general government expenditure. It includes all kinds of government expenditure (consumption, investment and transfers) and it is the most general measure of expenditure decentralization. The second measure is the government consumption expenditure centralization ratio (GCEC). 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.

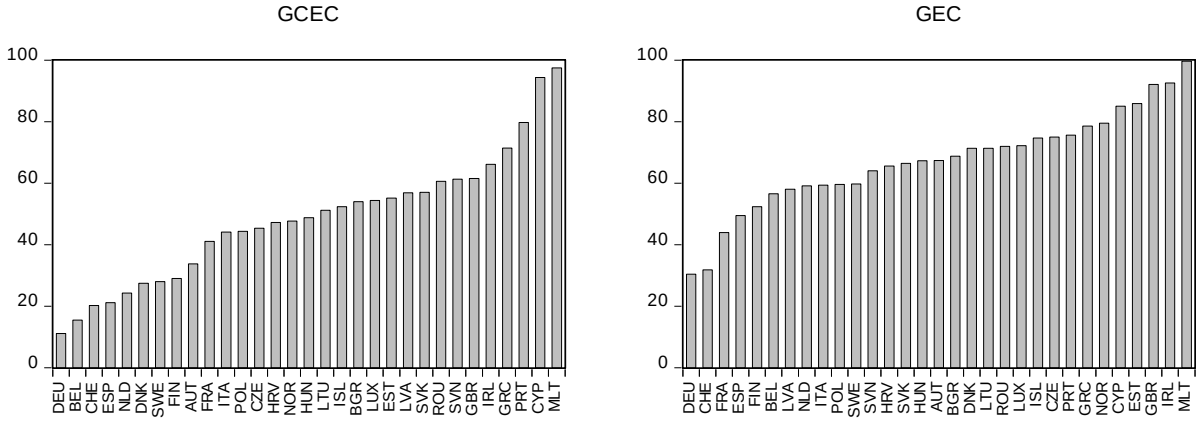
Over the last two decades, there has been an international movement towards both institutional and fiscal decentralization. Fiscally, the role of subnational governments has expanded. However, the development of decentralization has not been completely smooth. At the same time, we can see (Figure 1 and 2) that different measures of decentralization behave differently and that there are differences in expenditure centralization/decentralization among countries.

Figure 1: Mean expenditure centralization ratios in 31 developed European countries (%)



Source: see appendix 1

Figure 2: Mean expenditure centralization ratios in European countries (%, 1995-2016)



Source: see appendix 1

The Theory of Fiscal Decentralization

The decentralization has been a characteristic feature of social development in democratic countries. 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 federal structure, but it is usually more gradual and it is influenced by a number of factors. Countries with formally federal structure might be de-facto highly centralized, if local and regional governments have low fiscal powers and responsibilities. On the contrary, some unitary countries might be highly fiscally decentralized. Even though the institutional (constitutional) changes might be crucial,

there are usually many gradual and subtle changes in de-facto decentralization. These changes are more likely to be reflected in a continuous measure, such as the share of state and local governments in government expenditures. 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 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 W. Oates, E. (2005) 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 W. E. Oates (1972), together with the concept of fiscal equivalence of Mancur Olson (1969) and the early public choice approach (Brennan & 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, drew upon the assumptions of welfare economics and public choice theory, and employed various measures of expenditure decentralization and federalism.

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 (W. E. Oates, 2005). 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 toward the second generation of more precise 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 (Musgrave, 1959; W. E. Oates, 1972). The positive approach to fiscal federalism has been much less frequent. The positive literature (W. E. Oates, 1972; Wallis, Oates, & Oates, 1991) on decentralization suggest that there are empirical regularities concerning factors that promote or discourage decentralization.

The suggested determinants of fiscal decentralization and hypothesis formulation

Generally, there are two types of empirical studies on fiscal decentralization. First, 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. Since the aim of this paper is to study determinants of fiscal decentralization, the attention is paid to the second group of literature.

The suggested determinants of fiscal decentralization relate the decentralization to the cost of decentralization (technical efficiency factors), preference heterogeneity (allocation efficiency factors) and political and institutional factors.

1. Geography. In countries with larger and more diverse geographical area more important role of local governments can be expected (Canavire-Bacarreza, Martinez-Vazquez, & Yedgenov, 2017; Wallis et al., 1991). The cost of centralized information, administration and decision-making increase with the geographical area of country. Remote regions may be poorly served by the central government, due to higher transportation costs, poor information, and inattention of the center to demands of remote regions with different ethnic backgrounds and preferences. These bring pressures to decentralize (Tiebout, 1956).
2. Population. The local governments in countries with smaller population might not be able to use the scale economies on both, expenditure and revenue side of budget. Important factor can be the urbanization, where higher urbanization, bringing higher need for spending of subnational government, might exert higher decentralization (Kee, 1977; Litvack & Oates, 1970). On the opposite, with growing population number, in large

and less densely populated countries it is likely that the decentralized public administration would be more costly (Arzaghi & Henderson, 2005; Bahl & Nath, 1986; Cerniglia, 2003; Letelier-Saavedra, 2005; Panizza, 1999)

3. Level of country development. The government sector is known for its growth bias. As a consequence, the role of government sector tends to be more important in more developed countries. This might have important consequences for decentralization. Wallis et al. (1991) suggest that the growth of the relative size of government sector allows better exploitation of scale economies in local public good provision, making local provision more efficient. In such a case, however, one may expect that centralized income redistribution gain higher relative importance. According to number of studies (see Mullen, 1980; W. E. Oates, 1985; Panizza, 1999) the decentralization itself is a superior good, where the demand is likely to grow with the income per capita. Increasing wealth is expected to raise the diversity of preferences and thus the demand for decentralization (Bodman & Hodge, 2010).
4. Preference heterogeneity. The higher heterogeneity of preferences is a classical argument supporting decentralization (W. Oates, E. , 1968, 1999; Panizza, 1999). As it is not possible to measure the heterogeneity directly, it must be approximated by proxy variables, for example by language, religious or ethnical fractionalization or even geographical fragmentation (Alesina et al., 2003; Cerniglia, 2003; Panizza, 1999).
5. Institutional determinants. While the above mentioned determinants generally coincide with the first generation theory of fiscal federalism, the institutional determinants should capture the explanations within the second generation theory of fiscal federalism (Arzaghi & Henderson, 2005).

Based on the relevant literature, it is possible to formulate the following hypotheses (Table 1):

Table 5: Hypothesis formulation

The higher land area (AREA)	…the higher expenditure decentralization
The higher population (POP)	
The higher population concentration (URB)	
The higher average size of national income (GDPPC)	
The higher heterogeneity of preferences (ETH, LANG, REL)	
The better the control of corruption (CORR)	…(the lower expenditure centralization)
The better government effectiveness (GOVEF)	
The higher political Stability and Absence of Violence/Terrorism (POLSTAB)	
The better regulatory quality (REGQ)	
The better rule of law (RULELAW)	
The better voice and accountability (VOICE)	

Note: The details of explanatory variables and data sources are presented in Appendix 1.

It is further expected that the federated countries will be more fiscally decentralized. Political studies frequently emphasize differences among federated, supposedly more decentralized countries and unitary, more centralized countries. However, this contrast may not be necessarily high. Some unitary countries are strongly decentralized on both, expenditure and revenue sides of budget. Countries with higher military expenditure, which administrated by central governments, should show higher expenditure centralization (Bahl & Nath, 1986). It is also supposed, that part of the cross-sectional variability can be explained by different historical factors approximated by legal origin of the country (Alesina & Zhuravskaya, 2011).

Data and econometric model specification

To test the hypotheses, the panel data regression model with random effects specification is used. The panel includes 21 periods (1995-2016) and 31 cross sections[3]. The analysis focuses primarily on slope parameters, rather than on individual differences. Differences among countries are presumed to stem from non-observable random (for example historical) factors. The panel data contain a time invariant variables[4], which makes the use of fixed effects specification impossible. The estimated equation is following:

[3] *Austria (AUT)*, *Belgium (BEL)*, Bulgaria (BGR), Croatia (HRV), Cyprus (CYP), Czech Republic (CZE), Denmark (DNK), Estonia (EST), Finland (FIN), France (FRA), *Germany (DEU)*, Greece (GRC), Hungary (HUN), Iceland (ISL), Ireland (IRL), Italy (ITA), Latvia (LVA), Lithuania (LTU), Luxembourg (LUX), Malta (MLT), Netherlands (NLD), Norway (NOR), Poland (POL), Portugal (PRT), Romania (ROU), Slovakia (SVK), Slovenia (SVN), *Spain (ESP)*, Sweden (SWE), *Switzerland (CHE)*, United Kingdom (GBR). Federated countries in *italics.* Spain included among federations.

[4] The case of surface area. Also the heterogeneity proxies are considered to be time invariant.

$$EC_{it} = a + b_1 G_{it} + b_2 H_{it} + b_3 I_{it} + w_{it} \quad (1)$$

$i = 1 \dots N, \qquad t = 1 \dots T$

where EC is expenditure centralization variable, a is a scalar, G_{it} is the vector of explanatory variables representing geography, population and level of country economic development, H_{it} represents preference heterogeneity and I_{it} represents institutional variables. The residual wit consists of two components:

$$w_{it} = \varepsilon_i + u_{it} \quad (2)$$

where ε_i is the cross-section error component and u_{it} is the combined cross-section and time error component.

The validity of standard assumptions for random effects model, that the country error term is not correlated with the predictors is assumed. The cross section random effect model is estimated using OLS estimator with White robust standard errors. All the continuous explanatory variables (AREA, 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. Following the study of Papke and Wooldridge (1996), as demonstrated by Cerniglia (2003), the model is estimated with log-odd ratio of dependent variable[5].

Results

The estimation was performed in two steps. In the first step the model of government expenditure centralization ratio was estimated in various specifications, reflecting the land area, population size and concentration, level of economic development and preference heterogeneity (table 2, specification 1 to 6), controlling for the federations factor and military expenditure burden. In the seconds step, the institutional explanatory variables and legal origin variable were added to the most efficient estimation from the first step (specification 6). The results are summarized in table 3. The same procedure was applied for the government consumption expenditure centralization ratio, with the result stated in table 4 and 5.

Table 6: Estimation results for Government expenditure centralization ratio (GEC)

Specification	(1)	(2)	(3)	(4)	(5)	(6)
LOG(AREA)	-0,371* (0,220)	-0,292 (0,224)	-0,439** (0,219)	-0,344 (0,223)	-0,292 (0,221)	-0,455** (0,226)
LOG(POP)	-0,114 (0,088)	-0,203** (0,081)	-0,194*** (0,066)	-0,211*** (0,070)	-0,183** (0,090)	-0,176** (0,088)
LOG(GDPPC)	-0,092 (0,068)	-0,127** (0,062)	-0,131** (0,064)	-0,136** (0,065)	-0,128** (0,062)	-0,110 (0,070)
URB		0,013*** (0,003)	0,013*** (0,003)	0,012*** (0,003)	0,012*** (0,003)	0,015*** (0,003)
LANG			-3,159*** (1,119)			-3,162*** (1,099)
ETH				-2,578* (1,320)		
REL					-0,635 (0,748)	
ME						0,043*** (0,016)
FED	-0,893*** (0,301)	-0,876*** (0,277)	-0,330* (0,185)	-0,454 (0,280)	-0,826*** (0,244)	-0,350* (0,179)
C	7,967*** (2,350)	7,910*** (2,318)	10,081*** (2,523)	9,265*** (2,674)	7,856*** (2,278)	9,597*** (2,525)
Weighted R-squared	0,043	0,055	0,089	0,072	0,057	0,095
Overall R-squared	0,463	0,458	0,646	0,562	0,477	0,669
No. of observations	663	663	663	663	663	647
No. of periods	22	22	22	22	22	22
No. of countries	31	31	31	31	31	31

Source: Author´s computation based on data sources (appendix 1)
*Note: p-values ***…1%, **…5%, *…10%. Std. errors in brackets.*

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

Specification (6) from table 2 was further widened and tested with the following results. The coefficients of variables from the specification (6), due to high similarity, are not reported.

Table 7: Estimation results for Government expenditure centralization ratio (GEC) – Governance and legal origin variables

Specification	(6a)	(6b)	(6d)	(6e)
VOICE	-0.207*** (0,069)	-0.201*** (0,070)	-0.208*** (0,065)	-0.178** (0,069)
REGQ	0.084* (0,046)	0.080 (0,050)	0.085* (0,051)	0.078 (0,049)
POLSTAB	-0.074** (0,037)	-0.069** (0,034)	-0.073** (0,036)	-0.067* (0,036)
GOVEF	0.099* (0,060)	0.084 (0,056)	0.095 (0,060)	0.102* (0,058)
LOENGLISH		1.531*** (0,248)		
LOGERMAN			-0.789** (0,307)	
LOSCANDIN				-0.602*** (0,204)
Weighted R-squared	0,163	0,231	0,180	0,165
Overall R-squared	0,684	0,811	0,712	0,702
No. of observations	536	536	536	536
No. of periods	18	18	18	18
No. of countries	31	31	31	31

Source: Author´s computation based on data sources (appendix 1)

*Note: p-values ***…1%, **…5%, *…10%. Std. errors in brackets. The coefficients of variables from the specification (6), due to high similarity, are not reported. Coefficients for RULELAW and CORR are positive but not statistically significant and are not reported. Specifications with not statistically significant legal origin variable coefficient (Socialist, French) are not reported.*

Table 8: Estimation results for Government consumption expenditure centralization ratio (GCEC)

Specification	(1)	(2)	(3)	(4)	(5)	(6)
LOG(AREA)	-0,632*** (0,056)	-0,559*** (0,055)	-0,609*** (0,053)	-0,556*** (0,050)	-0,560*** (0,054)	-0,650*** (0,050)
LOG(POP)	0,361*** (0,095)	0,295*** (0,097)	0,222** (0,106)	0,213** (0,103)	0,343*** (0,104)	0,266* (0,136)
LOG(GDPPC)	-0,424*** (0,051)	-0,476*** (0,048)	-0,480*** (0,050)	-0,491*** (0,052)	-0,481*** (0,050)	-0,403*** (0,050)
URB		0,017*** (0,003)	0,018*** (0,003)	0,017*** (0,003)	0,016*** (0,003)	0,021*** (0,003)
LANG			-2,114*** (0,806)			-2,078** (0,820)
ETH				-2,087*** (0,298)		
REL					-1,625*** (0,526)	
ME						0,136*** (0,028)
FED	-1,599*** (0,304)	-1,623*** (0,267)	-1,186*** (0,122)	-1,204*** (0,216)	-1,488*** (0,278)	-1,235*** (0,112)
C	5,966*** (1,097)	5,464*** (1,135)	7,611*** (1,587)	7,346*** (1,295)	5,433*** (1,111)	6,135*** (1,941)
Weighted R-squared	0,134	0,147	0,163	0,163	0,154	0,196
Overall R-squared	0,473	0,461	0,567	0,559	0,516	0,556
No. of observations	663	663	663	663	663	647
No. of periods	22	22	22	22	22	22
No. of countries	31	31	31	31	31	31

Table 9: Estimation results for Government consumption expenditure centralization ratio (GCEC) – Governance and legal origin variables

Specification	(6a)	(6b)	(6f)
VOICE	-0.209 (0,139)	-0.184 (0,135)	-0.274* (0,143)
RULELAW	0.213 (0,155)	0.241 (0,162)	0.253* (0,151)
REGQ	-0.184* (0,094)	-0.213** (0,099)	-0.160* (0,097)
GOVEF	-0.099** (0,050)	-0.143*** (0,055)	-0.125** (0,052)
LOENGLISH		1.538*** (0,536	
LOSOCIALIST			-0,601*** (0,206)
Weighted R-squared	0,219	0,355	0,262
Overall R-squared	0,626	0,815	0,709
No. of observations	536	536	536
No. of periods	18	18	18
No. of countries	31	31	31

Source: Author´s computation based on data sources (appendix 1)
*Note: p-values ***…1%, **…5%, *…10%. Std. errors in brackets. The coefficients of variables from the specification (6), due to high similarity, are not reported. Coefficients for POLSTAB and CORR are positive but not statistically significant and are not reported. Specifications with not statistically significant legal origin variable coefficient (Scandin, German, French) are not reported.*

Conclusions

Based on the estimation, the results support the positive impact of larger land area, population and level of economic development on government expenditure decentralization (negative to centralization). The coefficients were statistically significant in most specifications. The result were similar, but even more statistically significant for the government consumption expenditure centralization ratio. The higher urbanization, surprisingly, supports more centralization. The heterogeneity of preferences measured by ethnical, language or religion fractionalization proved to be the significant factor of expenditure decentralization. From the institutional determinants, the voice and accountability, government efficiency and the political stability were the most significant determinants of expenditure decentralization. Finally, the federated countries and countries with socialist or German legal origin are more decentralized, while the English legal origin countries are more centralized.

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Appendix 1: List of explanatory variables and hypotheses

Variable	Symbol	Data source	Units	Expected sign of slope parameter
Dependent variable				
Government expenditure centralization ration	GEC	EUROSTAT	Central government expenditure/gen. gov. expenditure in %	
Government consumption expenditure centralization ratio	GCEC	EUROSTAT	Central gov. Consumption/gen. gov. consumption in %	
Geographical size, population and population concentration				
Population	ln(POP)	World Bank WDI	Population	-
Land area	ln(AREA)	World Bank WDI	sq. km	-
Urban population	URB	Word Bank WDI	Percentage of total	-
Average size of income				
GDP per Capita	Ln(GDPPC)	Word Bank WDI	constant 2010 US$	-
Heterogeneity of preferences				
Ethnic fractionalization	ETH	Alesina (2003)	Index, higher value mean higher fractionalization	-
Language fractionalization	LANG	Alesina (2003)	Dtto	-
Religious fractionalization	REL	Alesina (2003)	Dtto	-
Institutional variables				
Control of corruption	CORR	Worldwide governance indicators	index	-
Government effectiveness	GOVEF	dtto	Index	-
Political stability and absence of violence/terrorism	POLSTAB	dtto	Index	-
Regulatory quality	REGQ	dtto	Index	-
Rule of law	RULELAW	dtto	Index	-
Voice and accountability	VOICE	dtto	Index	-
Federation	FED	Wikipedia	dummy FED=1	-
Military expenditure	ME	Word Bank WDI	% of GDP	+
Legal origin of the country (GERMAN, FRENCH, ENGLISH, SCANDINAVEAN, SOCIALIST)	LO	Alesina and Zhuravskaya (2011)	Dummy LO=1 (five dummies)	Controls for historical factors of individual countries

Transferring a Part of Corporate Property Tax to the Local Budget of Russian Regions: Feasibility Study

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Abstract. The paper focuses on the possible sources of income growth for the local budgets. In the present conditions local budgets find themselves in the difficult situations when the income is reduced while social expenses are constantly rising. Local budget deficit is closely connected with a prominent level of fiscal centralization in Russia. We analyze the possibility to transfer any tax income to the local level considering the requirements to the transferable taxes. The corporate property tax (CPT) remains the only tax for such a transfer at the moment. This tax income would be substantial for the local budgets, and the tax base of this tax is distributed relatively fair. The analysis shows that tax income from the CPT does not depend on the price changes of hydrocarbon raw materials and the inflation. The main disadvantage of CPT is a natural limit of possible revenue, but this limit can be overcome by basing property taxation on cadastral value. The analysis demonstrated that the country's average increase of tax base is 17. 9 %, and the region's average is 13 %. Thus, it can be supposed that the tax base of CPT will increase by not less than 13 % if the cadastral property estimation is applied. The conclusion is made that transferring up to 20% of total revenue of corporate property tax to local budgets will ensure the growth of municipal entities budget revenues and will not lead to a significant reduction in the budget revenues of the region.

Key words: local government revenue, corporate property tax, taxation.

JEL classification: H710

1 The problem of local budget revenue as the consequent of high fiscal centralization

Investigation of the role of tax decentralization started in the early works of Samuelson (1954), Tiebout (1956), Musgrave (1959) and in the decentralization theorem by Oates (1972). This theorem refers to the loss of welfare in case of centralized provision of public goods caused by the heterogeneity of local preferences. Zodrow and Mieszkowski (1986) supplemented the analysis with a model of tax competition. Baretti, Huber, Lichtblau (2002) proved that the subsidence of taxes at the subnational level plays a crucial role in the effective provision of public goods. Modern research in the field of fiscal federalism traces the implications of incentives created by the political and fiscal institutions, see McCann, Shipany, Volden (2015), Ivanova and Polyakova (2016).

The high level of fiscal centralization in the federal state can be determined by different economic and political reasons. Herein the political reasons play the determinant role. For example, king's sovereignty (Ebel, Fox and Melhem, 1995; Vaillancourt, 1997), military regimes (Shah, 1996), the transition from a command to market economy (Dunn and Wetzel, 2000; Bird, Ebel and Wallich, 1995; Wong and Martinez-Vazquez, 2002). Some Central and Eastern Europe states being in transition from command to market economy demonstrate a higher level of fiscal centralization than the countries with traditional market economies. First of all it refers to the Russian Federation.

The Russian Federation is a federal state and its tax system is composed of three levels: federal, regional and local taxes. But the possibility of making independent decisions at regional and local levels is limited. The Tax Code of the Russian Federation establishes the priority of the federal level for setting taxes at all levels, establishing

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the taxable objects and the tax base, as well as the marginal rates for taxes at all levels. The fiscal powers of the regional and local authorities are limited. Only federal level have a significant impact on the level of all budgets tax revenues and taxation carried out without taking into account regional and local specifics. It is difficult to change the situation at the country as a whole. But at the same time, the regions have the opportunity to improve the situation with the distribution of tax revenues in the favor of local budgets. The importance of this change is due to the difficult situation of local budgets. Nowadays local budget income is being reduced while social expenses are constantly rising. Moreover, the extension of local budgets' income base by means of tax sources is a significant part of the issue of involving taxpayers into the solution of municipal problems.

Our research analyses possible sources of income growth for local budgets. The possible solution is the transference of the part of CPT revenue from regional to municipal level.

Reasons to transfer the CPT revenue from the regional to local level

Comparison of the tax revenues that can be transferred from the regional to the local level

The taxes that can be transferred to the local level should meet following basic requirements:

- an fair distribution of the tax base throughout the territory,
- tax collection should not require large tax administration costs for collecting on a small scale,
- it should be difficult to evade the tax so that it would not require additional costs for tax control,
- a high and stable income from the tax, because at the local level there are lack of tax revenues,
- the tax base must be within the jurisdiction of the local tax authorities to exclude or minimize the "migration" of the tax base,
- taxes should not create territorial disproportions in the income distribution of and should not create incentives for migration.

Also the taxes that can be transferred to the local level should meet the additional requirements:

- low dependence on the price fluctuation and the taxpayers financial conditions,
- municipal authorities motivation to increase the tax base and the tax revenues.

Let's consider the expediency of transferring to a local level various taxes the revenue from which currently is allocated to the Russian regional budgets. To do this, it is necessary to identify the reasons why such transfer to local budgets does not seem appropriate (Tab. 1).

Table 1: The disadvantages of establishing tax income transfers to local budgets from the taxes and dues that are under power of Russian regional authorities

Name of tax	Tax type / level of budget which receives the tax revenue	The reasons for inexpediency of transfer of the tax to local budgets
Transport tax	Regional Tax / Regional budget	• the minimum number of unregistered objects and, consequently, the absence of an incentive to expand the tax base; • the possibility of tax base "migration" (in connection with the change of the company legal address and re-registration of vehicles); • an insignificant share in regional budget revenue (less than 2%), as a consequence, an insignificant role in improving the balance of local budgets in case of revenue transfer.
Personal income tax (PIT)	Federal Tax/ Regional and Local budgets	• the possibility of tax base "migration"; • the tax is paid to the budget of the territory where the employer (the tax agent) is registered, not to the budget of the territory where the taxpayer (individual) lives.

Corporate income tax (CIT)	Federal Tax/ Federal and Regional budgets	• tax revenue depends on economic conditions and the taxpayers' (companies') financial conditions; • the influence of the company's corporate structure (redistribution of profits between branches, not depending on the actual results of their activities, but on the employees number (salary costs) and the residual value of property)
Excises, Mining tax	Federal Tax/ Federal and Regional budgets	• unbalanced spreading of the tax base through the territory (at the location of excisable goods producers and site of natural resources)
Fees for the use of objects of aquatic biological resources and objects of wildlife	Federal Tax/ Federal budget	• ad-hoc nature; • insignificant share in regional budget revenues.

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

The analysis shows that the transfer to the local level the revenue from PIT and Transport tax can increase the economic differentiation of municipalities. This is due to the mobility of the tax base and the ability of taxpayers to move the tax base to the big cities. The transfer to the local level revenue from CIT will not bring a positive result for two reasons: unprofitability of many enterprises and reducing the share of the tax incoming to the regional budget for 1 percentage point since the year the 2017. The transfer of the revenue from Excises and Fees for the use of objects of aquatic biological resources and objects of wildlife is also impractical because of the unequal distribution of the tax base. Thus, the corporate property tax remains the only tax for transfer to local level. The CPT revenue would be substantial for local budgets, and the tax base of this tax is distributed relatively fair.

Prospects of transferring a part of corporate property tax revenue to the local level

Let us consider in more detail the prospects for transferring a part of the tax revenue from the CPT to the local level.

Theoretical background

Immovable property value is based on its unique features in condition of limited market supply, as well as on features created as a result of improvements performed by the property owners. In both cases the immovable property value is determined by the minimization of costs needed for its employment. Thus, the profit for the budget from taxation of immovable property depends on how effectively the immovable property is employed.

The current foreign empiric research has determined certain tendencies of immovable property taxation. This has led to three main approaches to immovable property taxation: traditional, modern and rational. D. Netzer (1973) and H. Simon (1943), the followers of the traditional approach, found out that the introduction of immovable property tax based on its rent value may cause a decrease in the demand for real estate and in the rent value for land.

The modern approach is based on the provision that immovable property supply has a fixed level. Therefore, according to its supporters, the immovable property tax levied on land value not only has an income base but also some elements of consumer tax. The immovable property tax is comparable to consumer tax, the implications of which depend on the ratio of demand and supply elasticity, see H. Aaron (1986).

The rational approach considers immovable property taxation in connection with certain benefits taxpayers can obtain from local government services. C.M. Tiebout (1956), a representative of this approach, comes to the conclusion that taxpayers will prefer those residence jurisdictions where the quality of state services is higher.

Fiscal advantages of CPT

Particular attention should be paid to the advantages of CPT.

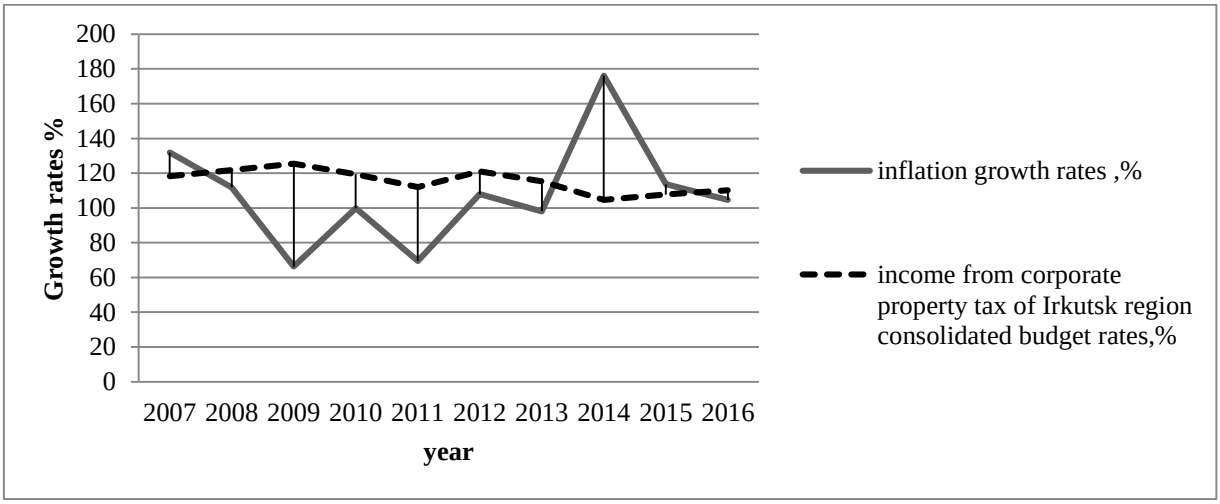
The advantages of CPT:

1. The Russian Federation subdivision budget receives tax income on a stable basis. For example, an enterprise received for a certain period of time a profit (X). For tax purposes, this is the tax base (X) for the corporate income tax. In this case (X) is taxed once. But, when an enterprise invests this profit (X) in property, the

government gets the tax base (X) for corporate property tax. It permits the corresponding budget to receive a regular tax income. Thus, profit (X) invested in property will be subject to tax regularly in the future. It should be noted that in this case the tax income does not depend on whether the property belongs to the entity that made the profit and invested it into property or whether the property was sold and now belongs to a new owner. The transfer of ownership does not interrupt the taxation in the future (unless the new property owner uses the property in activities that are subject to tax incentives). Thus, the income received once and invested in property, gives in the long term a stable, regular tax income. Consequently, it is important for the state (for a subdivision of the Russian Federation) to stimulate business entities to increase property objects for obtaining a stable fiscal effect from property taxation.

2. Tax income from the property tax does not depend on changes of prices for hydrocarbon raw materials and the inflation (Figure 1).

Figure 1: Dynamics of inflation growth rates in the Russian Federation and the tax income from CPT of Irkutsk Region consolidated budget for 2007-2015



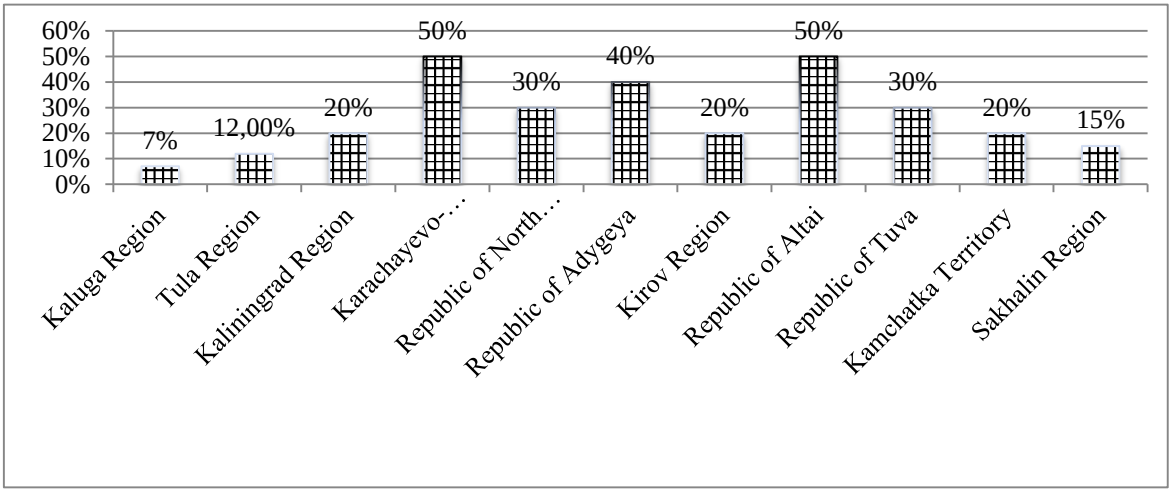
Source: author's calculation on the base of the Tax Statistics of Federal Tax Service of Russia and the Government Statistic Comity of Russia

3. The most part of taxation objects are immovable property, which makes it another advantage of CPT. This fact allows a local government to be sure that tax income will be stable.
4. Property taxes are significant in the process of budget formation of any Russian Federation subdivision and do not depend on the differentiation of the activity of enterprises on the territory of a subdivision, since the existence of a property is common for all types of activities.
5. Property tax is the most common tax at the local level in developed countries since it meets almost all the requirements for local taxes:
   a) the tax base is large and allocated within the jurisdiction of local tax authorities,
   b) this tax does not cause much administrative costs and it is difficult to evade from it,
   c) this tax does not lead to interregional disproportions in respect of income allocation,
   d) revenue from this tax has a constant nature.

The experience in transferring a part of the CPT to the local budgets in the regions of the Russian Federation

The transfer of CPT tax revenue can be implemented in the form of fixed or additional proportion from the total amount of tax up to the full transfer of taxes to the local level. Some regions of the Russian Federation have experience in transferring part of the CPT to local budgets. The number of such regions is growing. There were 8 such regions in 2016 and 11 in 2017. These regions transfer from 7 to 50% of income from CPT to local budgets (Figure 2)

Figure 2: The share of CPT transferred to the local level in different regions in Russia in 2017



Source: author's calculation on the base of the Tax Statistics of Federal Tax Service of Russia

The unique disadvantage of CPT is a natural limit of possible revenue receivable from such tax. This limit can be overcome by basing property taxation on cadastral value.

The forecast of the growth of CPT base after establishing the taxation of separate objects based on cadastral value

Let's consider the experience of regions that introduced such assessment and the prospects for raising taxes in the selected region.

According to the analysis of changes of the tax base by regions that established taxation based on cadastral value of corporate property in 2014-2015, it can be observed that the tax base changed unevenly.

Table 2: Dynamics of the tax base in the regions that established the taxation of separate objects based on cadastral value

№	Regions of the Russian Federation	Tax base before establishing taxation based on cadastral value, billion rub.	Tax base after establishing taxation based on cadastral value, billion rub.	Changes, billion rub.	Changes, %
1	Moscow region	1 830. 88	1 940. 48	109. 60	5. 99
2	Ryazan region	214. 19	243. 25	29. 06	13. 57
3	Tver' region	355. 96	347. 12	-8. 84	-27. 48
4	Moscow	4 758. 38	6 227. 08	1 468. 70	30. 86
5	Komi Republic	714. 36	888. 29	173. 93	24. 35
6	Arkhangelsk region	332. 73	366. 98	34. 25	10. 29
7	Novgorod region	146. 47	153. 89	7. 42	5. 07
8	Ingushetiya Republic	15. 98	20. 89	4. 91	30. 71
9	Chechen Republic	47. 61	53. 82	6. 21	13. 04
10	Bashkortostan Republic	540. 25	574. 83	34. 58	6. 40
11	Tatarstan Republic	1 056. 65	1 127. 17	70. 52	6. 67
12	Udmurt Republic	226. 05	240. 38	14. 33	6. 34
13	Nizhni Novgorod region	609. 92	655. 32	45. 40	7. 44
14	Penza region	148. 25	162. 49	14. 24	9. 60
15	Buryatiya Republic	178. 82	183. 88	5. 06	2. 83
16	Zabaykalskiy region	227. 76	273. 65	45. 89	20. 15
17	Amur region	401. 00	402. 92	1. 92	0. 48
18	Sakhalin region	219. 68	315. 05	95. 37	43. 41
	Total:	12 024. 97	14 177. 52	2 152. 55	

Source: Tax Statistics of Federal Tax Service of Russia https://www.nalog.ru/rn38/related_activities/statistics_and_analytics/forms/6126595/

Let us assume that all subdivisions have numbers from 1 to *N*; A_i is the tax base of subdivision "i" in 2013, and B_i is the tax base of subdivision "i" in 2015.

Country average change of tax base

Total tax base by country in each year is calculated as follows:

$$A = \sum_{i=1}^{N} A_i \quad , \quad B = \sum_{i=1}^{N} B_i \tag{1}$$

Country average change is calculated as follows*:*

$$\%_{ср\,по\,стране} = \frac{B - A}{A} * 100 \tag{2}$$

Region average change of tax base

For every region share of change is calculated as follows:

$$\%_i = \frac{B_i - A_i}{A_i} * 100 = \left(\frac{B_i}{A_i} - 1 \right) * 100 \tag{3}$$

Region average change is calculated by the following formula

$$\%_{ср\ по\ регионам} = \frac{\sum_{i=1}^{n} \%_i}{N} \quad (4)$$

This methodology shows that the country average increase of tax base is 17. 9 %, and the region average is 13 %. Thus, it can be supposed that the tax base of CPT will increase not less than by 13 % if the cadastral property estimation is applied.

Forecast of CPT tax income in the Irkutsk Region

To calculate the amount of tax, it is necessary to determine the real tax rate formed in the Irkutsk region territory due to the application of decreased tax rates. The real tax rate is calculated as a ratio of accrued amount of CPT to the amount of tax base. The calculation of real tax rate is performed for the period from 2013 to 2015 year due to the instability of legislation in the previous years in terms of tax incentives. As the next step a forecast was prepared for real tax rate growth, provided the tax base is stable. The forecast was based on the data on changes concerning CPT rate for the greatest regional taxpayer.

To prepare the forecast of the real tax rate, the tax base for the year 2015 was allocated into main groups: public railway tracks, cross-country pipelines, power lines and other property. According to the existing data for the years 2011 – 2012 specific gravity of public railway tracks in the total tax base consistently amounted to 34 %. Taking this into account the tax base was allocated for the purposes of application of differentiated rates established for the forecast period. As a result the forecast value of the real CPT rate for 2018 was calculated as 1. 94 % (Table 3).

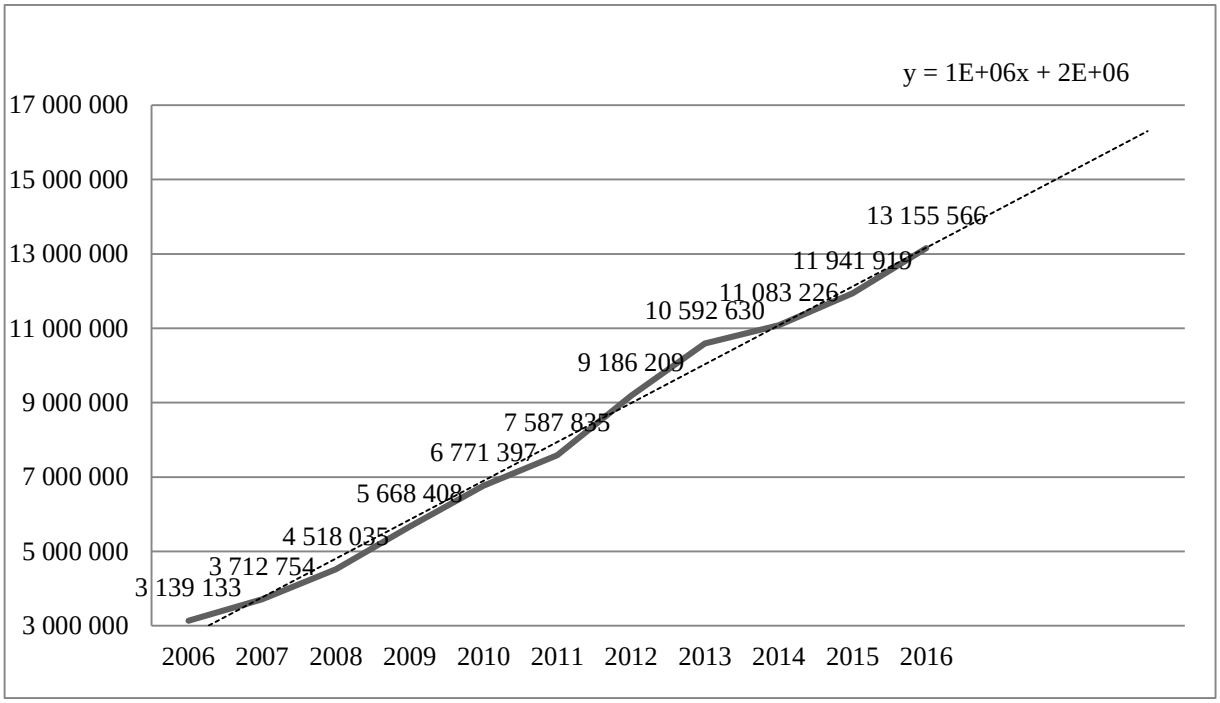
Table 3: Real CPT rate in the Irkutsk Region

Year	Tax base, billion rub.	Accrued tax, billion rub.	Real tax rate, %
2013	735. 26	10. 77	1,47
2014	724. 02	11. 21	1,55
2015	725. 71	12. 31	1,70
2016	750. 11	13. 53	1,80
2017 (forecast)			1,84
2018 (forecast)			1,94

Source: authors calculation on the base of Tax Statistics of Federal Tax Service of Russia and the Tax legislation

The estimated tax base increase as well as the estimated real tax rate allows preparing a forecast of tax income increase (Fig.3).

Figure 3: Forecast of tax income from CPT in the Irkutsk Region based on the linear trend



Source: authors calculation on the base of Tax Statistics of Federal Tax Service of Russia

Compensation of transferring of CPT budget revenue from regional to local budgets

Decreasing of regional budgetary income due to transferring CPT income to the local budgets can be compensated by means of introducing more strictly thin capitalization rule at the federal level that will lead to increasing of CIT. Such change can be performed as a part of preventing base erosion and profit shifting (BEPS).

Thin capitalization rules that are applied in Russia are based on "save harbor rule": additional restrictions on interest deduction can be applied in respect of indebtedness that exceeds the equity capital more than 3 times. According to our preliminary estimation of thin capitalization usage level in Russian companies, capital of which is fully or partly (more than 20%) controlled by foreign companies, considerable amount of tax benefit is received by companies with indebtedness which exceeds equity capital from 1,5 to 3 times due to interest deduction. For the purposes of investigation we analyzed 7 280 Russian companies. Such companies are not subject to Russian thin capitalization Rules. However potential amount of tax benefit received by investigated companies amount to 22,842 billion rubles (for long-term indebtedness) and 8,354 billion rubles (for short-term indebtedness).

According to our opinion Russian thin capitalization rules can be improved with integrating assessment of taxpayer payment capability based on operation cash flow indicators. Such changes will permit to estimate the critical amount of indebtedness to foreign shareholders in respect of each taxpayer depending on its features.

Conclusions

Local budget income depends on the budget's own taxing power as well as on the income received from the regional budget. Regional budgets, in turn, face the decrease of their own income base and, therefore, reduce the income transferred to the local budget.

Various research that have recently been carried out by the foreign economists show that separate taxation of land and real estate based on their rent value may lead to certain market distortions expressed in the decreased value of such a property. In the context of social-economic differentiation of the regions, these distortions can be minimized by establishing a correlation between the taxation level and the level of services provided by local governments. In the long-term prospect, the dependence between the level of demand for local services and the taxation level goes down due to capital movement. This influences property value and leads to a disproportionate allocation of the tax burden between territories with different levels of demand for local services.

Transferring up to 20% of total revenue of corporate property tax to the local budgets will ensure the growth of municipal entities budget revenues and will not lead to a significant reduction in the budget revenues of the region.

The percentage of the transfer at 10% rate will not decrease the revenues of the regional budget (due to the transition to cadastral value). The percentage of the transfer at 20% rate will remain the regional budget revenue from corporate property tax at the level of 2015 -2016.

The corporate property tax would be a viable source of local budgets revenue because it creates the high and stable income, it does not depend on the price fluctuations and taxpayers' financial conditions, the distribution of CPT tax base throughout the territory is relatively fair, the migration of CPT tax base is practically impossible.

The CPT tax base is close to the municipal authorities, thereby they have motivation to increase the tax base and the tax revenues of this tax. The transferring a part of CPT to local budgets ensures a more equitable distribution of tax revenues between big cities and small municipal districts compared to other taxes, smoothing disproportions in regional development. At the same time, the experience of some regions shows that the introduction of the taxation on the basis of cadastral value changes the tax base unevenly. Besides, the tax legislation on tax incentives and reduced tax rates has changed in 2017-2018. These reasons require detailed elaboration and further evaluation of the consequences of the CPT transfer to the local budget.

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Title Comparing the Supply Side Reform of the United States and China - Whose Tax Cut Can Raise the Level of Productivity?

Waiching Li*

Abstract. Trump's economic policy and China's supply-side reform both evokes association about the policy similarities to Reagan's supply-side economics, since both Trump and China's president Xi advocate the deduction of tax to person and corporate alike. Historically, Reagan's economic was mixed with praises and criticism, mainly because it helped the United States to restore the economy while Keynesianism failed to combat hyperinflation downward spiral, but its tax policy favored the business and capital. This paper makes comparison across of Trump's economic policy and China's supply-side reform to the policy of Reagan's era, to find similarities and differences. This paper also intends to look at the long-term effect of tax deduction on productivity performance in relation to the ongoing tax reform of both nations.

Keywords: economic policy, supply-side reform, reaganomics, productivity

JEL Classification: F00, H29,P3

1 Introduction

President Trump signed his "Tax Cuts and Jobs Act" into law on Dec. 22nd, 2017. The law gives a deduction of taxes to corporations and individuals alike, and creates a single corporate tax rate of 21%, a reduction from 35%, beginning in 2018.

The proponents of this tax act gave the reasons of supply-side economics, which reminiscences the tax policy of Reagan era. The supporters of Reagan policy often argue that the deregulation and tax cut to the capital and corporate income of that time created additional investment, which translated into trickle-down effects, boosted the economic growth of the following years while Reagan was in the office. Such logic derives from the theory of supply-side economics, presuming that investment will increase labor demand and can raise the long-run quantity of goods available for consumption. In the meantime, China also introduced supply-side structural reform in recent years, which also includes the clause of reducing taxes and fees. While Trump tax reform is expected to create tax reduction of 1.5 trillion U.S. dollars in the next ten years (Howard, 2017), the purpose of tax reform in China is more complicated. Li Keqiang, China's prime minister, recently put forward in his government work report on March 5th, 2018 , that tax reform aims to promote the transformation and upgrading of the real economy and to stimulate market vitality and social creativity.

Against such background of the tax reduction in both nations, it makes sense to examine the content of economic policies of both countries. China and the United States, polar opposite in the aspects of ideological and institutional, what are similarities and difference in their policy in comparison to the Reagan-era supply-side policy? Since the productivity is crucial to the long run growth of a real economy, how can the tax reforms in the United States and China contribute to the improvement of productivity? This paper aims to examine the economic policy difference in comparison to the Reagan time and to understand the effect of policy on the competitiveness of the real economy of the United States and China.

Since much of my research interest is in the comparative study about economic reforms, occurring in China and beyond, I pay attention to the news and publications on the related topics. One paper that intrigued me was by Jingtong, Zhou, a senior researcher at the research branch of the Bank of China's. His work "Supply-Side Reform Is Not Reaganomics" inspired me to write this paper. Zhou's paper defuses a major misconception surrounding the idea of supply-side reform in China, that reform is motivated by the same market-centric ideology, as it was an imitation to Reagan's reform to resolve the structural imbalance in China. My reading on the media coverage and analytic pieces also confirms Zhou's viewpoint, that despite the aim of the reform is to reduce governmental involvement in the market, however, China will insist on the role of government in macro-planning and to set the development course. The other informative paper is by Dr. Zheping Ren, a researcher at the HengDa Economic Research Institute, his paper "Comparison of the Tax burden of China and the United States—A Part of Supply Side Reform Research" gives an in-depth look at the existing tax system difference between the two nations. On Trump's tax policy, plenty media coverage is available. Other informative research resource includes the world bank database, the US congressional library, The Trading Economics, etc.

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Data and Methodology

The research methodology was qualitative in nature, aiming to obtain an understanding of the underlying difference and motives of China's supply side reform and Trump's economic policy, in comparison to that of Reagan's. The analysis was built on extensive readings of first hand and second hand coverages, academic publications, economic databases on the issues like tax, china's supply side reform, Reagan's economic policy, and Trump's tax reform, etc.. I used cross-tabulation to do comparisons since many dimensions of policy evaluation can be presented in a way more organized, easier for reading and understanding. The charts 1,2,5,6,7 are created by using the chart-creating tools available at the public accessible data sites like the "tradingeconomics.com" and the world bank site. The data for productivity evaluation is based on the published number on the site of the United States Bureau of Labor Statistics and the right leaning think tank of Tax Policy center.

Trump tax cut vs the reaganomics

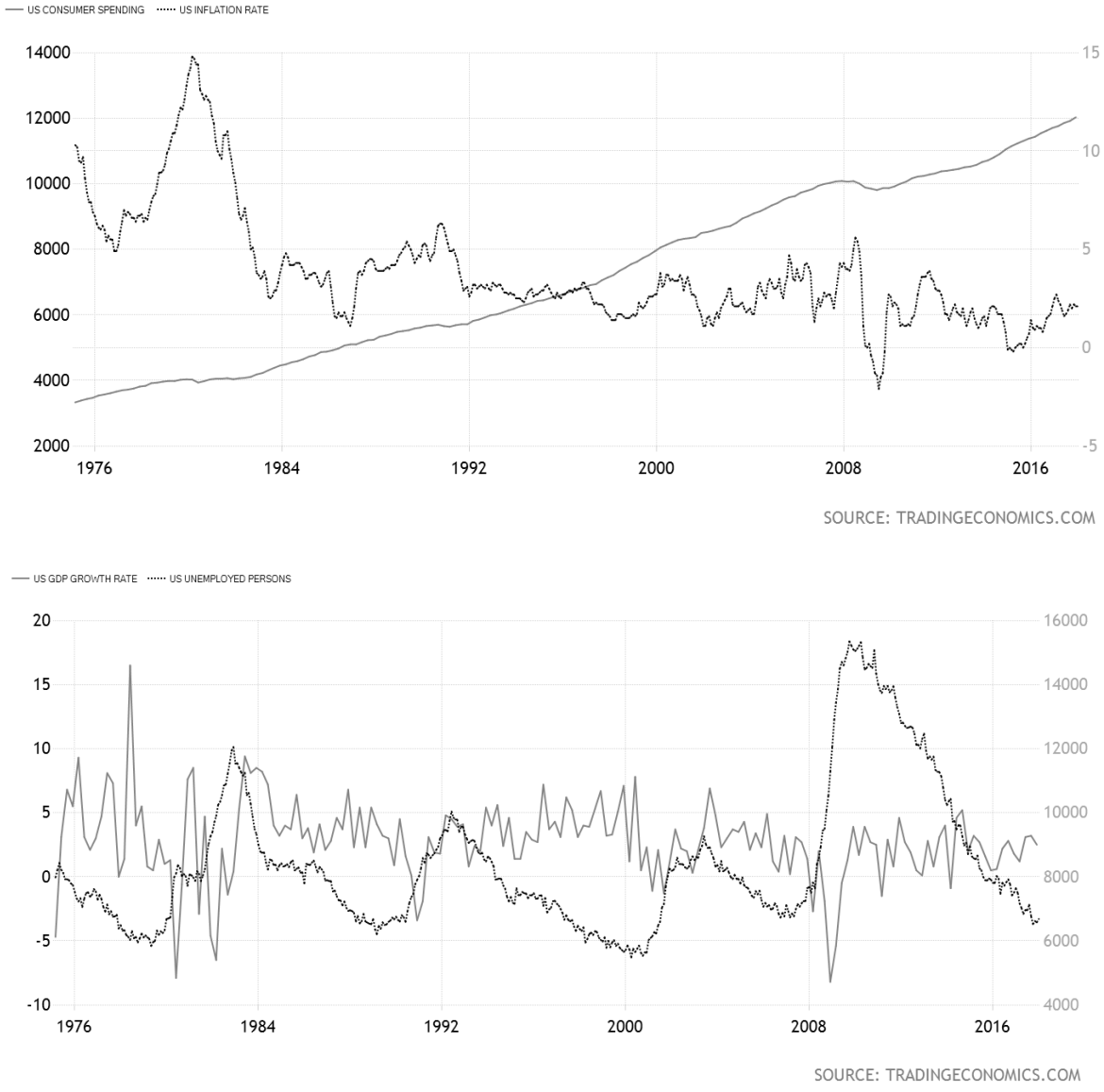
Same as Reagan's campaign for the presidency in 1980, Trump put economic growth and a friendly environment to the business at the center of his appeal. Some commentators said that Trump's plan of deregulation and tax cut is a revisit of the economic policies of the Reagan era. Between 1981 and 1986, the Reagan administration had successively conducted two tax reform plans. The Economic Recovery Act of 1981 allowed the business to accelerate capital recovery through faster depreciation and offered relaxed tax rule to small business. The act also made a significant reduction in capital income tax, profit tax and individual income tax across the board. The Tax Reform Act of 1986 further reduced top individual income rate from 50% to 28%.

In many respects, Trump's plan, "Tax Cuts and Jobs Act," is also said to favor the elite and doesn't show much concern about the accumulation of debt. His tax act includes a scheme for fast capital depreciation, instead of going through deduction over time, nearly all capital expenditures can be written off in one year. The new tax law raised the total taxable estate value from 5.5 million to 11 million. The maximum individual income tax rate set at 37% and reduce the corporate tax to 21%, etc.

However, comparing Reagan's policy and Trump tax reform, the tremendous circumstantial difference in the time of policymaking become apparent. In 1980, the United States was facing stagflation, and on the risk of a downward spiral with negative investment. The economy was already mired in recession, suffering high unemployment. Tackling hyperinflation and stimulating investment of private sector in a short period was the primary goal of the Reagan policy.

Trump today faces an entirely different set of macroeconomic prepositions. Since 2010, the U.S. economy has continued to grow, credit to the timely quantitative easing after the financial crisis. Inflation today remains at bay while the growth of consumer spending remains strong, and unemployment rate is down to 4.1% by the end of 2017 (see Fig. 1). What the United States faces today is not an issue of short-run mismatch of supply and demand, but the matter of structural imbalance. The continuously growing income gap between the rich and the poor brings about worries of social stability in long run. The challenge is also evident when the demographic reality is checked. During the Reagan era, there was more room to grow due to the labor force expansion, the baby boomer generation was best educated in the history of the U.S. at that time, the improvement of human capital made significant contribution to labor productivity. While today, US has slow growth in working age population, but the fast advancement of technology and automation brings new demand for labor skills.

Figure 1 – American economic outlook



Source: TradingEconomics.com.

China´s supply side reforms is not Reaganomic

In November 2013, a reform blueprint set out by the ruling Chinese Communist Party (CCP) called for the market to assume a "decisive" role in allocating resources by 2020. Two years later, China's head of state, Xi Jinping, proposed the idea of "supply-side structural reform" at a fiscal planning meeting. Since then, the term "structural reform" has become the hottest word in China's economic development and progress.

For the first decade of this new century, among the three growth engines of investment, export, and consumption, China's macro-policies had placed more emphasis on the demand side. The focus was production to satisfy the demand, especially export industry. The financial crisis of 2008 had shocked China with the new reality of global macro condition ---- the sluggish global demand. China had to drastically expand domestic credit supply to infrastructure investment to mitigate the shortfall of exogenous demand. China's model of development was based on large scale of input, consequentially created a serious problem of structural imbalance: industrial overcapacity, fast accumulation of debt, inefficiency, and industrialization caused environmental degradation. It is the unsustainability of the old China's model that has invoked the supply side reform.

The Supply-side reform in China is to achieve several goals, including reforming its tax policy and system, financial deleveraging, aiming to resolve the structural problems. From a policy perspective, it aims to redefine the relationship between the government and the market, which allows people to connect Reagan's policy to

China's supply side reform, since limiting the role of government involving in the economy was definitely a prominent concept of Reaganomics of 1980s (Zhou, 2016).

In the "13th Five-Year Plan" , China has made it clear that the country needs to move from a structure of investment intensive, value added manufacturing to an economy that is "innovative, coordinative, greenness, openness and sharing". This is completely different from the goal of the Trump policy, focusing on "making the America great again", a plan for domestic manufacturing revitalization ---- more jobs and investing in modern infrastructure. Comparing to the supply-side reform of Reagan time, China's reform is not only for economic growth, but also for the quality of economic growth (see Appendix).

Results and Discussion – Comparing the Taxation Reform in the United States and China

The Trump tax plan in the U.S. was finally passed into law in December 2017, with a tax cut of $1.5 trillion trillion over the next decade. Meanwhile, China's supply-side structural reform introduced in recent years also includes a taxation reform. On March 13, 2018, the member of the State Council announced on the meeting of People's congress, that China is going to unify it's the separated central and local government tax collection systems into one. To the businesses in China, is part of the ongoing effort to make the tax structure more business friendly and more comprehensive to the collection agency. The Appendix table relates to the major difference in the existing taxation system and the following reforms of the two nations.

In contrast to the U.S., where individual income tax makes the majority contribution to government revenue, in China, individual income tax only presents 8% of the total government revenue. Taking 2016 years as an example, 13 trillion of total tax revenue the government of China collected, plus 1 trillion individual income tax, the remaining more than 90% of the tax is levied on businesses, including value-added tax, consumption tax, enterprise income tax. The tax structure of the United States is based on direct tax and individual income tax, which accounts for 85.3% of the tax and a tax on about 50% of the federal budget (Ren, 2018). Although the statutory rate for corporate income in China is lower than that of the U.S., which is set at 35% at the federal level; but in practice, that rate in the U.S. is 25.2% after factoring in various deductions, China's corporate tax was only 0.2% less than that of the U.S, even before the Trump tax cut.

In addition to tax, the various level of government in China also collect non-tax revenue from the business, mainly includes various administrative fees. The proportion of non-tax revenue in China's fiscal revenue has gradually increased. In 2016, it reached 18.3%, then it decreased to 16.4% in 2017. The non-tax revenue in the United States accounted for a very low proportion of federal revenue, less than 4.79% (Ren, 2018).

A study has shown that China's "macro tax burden" in 2014 was 35.5%, slightly higher than the US's 35%. After the US tax cut, it may reduce the macro tax burden by an average of 0.8 percentage points per year, which puts pressure on China (Ren, 2018).

Conclusion

Supply-side reform opens the new stage of China's economic development. It is about the reforming the existing system, which was reshaped in the process of marketization from a planned economy, in the past 30 years. Today, while in the United States, Trump's reform has an aim to revitalize the manufacturing to make "America great again," China is a nation striving to overcome middle-income trap, to cultivate new development impetus in the field of innovation and service. The supply-side is a must step for China since the investment driven and labor intensive China Model has already reached limit. While in the case of United States, Trump's economic plan also being said a Reagan time re-visit, however, Reagan's tax deduction didn't establish enough correlative evidence to show that trickle down effect was able to lift productivity. If Trump hopes that the tax cuts would spur waves of asset investment in equipment and machineries, and consequentially that will revitalize manufacturing in the US, he probably will be disappointed.

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Compulsory two-component health insurance for Czechia: a bad idea whose time will never come

Jan Mertl*

Abstract. The paper deals with possible introduction of compulsory two-component health insurance in Czechia. Although it exists in the Netherlands in pure form, even there it does not have conclusive results, comes from different health policy and historical background, and the health expenditure has increased since it was introduced. The aim of this paper is to show the main socioeconomic properties of compulsory two-component health insurance system as it appeared in the Netherlands, classify it and then discuss them according to the Czech environment and Czech health policy goals. Nowhere in the world, the health system works without problems, it is necessary to use the international experience, but we must be careful if we think about transferring them to local conditions. After comparative and socioeconomic analysis, we suggest different approach for Czechia, based on universally available standard financed from earmarked proportional taxation and strictly voluntary prepaid programmes.

Keywords: health insurance, earmarked taxation, prepaid programmes, nominal premiums.

JEL Classification: I13, H20, H51

1 Introduction

In the book of last general election winner Andrej Babiš, whose nominee Adam Vojtěch became Minister of Health, on page 77 he dreams of a system of compulsory two-component Dutch type insurance (Babiš, 2017). The Netherlands is practically the only country that has this system in its pure form, and its effects are not convincing even there, and even more problematic in the event of a possible transfer to the Czech environment. Nevertheless, the proposals for its introduction in Czechia are periodically appearing. Motivation is basically twofold. First, the interests of the health insurance companies and the financial groups connected to them, which want to rely on theoretically extremely problematic price competition in the universal part of the system and do business there. Second, because of the relatively low proportion of private health expenditure in the Czechia, there is a constant demand for part of the population for the use of private resources to improve the services they receive within the healthcare system (ideally linked to a reduction in the percentage of payroll contributions, and thus the degree of solidarity that these social groups perceive as not that much necessary due to their financial strength).

The aim of this paper is to show the main socioeconomic properties of compulsory two-component health insurance system as it appeared in the Netherlands, classify it and then discuss them according to the Czech environment and Czech health policy goals. Nowhere in the world, the health system works without problems, it is necessary to use the international experience, but we must be carmgrnedajíeful if we think about transferring them to local (e.g. Czech) conditions. Methodologically we shall respect the reality in foreign countries, do the international comparison but then formulate our own health policy approach.

Theoretical background

It is an interesting research problem (Costa-Font & Zigante, 2012), when the theoretical knowledge clearly defines the limits and rules of health systems, yet the practice for the aforementioned reasons repeatedly deals with concepts whose applicability and especially long-time sustainability of their implementation can be low (generally or in the chosen country). As illustrated by the example of the Czech introduction of the second pillar of the pension system in 2012-2013, if the implementation is a fundamental theoretical or, a conceptual problem, then even relatively forcefully implemented reforms cannot be kept in practice and next governments abandon them. However, even well-and theoretically well-designed reform can be ruined if errors are made in its practical implementation. This is an example known from horticulture - if we have good seeds (theory), we also need to water and hoe well and (in practice) so that the plants grow and prosper. On the contrary, we can water the bad or dry seeds (wrong theory) as much as we want, and at best we will grow up a few small plants that will soon disappear.

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The consolation may be that it is not quite the specificity of Czechia - for example, in the USA there are repeated proposals for the privatization or "capitalization" of the basic Social Security pension pillar, which leads to theoretical analyses which reliably disprove the advantage of such practices in American environment – actually this paper's title is chosen similarly to one of them (Aaron, 1997). At the same time, there are different solutions in social policy based on the typology of the welfare state and social models (Krebs, 2015), which broadly correspond to individual conceptual concepts within the political spectrum and are very useful for their theoretical classification. At the same time, however, these models always need to be considered in relation to a particular country and the desired results (Grand, 2009), (Wendt, 2009).

We can make a theoretical hypothesis – unfortunately, that the compulsory two-component health insurance system, especially in the Czechia's conditions, will not provide satisfactory results for stakeholders in health care. It is clear that price competition in the universal system does not hold because of an inconclusive effect on the availability, cost and quality of universally provided care (Frank & Lamiraud, 2009) (Ericson & Starc, 2012) and it does not make sense to operate it permanently (Vaithianathan, 2006). In addition, when using the multi-payer system (Hussey & Anderson, 2003) is the current standard of sharing health risk on a national level (Kleef, Ven, & Vliet, 2013), which further virtualizes the individual insurance payments and makes the issues of cream-skimming more important (Thomson, Busse, Crivelli, Ven, & Voorde, 2013). We see the usual public financing schemes fully based on general or earmarked taxation (Bloom, Cashin, & Sparkes, 2017) as already having key features that regulated competition with strong effort only tries to achieve. For private expenditure respectively, it is possible to construct more appropriate and truly voluntary funding schemes by means of an absolute amount (nominal) expenditure, rather than using them as a compulsory tool for differentiating the price of basic healthcare package. Both universal financing based on earmarked proportional taxation (Mertl, 2017b) and optional prepaid programmes based on fixed amount paid (Mertl, 2017a) have been already constructed and described for Czech conditions.

Health insurance system in the Netherlands

The Dutch system is economically based on dividing the health insurance payment into two parts: income dependent contribution, that is collected and redistributed through central Health Insurance fund (where risk-pooling at national level occurs), and nominal contribution, which is paid directly to selected health insurance company. Both parts are compulsory, and the client/citizen is then entitled to a basic package of health services. Therefore, the competition is at the level of individual nominal contribution, but not primarily the services that the client gets for them (that are primarily reserved for voluntary health insurance that can also be offered by health insurers). The content of the basic package is at the general level similar to what we know from universal health care systems, which means (Boerma, Kroneman, Berg, & Groenewegen, 2016):

- medical care, including care provided by GPs, hospitals, medical specialists and midwives,
- hospital care,
- home nursing care and personal care (assistance with eating, dressing, etc.),
- dental care for children until the age of 18. For older people only, specialist dental care and a set of false teeth are covered,
- medical aids and devices,
- pharmaceutical care,
- maternity care (midwifery care and maternity care assistance),
- transportation of sick people by ambulance or taxi,
- professions additional to medicine (allied healthcare): physiotherapy for persons with a chronic medical condition (the first 20 sessions relating to the condition are excluded; there is a limiting list of conditions) and for children below the age of 18; occupational therapy; exercise therapy and dietary advice to a limited extent; speech therapy,
- quit-smoking programmes,
- geriatric rehabilitation care,
- care for people with sensory disabilities, and
- mental care: ambulatory mental care and inpatient mental care for the first three years. (After three years inpatient mental care is considered long-term care and is financed by the Long-term Care Act).

For some treatments, there are exclusions from the basic insurance package:

- for allied healthcare, generally, a maximum number of sessions are reimbursed,
- some elective procedures, for instance, cosmetic plastic surgery without a medical indication, are excluded, and
- in vitro fertilization: only the first three attempts are included.

Therefore, in the Netherlands, citizens pay for the care that is "essential, prevents loss of quality of life and effective" (Boerma, Kroneman, Berg, & Groenewegen, 2016) compulsory payments, where approximately half is income-dependent, and half are nominal premiums. Of course, this introduces problems for lower-income social groups, therefore the government provides within social protection "healthcare allowance" (zorgtoeslag), which is set at the average of nominal premiums offered by health insurers. Approximately half of the households are receiving the health allowance, which compensated for circa 40 % of their nominal premiums. The maximum monthly healthcare allowance was 78 EUR for singles and 149 EUR for families in 2015. Also, for children up to 18, the government pays a contribution to the central Health Insurance Fund from general taxation.

We can say, that this is an incarnation of neoliberal model in health insurance (Vostatek, 2013), where the government provides big subsidies and forces partial national health risk pooling so that the individual health insurers can operate on the health insurance market, and everybody is obliged to buy that highly regulated insurance. Similar social model is applied in USA and Switzerland, but only in the Netherlands, there is such detailed and unified specification of basic package content. The government is monitoring if citizens buy insurance and there are penalties if they do not, still, about 2 % fail to choose their health insurer for several reasons. Just for curiosity, in the Netherlands there is very small group of citizens (approx. 12 500 people) that from personal and religious reasons needn't enter any insurance scheme (gemoedsbezwaarden), and they still must store their income-dependent payment on personal accounts that are then used when they need health care; of course, they must pay out-of-pocket when their account is exhausted.

We can also look at how the health expenditure has developed during the transformation period to the two-component system in the Netherlands.

Table 1: Share of health expenditure on GDP and share of public expenditure in Netherlands, 2000-2016

Year	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**
% exp./GDP	7,1	7,4	8,0	8,5	8,5	9,3	9,2	9,2	9,5	10,2	10,4	10,5	10,9	10,9	10,9	10,7	10,5
% public exp.	66,4	65,8	65,5	66,5	65,6	67,3	82,7	83,0	81,7	82,4	82,6	82,2	82,0	81,1	80,7	80,7	80,8

Source: (OECD, 2017).

These data show, that since the introduction of the two-component system in 2006, an increase of total health expenditure has been observed and now it oscillates about 10,5 % GDP, therefore no cost-saving under the new system has occurred. Also, in 2006 there has been the sharp growth of public expenditure, because some of the former private schemes were merged to the new system, where OECD classifies both income-related and nominal payment as public, because of their compulsory nature and single basic health package that they cover.

It is worth noting that the proposed view of Dutch system as a "bad idea for Czechia" does not necessarily mean, that in the Netherlands this system will not continue or shall fail. For sure, it is one of the models that were implemented in real life and has clear logic. Also, the Netherlands is a country which does not have problems with allocating a relatively big share of GDP to health care and had gotten in the past different conditions as, before this system, a lot of higher-income people ought to have purchased private health insurance and the system was not universal in its roots.

In theory, there is a "menu" of possible concepts of health financing, each of which has its logic and can be used under certain conditions, but this does not mean that its usage can only be justified by its theoretical "economical correctness". In health economics, more than in other parts of economics, we must cope with the existence of several possible paradigms, social models, but also different schemes of public and private financing with a separate logic. This is also perceived at the OECD level (Joumard, André, & Nicq, 2010) – „There is no health care system that performs systematically better in delivering cost-effective health care" (OECD, 2010).

This may lead to recommendations for a particular healthcare system being perceived as too normative and little supported by a theoretical positive economic analysis, or rather preferring a certain theoretical variant to the detriment of "proof of an effective and optimal solution". But that is how it works in healthcare - under certain conditions it is possible to prove and achieve different results - it is not the questioning of scientific work but an awareness of the importance of health care in what we consider and what criteria we use for analysis. For example, from a European perspective, we understand the health system of insurance plans in the United States of America as being cost-inefficient and socially insensitive, we can find in the literature a number of analyses (Cutler & Zeckhauser, 1999) that quite reasonably justify its effectiveness in relation to a particular client of a private insurance company with a relevant insurance plan (and put the social availability of health care aside).

Therefore, if we want to contribute to effective healthcare settings in a particular country, it is also necessary to respect its factual specifics, ethical values framework and long-term trends. That is what we are going to do in the next part.

Discussion and possible configuration of health financing resources for Czechia

It is clear that the above-mentioned possibility of the Dutch type, i.e. the regulated competition of insurance plans with the pressure to unify the universally offered range of care (whether mandatory in the style of the Netherlands or indirect pressure on the content of insurance plans in the USA) is, for a number of reasons, problematic and basically forms the basis of health policy for countries where there have been problems (or weak interest) within public choice consensus on universally available and publicly funded health care for every citizen. In Czechia, therefore, there is no need to deal with it, because here long-term consensus on universality exists, and it is not necessary to complicate it through the detailed and demanding regulation of commercial insurance companies and providers, who in principle cannot effectively ensure the universality through pure market-driven methods alone (Němec, 2008).

The issue with the market-based approach lies within the following framework. There are two main obstacles to effectively provide private insurance plans for the entire population: first people differ too much and unpredictably in their health status implying their vastly different health care needs. Second, their needs are not related to their income and known market financial mechanisms cannot "match" these two variables together (see again the big subsidy effort of Dutch government to make the system work), also because information asymmetry, shortsightedness of human behaviour and adverse selection in health insurance. Therefore, in most OECD countries, the market-driven way of health insurance plans was not established (especially in the universal part of the system) at all.

On the other hand, some features of competitive health care markets intrigue the health policymakers in the countries that have the peace and simplicity of solidarity-based financing. This is the case of Czechia, where the long-time tradition of universally available care exists. So, it seems very tempting to evaluate the Dutch approach, that provides a universally available package for everybody, but with the suggested dynamic of multiple health insurers, possibility to choose the health insurance provider based on the nominal amount offered, decreased income-related part, room for health insurers to "compete" …

But as we suggested in the theoretical hypothesis, based on the literature review and situation in Czechia, this temptation is false. It would mean the transformation of current public health insurance into more complicated and less solidarity-based system, and the citizens would not get better services or prices than those that they have now. Why?

The health expenditure level in Czechia is much lower than in the Netherlands (7.3 vs 10.5 % GDP in 2016), therefore there is currently very little or no room to compete within the universal part of the system. Also, it is debatable whether partial national risk pooling (as done in the Netherlands since only the income-related part is centrally redistributed) is enough.

The competition in the Netherlands is mainly/primarily about choosing the health insurer based offered price of nominal premium that provides at least the basic package coverage with some specific services and approach of chosen health insurer. The health insurers usually differ in charging deductibles, the access to health providers and its reimbursement (so-called in-kind policy vs restitution policy). For obtaining "better" coverage, additional private financial schemes also exist.

Even in the Netherlands, the majority of citizens purchase their insurance through group agreement (69 % in 2015), so the often-cited principle of individual purchase and client's decision is mostly unused in reality. In Czechia, after possible initial excitement, it would be probably similar or even worse.

If we see the current system of "state insured persons" in Czechia as complicated and not very systemic, the government subsidies to the Dutch system are even more complicated and also fiscally intensive (payments for children, "health allowances", payments for long-term unemployed/uninsured).

To make it clearer, we dare say that we already have the universal health system financing better suited for Czechia's condition. This does not mean it cannot be fine-tuned further, but a change to the compulsory two-component system could be a step back, not a progression. Before suggesting possible configuration for the Czech system (if we do not support the compulsory two-component insurance it is good to say what we propose instead), we ought to briefly deal with two important but controversial issues: the number of health insurers and the range of universally available health services.

Every universal health system designer must make the choice of single-payer versus multi-payer financing. That is typically a decision for decades, which must have political support for a long time ahead and a secure more radical reform in this area for example by a three-fifths majority in parliament. It is of no importance and sense to oscillate permanently between the possibilities. We ought to note that theoretically, the financing of universally

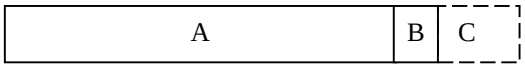
healthcare purely from the government budget (general taxation) and without insurance companies, or more precisely single-payer as a regional structure of public administration in the style of the British NHS (single-payer), is technically feasible and, from the point of view of classical public finance theory, should be the most effective. However, it depends significantly on the quality of governance, the consistent application of public governance practices, the willingness to introduce/increase the tax progression from personal income and the acceptance of a monopoly in health care payments in the existing pluralist structure of healthcare facilities, including outpatient care. These conditions are not fulfilled in the Czechia, and a multi-payer system has already been put in place since 1993, the cancellation of which does not have significant political support. Therefore, we can recommend for Czechia to keep the multi-payer system running, even if direct price competition in health insurance is not (and it needn't be) introduced. The health insurers should differ primarily by:

- dealing with health providers, adjusting payment methods for provided care, and management of healthcare provision (this indirectly influences also the quality of services for the clients),
- customer service and care (responsiveness matters in health systems),
- if desired, also by positive motivation schemes (health tax credit, benefits) and chronic conditions' management within the universal system,
- if desired, also by offering individual prepaid programmes or other strictly optional financing schemes.

Generally, the universal part of the system must not be subject to permanent pressure for the erosion of the medical standard that it guarantees. It is not true that there are no additional options, current medicine and the development of associated services offer a range of voluntary options for private spending. The often-heard theory that it is necessary to pay extra for banal treatment to afford to cover serious diseases is not applicable, especially when we know that the overall volume of (public) health expenditure in Czechia is relatively low. Moreover, serious illnesses often arise through neglect or non-treatment of malignancies or their initial stages. Similarly, the costs of treating serious illnesses are such an essential component of reimbursements that any savings on "banal" care do not address the situation of their coverage. In any case, it is necessary to maintain the medically appropriate standard of treatment for all illnesses, while recognizing that it is a challenging task and that in the universal system there is always the risk that accessibility of care will become formal in a certain segment, region or diagnosis. However, this is better than when it is inaccessible apparently and ex-ante, because in case of such unavailability it is always possible to claim the relevant rights of patients who are refused in commercial systems for simple financial reasons on the principle that nothing like solving health problems in there is no objective requirement in them. We can see, that even in the Netherlands the content of regulated basic health package is complex and covering the whole health care range that is seen as essential, or better say, medically complete.

Let us see how the configuration for Czechia could look like.

Figure 1: Simple possible configuration of health financing resources for Czechia



Source: author

The parts "A+B" together make up the compulsory universal system. Their fiscal volume is defined by the public resources that are collected through public finance techniques and are redistributed through central health fund according to the cost indexes of the insured (full national risk-pooling). For Czech conditions, it is advisable to maintain the earmarked proportional tax on wages or whole personal income of individuals (Mertl, 2017b). Maintaining a fiscal subsidy from general taxation (the simplest variant) or excise taxes to reduce the burden of the labour factor and partially offset – when using the share of excise taxes' revenue – the negative externalities of tobacco (Goodchild, Perucic, & Nargis, 2016), alcohol (Elder, et al, 2010) and transport are also possible. Simultaneously, the degree of simplicity and transparency of the relevant tax mechanisms must also be considered as they are significant public finance's effectiveness factor (Bloom, Cashin, & Sparkes, 2017). This type of transformation can be if desired fiscally neutral, keeping the rate of earmarked payroll/income health tax around current 13,5 % and the subsidy at the level of total current contribution for "state insured persons" (approximately 62 billion CZK in 2016).

Currently, Part "B" is very small, consists only of preventive programmes financed from so-called "Prevention fund" of public health insurance companies. It can be abandoned if we want to have pure universal system consisting of part "A" only. Or vice versa, if desired by public choice, part "B" can be slightly (it will always have marginal share) expanded to individual motivation strategies within the universal system, such as health tax credit for fulfilling specified behavioural criteria or programmes for chronic diseases management as done by social health insurance companies in Germany (Busse & Blumel, 2014). Of course, if we want to have such programmes within universal part we must provide fiscal space for them, e.g. allowing the health insurance companies to allocate small part of their budget for their financing.

Part "C" is the optional private amount. The development of medicine and socio-economic environment has brought new treatment options and health services for patients. Likewise, some patients' demands for comfort, time for health professionals and the extent of consumed services are increasing. Although it has several ethical connections, it is currently recognized in developed countries that health professionals can also provide care to those patients who have higher requirements than others, and these requirements are not strictly objectively justified by their health status. This moves us from the category of care that must be provided into the category of care a patient can or wants to consume. In this context, optional healthcare schemes can be created that can be used to finance and provide it.

Given the limitations of private health insurance (Mertl, 2011), a suitable option for extending schemes for optional healthcare financing comprises prepaid health care programmes. Their economic construction is relatively simple and consists in the regular allocation of the amount chosen (e.g. monthly or yearly), for which the client receives a healthcare package according to their preferences and needs (Mertl, 2017a). Therefore, there is no need to quantify health risks or otherwise complicate entry into the product, although it is, of course, advisable to customize the package to the needs and health of the client according to their preferences or because of expert advice when purchasing the product.

In practice, these schemes only make sense as an extension of a universally available system because international experience with Health Savings Accounts (HSA) systems, if used for reimbursement alone, is relatively weak in the sense of inadequate coverage of any more serious or more frequent health problems - they can easily get exhausted (Avera, 2017)

An employer can contribute to the payment of these programmes, even in relation to workload compensation by influencing the content of the respective programmes. Similarly, if the client is involved in the optional extension of the pension system (Mertl & Valenčík, 2017), then a part of the benefits from this extension may also be used to pay for the subscription.

As an alternative to direct out-of-pocket payments and private health insurance, these schemes have the benefits in a possibility for the creativity of health insurers and healthcare facilities in organizing and implementing the health packages consumption and financing, utilizing economies of scale, promoting regional development, predictability and transparency of funding for the client and for healthcare facilities, and better price negotiations done by the health insurers that the majority of clients would be able to obtain individually.

If these programmes are voluntarily offered at the health insurers' level, while strictly keeping the separation of public and private resources within their budgeting and management, they can function from the client's perspective transparently as single combined health financing product, whose financing consists of compulsory health income tax and optional subscription to the selected prepaid programme. The marketing of health insurers can work with these programmes as an optional product for their clients. Synergic effects from this combination, if implemented properly by health insurers, shall be significant.

Conclusions

In the current healthcare systems there is space for both universal and optional funding schemes. The reason is the development of medicine, the socioeconomic development of advanced countries and the increasing demands of the population. At the same time, however, the construction of the relevant schemes cannot be left to invisible market hand only. Because of market failures and significant differences in health status and incomes of the population, such solutions nowhere in the world in themselves lead to acceptable results. The system in the Netherlands is an effort to combine the public subsidy and private financing together so that the universal standard is improved – but this is already done through simpler techniques of public financing in majority of OECD countries without application of neoliberal schemes and artificially created highly regulated health insurers' competition. Therefore, in countries like Czechia, where we already have robust public financing, there is no reason to weaken or compromise it.

In the universal part of the system, the evolution of current health insurance to the earmarked proportional tax on wages/personal income and the distribution of its revenue according to cost indices of individual payers through the central fund to health insurers appears to be optimal for Czechia. The current payment for state insured persons should be technically transformed to pure subsidy to the central health insurance fund from government budget. This will allow for a continuing reduction in the tax burden on labour, or in case of excise taxes' share even a partial compensation of the negative externalities associated with the consumption of tobacco and alcohol.

The universal part of the system must be medically complete; what cannot be accepted is the thesis of the reliance on the competitive market for necessary and needed care with variable insurance plans or the spill over effects from the private part of the system as a tool for increasing universal availability and effectiveness. Of course, there are synergic effects between public and private part and we suggest using them with the introduction

of prepaid health programmes, but the government's direct guarantee for universally available care including the relevant financial flows shall be maintained. Similarly, we cannot recommend for Czechia compulsory two-component (nominal) insurance premium according to the model in the Netherlands. It is necessary to acknowledge current healthcare requirements in terms of maintaining the necessary degree of solidarity and the range of universally available health care, as well as allowing greater variability and response to patient priorities and optimizing the role of health insurance companies. However, this can be done much better through the evolution of existing health insurance contributions into proportional health tax and optional prepaid health care programs.

The suggested configuration for Czechia might seem partially like discussed two-component (income-related and nominal premiums) health insurance used in the Netherlands. But the very substantial difference is that the absolute (nominal) part "C" is strictly optional in our concept and delivers additional health services extending the standard; while the Dutch absolute (nominal) health insurance premium primarily targets the variation of the total amount paid for the basic health care package, and thus relying on price competition within the universal part of the system. This cannot be considered an effective solution (mainly for Czech conditions but also in general it is debatable), as it brings an increase in total expenditure on health care (in the Netherlands currently approximately 10,5 % of GDP) and because the effect on the cost-effectiveness of insurance companies and the premium rates for the clients is inconclusive. Moreover, the poorer citizens and children must be fiscally subsidized to be able to buy the basic package with nominal premium, whereas the prepaid packages needn't be subsidized at all (because their purchase is fully voluntary). Thus, there is a strong and hidden erosion of public funding and provision of a universal standard of care when we compare the Czech and Dutch way of financing, which we have already justified as undesirable. On the contrary, the system of prepaid programmes as the extension of medically complete universal system builds and enables a truly optional allocation of private resources.

We have observed, that even in the Netherlands approximately half of the population receives subsidies and allowances so that they can buy the insurance. It can be also estimated that even if the voluntary programmes are introduced in Czechia, there will be always a lot of people that will use those schemes occasionally or not at all. But in the suggested configuration that does not make a problem since the "C" part could easily, at the individual level, be zero and then the universally available standard will be the only (but fully sufficient) care that will be consumed by individual patient.

When well-done, Czechia can maintain and evolve multi-payer public health insurance system even without utilizing two-component insurance with compulsory nominal premium. Health insurance companies can differ in dealing with health providers and payments for healthcare, responsiveness to clients, preventive and positive motivation programs and if desired also voluntary prepaid health programmes and other products they can offer to the clients with synergic effects, but separation of public and private resources. That's plenty of possibilities into the future and there is no need to weaken our universal system that provides medically complete care for every citizen, which is a notable feature that some other health care systems have been struggling to achieve for decades.

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Consumer preferences in the consumption of public goods

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Abstract. The decision-making process in political market is determined by economic context (market failure in the production of goods of pure public goods) and political context (Downson's model of the political cycle, the problem of cyclical choice, log-rolling, rational ignorance and others). The reallocation of resources in the economy in favor of the provision of public services therefore has a certain degree of inefficiency in itself**.** This degree of inefficiency could be reduced by introducing alternative ways of securing public goods on a voluntary basis when individuals are not guided only by financial motives but also by social or behavioral motives such as altruism, warm-glow effect, and social norms. Regardless of whether this is a field or laboratory experiment, the level of voluntary provision of public goods can be affected in a positive or in a negative way. The ability of an experimenter to influence a particular factor by a different set of instruction can significantly affect the willingness of individuals to voluntarily pay for public goods. The aim of the paper is to find out if different instructions lead to a different rate of voluntary payment for public goods. We assume that individuals are particularly affected by internal factors when deciding. Individuals' decision whether to voluntarily pay has been influenced by risk perception, warm-glow effects and the social position of the individual.

Keywords: consumer, experiment, internal factors, willingness to pay.

JEL Classification: C91, D12, D64, H41.

1 Introduction

The lack of consumer preferences in the consumption of public goods means that there is no information on the expected benefit from the consumption of these goods as would be the case with private goods. It should be remembered that in the case of a society with hundreds or several million people, the state cannot decide correctly about the species and the amount of provided public goods. The reason is very simple, the state does not know the value of the goods or the benefits of those individuals who have consumed the goods and does not know the loss (cost) of those individuals who pay their taxes to the good but do not use this goods.

This degree of inefficiency could be reduced by introducing alternative ways of securing public goods on a voluntary basis when individuals are not guided only by financial motives but also by social or behavioral motives such as altruism, warm-glow effect, and social norms.

Economists generally assume that individuals choose to act rationally (Johnson, 1997), the so-called "Homo oeconomicus" (Mises, 2006, p. 879). The result is creating a mental order of individual preferences and trying to achieve the highest material or monetary gain. Based on their preferences and pre-defined constraints, they then make their decisions, otherwise referred to as rational calculations (Downs, 1957, pp. 5-6). It does not mean, however, that individuals are cool computers that use perfect information and make calculations with infallible accuracy. This means that when making decisions, individuals make certain calculations in order to achieve their goals. The information they have, or the goals that follow may differ from ours, but these differences can't be explained as the basis of irrationality (Johnson, 1997).

However, people behave in real life diametrically differently from what the economic model implies. The main reason for the difference is the impossibility of capturing all the potential impacts and aspects of individual decision-making process (Downs, 1957). In contrast to the classical and neo-classical concept of a rational individual, the assumption of an irrational individual, whose behavior is not accidental, is subject to the irrational influence of the environment, contextual effects such as emotions and feelings from short-sighted planning and many other sources (Ariely, 2009). The result is errors that can be predicted and are still the same. Such an individual concept represents behavioral economics (Ariely, 2009; Kahneman, Tversky, 1979), attempting to explain human decisions

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based on psychological motives. Similarly, political economists are aware of the existence of personal motivations other than self-interest related to the concept of "homo oeconomicus" (Johnson, 1997, p. 29). An example may be an explanation of altruistic behavior based on economic analysis (Apgar, Brown, 1987).

According to Hladká et al. (2015), factors that enter the decision-making process of the individual can be divided into internal factors (motives) and external factors (determinants). The reason for such a division is, according to the author (Hladká et al., 2015), to distinguish those factors that originate from the inside of an individual, to form his / her naturalness and personality (internal factors), and those factors that are given and the individual influence outwardly (external factors). The internal factors include altruism (for example the reasons of voluntary payment are the desire to help those who cannot help themselves or my family, friends and relatives pay, so I pay myself), egoism (feeling of satisfaction from the promotion of good things), and investment (for example the personal contacts, experience, socio-economic status, job opportunities).

External factors (determinants) are according to Hladká et al. (2015) divided into four groups, economics (financial accessibility such as income level - ownership, real estate, size of savings - Bekkers, Wiepking, 2006, Marx, Carter, 2014, tax policy - Duquette, 2016, number of economically active household members - Bekkers, Wiepking, 2006), demographic (age, gender, education, socio-economic profile, religious orientation, marital status, residence, political orientation - Snipes, Oswald, 2010; Yao, 2015), social (volunteering and civic participation, family environment, models and experiences from youth, lifestyle - Bekkers, Wiepking, 2006, Marx, Carter, 2014, Yao, 2015), and situational (relations with the organization, employees, with the final recipient, with other donors, the nature of the situation, fundraising methods, donor moods, donor habits, media influence - Snipes, Oswald, 2010).

The states, professionals and communities has minimal opportunities to influence external factors and thus willingness to voluntarily pay. We have therefore addressed how different settings of experimental conditions can influence the willingness of individuals to voluntarily pay through influencing internal factors. The aim of the paper is to find out if different instructions lead to a different rate of voluntary payment for public goods.

According to Hladká et al. (2015), an act of giving can cause self-satisfaction, praise, respect, admiration, sympathy, or admiration from others. Some donors receive donations from an organization that has received specific material rewards, in the form of public recognition and appreciation, membership, access to planned auctions, exclusive invitations to dinner or lunch with a celebrity (the possibility of starting the project itself, "cutting red tape"), political advantages or indirect market benefits. An interesting motive for donation is, according to Lloyd (in Hladká et al., 2015), when an individual perceives their gift in the form of investment. The individual will not receive a financial reward for his professional counsel and assistance, but in return he will receive a reward in the form of contacts that can help him/her in his / her professional life or receive a reward in the form of knowledge that will make him / her socio-economic status increase or the individual gains better job opportunities.

The way of presenting the problem to individuals can significantly change his willingness to cooperate without the state having to go into the possibility of compelling an individual. Experiments using positively taught instructions, highlighting the benefits of cooperation ("We believe that thanks to this project" Fight for the Future of Our Children "we will save the future of our children as well as the competitiveness of Slovakia"), the rate of willingness to voluntary pay is higher than in experiments with negative tentative instructions (Alpízar, Gsottbauer, 2015). In practice, this means that for organisations, state, it is wiser to present the collection as something the individual or society can achieve, to present a positive effect of money collection as opposed to highlighting negative effects, hazards, the misfortune that could have happened if the collection didn't work. Individuals want to know what they can do better than what they have to prevent (Špalek, 2011).

Also Hardin (1968) states that the possibility of compulsion leads to the suppression of the individual's social interests to the detriment of one's interests, for the benefit of society as such. Similar thoughts have led to the exploration and search for factors (biological and social) that would lead to the establishment of individual co-operation (Andreoni, Croson, 1998; Hewstone et al., 2002, Hladká et al., 2015). The result is that the correct setting of a collaborative factor suppresses the individual's interest and leads to social welfare (Gaechter, Herrmann, 2008).

Masclet et al. (2003) point out that the use of compulsion, in the form of sanctions, is advantageous only if the degree of cooperation, the amount of individual contributions is low. Similarly, in the experiments without the possibility of punishment the individual will cooperate only if other individuals cooperate (Falk, Fischbacher, 2006; Fehr, Schmidt, 1999). Otherwise, it is preferable to use non-financial information sanctions (Alpízar, Gsottbauer, 2015) such as the social exclusion of an individual (Dolan et al., 2009), which ultimately lead to a higher degree of co-operation (Dolan et al., 2009) and higher voluntary payment (Krieg, Samek, 20170; Masclet et al., 2003). Social pressure is thus a major factor influencing an individual's behaviour, resulting in the manifestation of his / her real preferences, though not necessarily to the full extent (Dellavigna, 2009).

Methodology and methods

The aim of the paper is to find out if different instructions lead to a different rate of voluntary payment for public goods. We assume that individuals are particularly affected by internal factors when deciding.

For the public good on which we carried out the survey, we choose the education in Slovakia.

Based on this, we have further investigated the influence of internal factors such as aversion to risk, warm-glow effect, or a sense of satisfaction from promoting good things, and identifying with the group on the willingness of individuals to voluntarily pay for education.

When exploring these factors, we were inspired by the Huck and Rasul (2010, 2011). Their experiment (2010, 20110) on a sample of 25,000 regular visitors to the Bavarian Opera in Munich explored the relative success of the different mechanisms of voluntary payment for charitable collection. The charitable collection was aimed at collecting financial payment to the Stück für Stück project to support children from disadvantaged families. Visitors were divided into six equally large groups and were approached with an official letter with the permission of the opera conductor. The wording of the letter was the same in all groups, except for the passage describing the method of collecting financial payment to the charity collection (Huck, Rasul, 2010; 2011).

We implemented a survey experiment. A frequent problem of experiments is a non-representative selected sample that does not allow generalisation of the results achieved. 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 for testing by students (Špalek, 2011). In contrast, the advantage of the survey experiment is an experiment that 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 (different mechanism), 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 a scenario will generally change subjects' beliefs about other features of the scenario (Dafoe et al., 2015).

We did not reward respondents in our survey experiments, as we wanted to find out if they were willing to voluntarily pay according to their net monthly earnings.

Our survey consisted of three parts. We used a questionnaire for collecting the data, which we distributed personally or via the internet. The first part of the survey was focused on calculating net earnings. This type of assignments we have chosen to calculate how much of their earnings go to "state".

In the second part, we asked the respondents what kind of project they are willing to support (health, education, tackling corruption, poverty, improving community life project or others). We also ask respondents what influence their decision to voluntary pay for the selected charity project. In the next part of survey, we chose a specific educational project and the respondents should decide what form of the payment they select:

1. Method: I will voluntary pay for the project based on these instructions – voluntary contribution mechanism;
2. Method 2: The donor with the highest payment will be given the opportunity to start and run the project itself ("cut the red tape") – charity lottery with a fixed amount of remuneration (wins the highest contribution);
3. Method: The draw donor will be given the opportunity to start and run the project itself ("cut the red tape") - charity lottery with a fixed amount of remuneration (wins the requested contribution).

The 4th and 6th method had almost identical instructions, "A charity auction is a charity auction that you can join, if you contribute a minimum of € 7 per project. During the auction is secure refreshments, You can win by joining the auction promotional items, sponsorship items and the first prize to start and run the project itself ("cut the red tape")". The difference between 4th and 6th method was only in the passage describing the way of payment for the educational project:

4. Method: The winners of the auction become the one who offered the highest amount, with the difference that all the participants in the auction have to pay for the project 10% of the maximum amount - all-pay auction;
5. Method: For each auction, you will be able to write the lowest amount in the envelope, which you are willing to pay for a first prize, and whether you have an interest in the auction. The auctioneer with the highest of the lowest proposed amounts will become the winner of the auction – first-price auction;
6. Method: For each auction, you will be able to write the highest amount in the envelope, which you are willing to pay for the first prize and whether you have an interest in the auction. The bidder with the highest bid amount will become the winner of the auction but will only pay the second highest bidder – second-price auction;
7. Method: I do not want to support the educational project.

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 dependent children, type of school that children attend and the number of members of the household).

The basic sample, as a set of statistics, in this case, consists of residents of Slovak republic 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 181 citizens from Slovak republic. We obtained the selected sample (Table 1) using quota sampling according to the following statistical attributes: gender, age group and educational attainment, whereby its structure corresponds to the basic sample (Table 1).

Table 10: The selected sample for measuring willingness to pay for public goods

Classification symbol		**Selected sample %**	**Basic sample (%)**
Gender	Men	48.62	48.78
	Woman	51.38	51.22
Age group	18-24	10.50	10.34
	25-34	18.78	18.85
	35-44	19.89	19.92
	45-54	16.57	16.26
	55+	34.25	34.63
Education	Elementary	18.23	18.39
	Secondary without final exams	29.28	28.29
	Secondary with final exams	35.36	36.31
	Tertiary	17.13	17.10
Net earnings	To € 330	9.44	-
	€ 331 – 500	25.00	-
	€ 501 – 700 EU	17.78	-
	€ 700 – 1,000	13.89	-
	More than € 1,000	12.22	-
	I'm not interested in answering	21.67	-
The number of members of the household	One	8.84	-
	Two	28.73	-
	Three	18.23	-
	Four	27.62	-
	Five and more	16.57	-
Number of dependent children	No one	46.96	-
	One	23.76	-
	Two	21.55	-
	Three	2.76	-
	Four	3.87	-
	Five and more	1.10	-

Source: Authors own, 2017

We translated the obtained data using numerical codes and was furthermore statistically processed using the Chi-square test (tests the representativeness of the selected sample), multiple response analysis, Friedman and Wilcoxon non-parametric test (identification of incentives of consumers in the consumption of public goods), and 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, number of dependent children, the type of school that children attend, the number of members of the household).

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

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 of all sorting characters, e. g. gender, age category and the highest achieved education (p-values 0.002, 0.023, 0.112). The results found in the survey can be generalised to all inhabitants of the Slovak Republic.

Results and discussion

In the paper, we have determined the research assumption that we will try to verify in the next section: We assumed that individuals are particularly affected by internal factors when deciding.

During the survey, respondents had to decide several times whether or not to voluntarily pay for the selected public goods, and at the same time we asked them why they decided to do so.

At the beginning of the second part of the survey we introduced the possibilities of voluntary payment for public goods. We asked the respondents what type of project they would be willing to support published on www.dobrakrajina.sk (Table 2).

Table 11: Interest of respondents to support the project from the selected area published on www.dobrakrajina.sk

Project	% of respondents who supported a selected project
Child health care	14.92
Adult health care	10.50
Education	18.78
Tackling Corruption	9.39
Tackling poverty	11.05
Improving community life (homeless people, children from children's homes, people with disabilities, flora renewal, monuments, etc.)	11.05
I do not want to pay for any of the projects	23.20
Others	1.10

Source: Authors own, 2017

Subsequently, we introduced to all respondents a fictitious educational project "Fighting for the future of our children" aimed at improving the quality of education in society in order to propose state-tested practices for the change of education in Slovakia. The project set itself the goal of collecting € 4,000 in the form of private payment from individuals, with a further € 4,000 funded by the foundation from its own resources. Possible ways of contributing voluntarily to the educational project, together with the amount that individual mechanisms would be able to collect, is captured in Table 3.

Table 12: Possible ways of voluntarily payment for the educational project "Fighting for the future of our children"

Mechanisms	% of respondents who selected the mechanism	Total collected amount in €	Average payment in €	Auction payment in €
1st method	32.60	1,294	21.93	-
2nd method	11.60	556	26.43	-
3rd method	5.52	278	24.70	-
4th method	6.08	258	13.55	109
5th method	4.97	178	12.33	67
6th method	5.52	379	13.70	242
7th method	33.70	-	-	-

Source: Authors own, 2017

The highest voluntary payment were for the first three mechanisms, the classical voluntary contribution mechanism (1st method), the charity lottery with a fixed amount of remuneration (wins the highest contribution – 2nd method), and a charity lottery with a fixed amount of remuneration (wins the requested contribution – 3rd method). We confirm the moderate to weak dependence between willingness of individuals to voluntarily pay and the amount of the payment, the amount of payment was higher for these methods than for other methods (p-values 0.000, 0.000, 0.009, rs = 0.404, 0.308, 0.193).

We also asked the all respondents whether their decision to voluntary pay or not would change if the instructions were: "If you fail to reach a threshold of € 4,000, we will return your contributions to you". The original decision would only be changed by 24.58% of respondents, of which eight decided not to support the project. This change in instruction, "If you fail to reach a threshold of € 4,000, your contributions will be returned to you", it would have a moderate impact on the willingness of individuals to voluntarily pay for the educational project (p-value 0.003, Cv = 0.335).

In our survey, respondents only pay hypothetical money, so it is questionable whether their payments will be "generous" than if they are working with real money.

By using Friedman and Wilcoxon's nonparametric test, we found that the main reason why individuals decided to pay for the educational project was a sense of satisfaction in supporting a good thing (p-value 0, 644; 0.022), desire to help those who aren't able to help themselves (p-value 0.378, 0.174) or the state doesn't solve the problem (p-value 0.522, 0.546). The reason why individuals wouldn't support the project is that they do not see why they should do the "work" of the state (p-value 0,683, 0,414), they are not interested in such projects (p-value 0,178) or have mistrust on such projects (p- 0.088, 1.000).

Through the survey, we tried to identify the factors that could affect individuals and their decision whether to pay or not for the fictional educational project. We identified the risk aversion. We confirmed the moderate dependence between willingness to voluntary pay and the possibility of winning something, if there is a chance to win advertising, sponsorship items, individuals will be willing to pay for the project (p-value 0.012, $C_V = 0.341$), and warm-glow effect, in the form of a good feeling of satisfaction in promoting good things had a moderate influence on willingness to voluntarily pay for the project (p-value 0.007; 0.000; $C_V = 0.341$). The last of the possible factors we were following was the identification with the group. If the project is presented as a solution and improvement of the current situation in the society (in Slovakia), the individuals will be willing to voluntary pay for the project (p-values 0.000, 0.000).

Conclusions

The aim of the paper was to find out if different instructions lead to a different rate of voluntary payment for public goods. We assumed that individuals are particularly affected by internal factors when deciding. The rate of voluntary payment depended on the perception of risk from the point of view of the consumer, warm-glow effect and the social position of the individual. The subject of the survey was selected instruments (threshold mechanism, lotteries, auctions) that increase the rate of voluntary contribution to public goods. We chose education as a public good on which we conducted an experimental survey.

We found that different alternative mechanisms achieve a different rate of voluntary contribution (p-value 0.000, $C_V = 0.525$). The highest average contribution would be obtained by using a charity lottery with a fixed amount of remuneration (wins the highest contribution), where the contribution would be an average of € 26.43. We identified several factors that may have influence on willingness of individuals to voluntary pay for public goods, namely perception of risk from the point of view of the individual (p-value 0.012, $C_V = 0.341$), a feeling of satisfaction from good affiliation (p 0.007, 0.000, $C_V = 0.341$) and identification with the group (p-values of 0.000, 0.000).

The results of our research correspond to the results of studies conducted up to now (willingness to pay for education (Berlinski, Busso, 2016), enforcing individuals (Hardin, 1968; Masclet et al., 2003), warm-glow effect (Andreoni, 1995; Hladká et al., 2015) and highlighting of positive effects (Alpízar, Gsottbauer, 2015; Berlinski, Busso, 2016; Gaechter, Hermann, 2008).

The advantage of experiments with public goods and the voluntary contribution mechanism (VCM - voluntary contributory mechanism) is the direct link of the results of these experiments to the concrete practical application. The experimental fundraising techniques (charity lottery, auction, crowdfunding, threshold) that are mainly used in the USA can bring basic verification of the functioning of the investigated techniques, despite the limitations of economic experiments. If some fundraising mechanism achieves higher efficiency in lab conditions than others, there is a realistic chance that it will be in reality. If there is a possibility to bring a laboratory experiment in the form of a field experiment into reality, their validity and their practical applicability are very pronounced (Špalek, 2011).

Even though these factors (warm-glow effect, perception of risk from the point of view of the individual and identification with the group) are a powerful tool that states, professionals and communities can use, there is uncertainty about their duration, about their action, along with other factors, as these factors act under certain circumstances, furthermore the effect of factors on one population group will be the same as that of the other group (Dolan et al., 2009). According to Dolan et al. (**Chyba! Nenalezen zdroj odkazů.Chyba! Nenalezen zdroj odkazů.**2009), states, professionals and communities can use the exploration of factors influencing individuals behaviour as potentially powerful tools to address social issues (obesity, crime, environmental sustainability, etc.).

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Negative income tax and the debate about its justification

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Abstract. Negative income tax is a proposed tax policy reform. However, the concept extends beyond the field of taxation; it is conceived as welfare or poverty mitigating policy. This paper examines the negative income tax as a special case of a universal basic income. It reviews the different approaches to justify universal income guarantee starting from the early proposals of the late 18th Century through the 1960s and 1970s debate in the United States up to the contemporary debates. The paper shows that the concept can be justified from very diverse philosophical and ideological perspectives that would otherwise seem irreconcilable. In the final part, it reviews the current research issues in the field and provides a prediction of the future policy debates.

Keywords: negative income tax, universal basic income, justification

JEL Classification: H24, H53, I38

1 Introduction

The debate about the tax system reform is often limited to a discussion of an adjustment of selected parameters of the individual taxes. The same is true for the debates concerning the reform of the welfare system. Proposals for radical changes are rare and seldom has the debate included both taxation and welfare. The negative income tax proposals are among the exceptions. A proposal to introduce a negative income tax is repeatedly appearing in the public debate. The negative income tax received a lot of attention in 1960s and 1970s and the concept is currently coming back within the broader discussion of the universal basic income, a concept that has its own interesting history. Thus, this paper examines the negative income tax within this broader perspective, focusing on the issue of justification of such proposals.

The negative income tax can be understood as form of the universal basic income; that is, a welfare or social security program in which all citizens or residents of a country receive regular payments from the public budget. Over the recent decades, the concept has appeared under different names, such as unconditional basic income, basic income guarantee, demogrant, and citizen's income or dividend. The debate about the universal basic income has recently accelerated in Europe with the 2013 petition to the EU Commission, 2016 Swiss referendum and basic income experiments starting in the Netherlands and Finland. In the Czech Republic, the debate has been rather limited so far (Van Parijs, Hrubec, Brabec et al. 2007 provide a record of the debate among Czech philosophers and social scientists).

The universal basic income should not be confused with a minimum guaranteed income. The latter is a common welfare policy in developed countries, including the Czech Republic, and represents a threshold income for state intervention. While both concepts aim at eliminating extreme poverty and providing a social safety net, the minimum guaranteed income involves means test and often requires availability for the labor market or community service. The basic income is typically unconditional. In the same way, the negative income tax typically differs from similar proposals where a tax credit is conditional on other sources of income (such as the earned income credit in the United States).

The debate about the negative income tax and the universal basic income mostly lacks empirical content. Most works take a position, either supportive or critical (see Widerquist 2001a and 2001b for a review of older literature, or Widerquist et al. 2013), purely positive approach is rare (Atkinson 1995 presents an exception). Authors often avoid specification of parameters of the universal basic income; numbers typically appear only as an illustration (e.g., Friedman 1962; Raventós 2007; Munger 2015), or the author argues for a specific policy proposal (Murray 2006; Sulík 2006). Part of the debate also focuses on political feasibility (Groot & van der Veen 2000; Przeworski 1986). Experiments could provide a valuable evidence on microeconomics of the concept, particularly they should show how people's willingness to engage in productive activities change (Robins 1985). In some countries, research has been done with regard to the sources of financing and the relation to existing welfare and social security programs. There are even particular policy proposals for different countries. However, most of the debate is rather theoretical and it is so for a good reason; introduction of a welfare and redistributive policy such as the negative income tax is ultimately a political matter.

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This paper aims to summarize the debate about the justification of the negative income tax and the universal basic income schemes in general. First, the paper reviews the early proposals of the universal basic income that have provided inspiration for the later thoughts in this area. Second, the paper focuses on Milton Friedman's and James Tobin's work on the negative income tax which have revived the debate after the World War II. Third, the paper briefly outlines the current debate on the negative income tax and the universal basic income and its justification from different philosophical perspectives. The conclusion provides an outlook for further development in the debate.

Early proposals of universal basic income

The origins of basic income guarantee can be traced back into the 18th Century. Thomas Paine in his 1795 book *Agrarian Justice* proposed to tax land owners and inheritance and to use the tax income to fund annual pension payments for people above the age of 50 and a one-time grant to every man and woman at the age of twenty-one. In the 19th Century similar idea was advocated by Henry George, utopian socialists following Charles Fourier, and others.

Thomas Paine (1795) proposed a universal basic income funded by taxation of land rent upon inheritance, a proposal later dubbed a "citizen's dividend". Specifically, Paine proposed the following: "To create a national fund, out of which there shall be paid to every person, when arrived at the age of twenty-one years, the sum of fifteen pounds sterling, as a compensation in part, for the loss of his or her natural inheritance, by the introduction of the system of landed property. And also, the sum of ten pounds per annum, during life, to every person now living, of the age of fifty years, and to all others as they shall arrive at that age." (Paine 1795, not paginated)

Paine's proposal differs from the modern negative income tax or universal basic income proposals in the frequency of payments. There is a single guaranteed payment at the age of twenty-one years. The rest of payments is contingent on survival to the age of fifty years; thus, it is rather a universal pension. Paine also specifies the source of financing, a tax on inheritance, and gives a philosophical reasoning for both for the source and the payments based on the natural law. In certain ways, Paine's work is similar to some modern works, although the philosophical background is very different. Paine also offered specific calculations to illustrate public finance feasibility of the proposal and practical steps for implementation of his proposal.

The focus of Henry George was not primarily the universal basic income but a better way of taxation. He proposed (in George & Field 1885) to replace all taxes by a single tax on the value of undeveloped land. Theoretically, George's proposal was to extract the land rent for the state, while any revenue from improvements on land would be left for the owner. Thus, incentives for economic activity would remain intact; or, in modern terminology, the proposed tax would not cause any distortion in economic activity.

George proposed to use the revenue of his land tax to finance the ordinary expenses of the government. In addition, he proposed to use it for a "payment of a fixed sum to every citizen when he came to a certain age" (p. 6). This is similar to Paine's proposal of a universal pension. Later in the paper, which is written as a dialogue between George and Field, he suggests – in reaction to perils of increasing government revenues and powers – that "if it were to appear that further extension of the functions of government would involve demoralization, then the surplus revenue might be divided per capita." (p. 10) George's justification for land tax and its distribution is similar to Paine's, i.e., it is based on the natural law and a universal claim to natural resources.

The last of the 19th Century justifications come from the thought of Charles Fourier. According to J. S. Mill, Fourierism is "the most skilfully combined… of all the forms of Socialism." The same author gives the basic details on Fourierist ideas of income distribution: "This system does not contemplate the abolition of private property, nor even of inheritance; on the contrary, it avowedly takes into consideration, as an element in the distribution of the produce, capital as well as labour. […] In the distribution, a certain minimum is first assigned for the subsistence of every member of the community, whether capable or not of labour. The remainder of the produce is shared in certain proportions, to be determined beforehand, among the three elements, Labour, Capital, and Talent." (Mill 1909 [1848], book II, chapter 1, §4)

The basic idea behind the proposal of Fourierists is that the basic income shall guarantee liberty, while the distribution of the remaining product shall provide sufficient incentives for labor. Moreover, they assumed that free men would be more willing to labor for pleasure (additional incentives) than for mere subsistence. The argument for the basic income as a necessary condition of liberty foreshadows the modern left-wing arguments; however, the impact on labor incentives is probably very different from the Fourierist predictions.

Friedman's and Tobin's proposals of negative income tax

In the post-World War II period a similar idea reemerged in the United States under the name of the negative income tax. It was independently developed and advocated, among others, by two Nobel Prize laureates, Milton Friedman (1962) and James Tobin (1966, and Tobin et al. 1967). The interest in this concept stimulated some theoretical work on the possible effect of the negative income tax and led to a series of experiments with rather disappointing results. Influenced by Friedman's work, President Richard Nixon proposed the Family Assistance Program which was not adopted in the Congress. George McGovern, presidential candidate of the Democratic Party, proposed a "demogrant" program that was also inspired by the negative income tax.

Milton Friedman published the proposal of negative income tax in his 1962 book *Capitalism and freedom*. Friedman covers this theme in chapter XII which deals with the alleviation of poverty. He started with two premises: First, the program should be aimed at helping poor, not some particular groups defined by occupation, age, etc. Second, the program should not interfere with the market mechanism. A negative income tax is an arrangement fulfilling both of these criteria.

Friedman's proposal was following. If an individual earned (after deductions) more than certain threshold, he would pay tax on the income above the threshold. If he earned less than the threshold, he would receive a subsidy at a given rate. The rate of subsidy could be flat or gradual in the same way as for the tax. As a result, there would be a certain minimum income that everybody would receive even if he would not have any income. This scheme could even incorporate specific needs of certain group as the income after deductions could be negative and thus the subsidy even higher. The precise floor would be set according to affordability to the society.

The chief advantage, according to Friedman, is that the scheme is directed specifically to the problem of poverty. It is also much less complicated that contemporary (and present day) welfare schemes. Friedman admitted that the negative income tax scheme would reduce incentives but less than the extant welfare system. Also the negative income tax could have been incorporated into the extant tax system, thus relatively inexpensive to introduce in terms of administrative costs. Friedman also estimated that his proposal would be less costly than the exiting welfare system.

James Tobin advocated the negative income tax independently of Milton Friedman. Tobin et al. (1967) expressed that they "strongly support some sort of negative income tax plan" (p. 3), but also point to some of the difficulties in setting up the negative income tax scheme. Naturally, the basic characteristics include the definition of income to be taxed and the extent of support – the negative income tax could be aimed to subsidize low income or to guarantee income above poverty line. Another difficulty arises from the definition of the family unit. Finally, there is the issue of integration with other assistance programs and social security, and the choice of the method of payment. These issues have more prominent treatment in the paper than the public finance aspect of the scheme. Tobin's work touched on all the important characteristics that have appeared in the following debate.

The interest in this concept stimulated some theoretical work on the possible effect of the negative income tax and led to a series of four major government-sponsored experiments between 1968 and 1982. The experiments took place in New Jersey (and Pennsylvania), rural Iowa, Indiana, and Seattle and Denver, typically for three years and included hundreds of households. The chief concern was the impact of negative income tax on work incentives. Robins (1985) reviewed the results of these experiments and observed that the results are remarkably consistent despite the different methodologies and experimental setting. On average, the work effort was reduced by two weeks of full employment per year for husbands, three weeks per year for wives and four weeks per year for youth. In all experiments, the negative income tax program was viewed as fairly generous.

Theoretical proposals of Friedman and Tobin translated into policy proposals. President Richard Nixon proposed a Family Assistance Program in 1969, inspired by Friedman's work. The program would guarantee that no family would have to live under the poverty line. The government would pay up to 1,600 dollars subsidy and no tax would be paid for income below 3,920 dollars. Provisionally, individual states would also pay the difference to those who would receive lower income than under the extant welfare system. To meet the criticism from the right, the program also included work requirement, although less stringent than the extant programs. The proposal failed to pass Congress in 1970 and again in 1972. The proposal was criticized both by conservatives as too generous (it would increase the total welfare spending of the federal government) and the liberals (for the work requirement).

In the 1972 election campaign, Democratic presidential candidate George McGovern proposed a "demogrant" program. It would introduce a 1000 dollar tax credit and replace a personal income tax exemption. The program would also replace some of the existing welfare programs and reduce bureaucracy. However, McGovern was defeated by Nixon in the election and the program was never implemented in the United States.

The 1970s political debate over the negative income tax provides a prime example of the ideological and practical problems connected to the concept. In the end, the debate led to introduction of earned income credit in the United States in 1975. The scheme has some of the positive properties of the negative income tax while maintaining incentives for income producing activities. However, with other welfare programs still in place, some of the intended benefits of the system could not materialize; welfare bureaucracy could not be reduced and the existence of means-tested welfare benefits may lead to significant (even over 100 per cent) marginal tax rate.

Current proponents of the basic income and the negative income tax

The debate lost some of its momentum in the United States after the 1970s; although, it has never died out, and occasionally it has even attracted attention of Nobelists such as Robert M. Solow, Herbert A. Simon and Edmund S. Phelps (see Van Parijs, Cohen, & Rogers 2001). On the other hand, the debate accelerated in Europe in the 1980s. In 1986, the Basic Income European Network (BIEN, renamed to Basic Income Earth Network in 2004) was founded to facilitate the exchange between individuals and groups interested in the basic income. In the United States, the debate is advanced by the U.S. Basic Income Guarantee Network. Since 2006, De Gruyter publishing house has published the Basic Income Studies, a peer-reviewed journal devoted to basic income and related issues. However, the concept is also discussed elsewhere; the Independent Review, for instance, devoted a special issue to the universal basic income in 2015 (volume 9, issue 4). Palgrave Macmillan publishes a book series entitled Exploring the Basic Income Guarantee.

The debate mostly focuses on philosophical aspects of the issue rather than economics. There is much effort to provide justification for the basic income within various political philosophies. An interesting fact about the negative income tax and especially the universal basic income is that its proponents come from very diverse ideological backgrounds and the same is true for the critics of those concepts. Van Parijs (1995 and elsewhere) argues from the perspective of "real" (i.e., egalitarian) libertarianism, others try to reconcile it with classical liberalism or libertarianism (Zwolinski 2011 and 2015; Powell 2011), John Locke's political thought (Moseley 2011; Zwolinski 2015), Austrian school of economics (Nell 2013) or socialism, feminism and ecologism (Fitzpatrick 1999).

1.1 Left-wing proponents

Left-wing authors typically write about the universal basic income rather than the negative income tax; perhaps to avoid association with authors like Milton Friedman. Perhaps the most important figure in the debate on the universal basic income is Philippe Van Parijs (see, e.g., Van Parijs 1995; 1992; Van Parijs et al. 2001; 2006). Van Parijs builds on two elements – criticism of inequalities in modern market economies and his notion of freedom. He refuses the socialist concept of collectivism as misguided and argues that participation in collective choice is not equivalent to freedom. He also criticizes advocates of the market system who claim that freedom is only reduced when property rights are violated. According to Van Parijs, a free society must guarantee the structure of property rights, ownership of one-self and maximize opportunities for every individual, i.e., maximize the "real freedom". From a social perspective, it is not the total or average freedom to be maximized; rather, the freedom/opportunities to those who have the least of them (cf. the Rawlsian social welfare function).

Van Parijs sees the universal basic income as a policy that would help to achieve the "real freedom" as described above. Note that the concept of universal basic income is very broad to Van Parijs. The adjective "universal" means that it is paid to every citizen regardless of his income or wealth, and the adjective "basic" means that it is unconditional; however, it is not necessary that the income guarantees subsistence or certain living standard. Generally, Van Parijs does not argue for a particular amount to be paid; rather, he would like the income to be as high as possible while being sustainable. Regarding the negative income tax, Van Parijs argues that both system could achieve the same results and the tax may even be less costly. On the other hand, it would require advanced payments of the subsidies and individualization of taxation (the negative income tax has typically been proposed with regard to household income taxation).

Daniel Raventós (2007) argues for the universal basic income from a republican perspective (as represented by Aristotle, Cicero and Robespierre). His argument is similar to that of Van Parijs – certain level of income is necessary maintain freedom. Moreover, it is necessary to maintain political equality among the members of a society. Inequality of material resources leads to inequality of political power, and thus, it destroys democracy. The universal basic income would empower the poor and alter the economic policy to be more favorable to them. Raventós also argues that the market system makes sharp distinction between wage labor and other kinds of economic activity, such as household labor and voluntary activities. Only the first one is rewarded in the market, while the latter are not, however valuable they might be to the society. The universal basic income would enable people to choose which kind of activity they would like to pursue.

Raventós also provides a concrete proposal for a universal basic income in the context of Spain. The amount paid would be 451 euros per month, i.e., equal to the minimum wage in Spain at the time when he was writing his

book. The scheme would be financed out of savings after terminating current welfare programs as well as an increase in tax rate and abolition of all tax exemptions. Raventós estimated the income tax rate necessary to finance the universal basic income of 451 euros for every Spanish adult (and one half of this amount to minors) to 49.9 per cent. He also estimates that over 63 per cent of the population would benefit from the implementation of the proposal. He also considers less ambitious versions with lower amounts paid out.

To sum up the left-wing position, the main concern of the left-wing authors is inequality. In the first place, it is the inequality of income. Consequently, it leads to other forms of inequality, such as the inequality of opportunities or power. Authors in this group pay attention not only to the distribution of income or wealth but also to gender issues and other perspectives, such as environment and politics. They see the universal basic income as a tool to achieve greater equality of income and, as a result, mitigation of the negative consequences of inequalities.

1.2 Right-wing proponents

The right-wing supporters of the universal basic income are diverse and there are many right-wing opponents as well. Zwolinski (2011) reviews the diferent kinds of libertarianism and concludes that some of them – such as minimal-state libertarians (like Robert Nozick) and anarcho-capitalists (like Murray Rothbard) will almost certainly reject such policy. However, classical-liberal libertarians may be willing to accept the universal basic income on pragmatic grounds. Friedman's case would be an example of such approach.

Zwolinski (2015) builds a classical-liberal case for the universal basic income based on John Locke's philosophy. Locke laid down an argument for private property with regard to natural resources; however, he also stated its limits. The so-called Lockean proviso "holds that in order to take an item out of the common stock of nature and make it one's own individual property, one must ensure that one leaves 'enough, and as good, in common for others'" (Zwolinski 2015, p. 519, inner quote of Locke). From Lockean proviso, Zwolinski argues for a social safety net and ultimately for the basic income. Similar argument is used by Moseley (2011).

Munger's (2015) argument resembles the Friedman's argument of cost savings. The subtitle of his paper – "we could do worse, and already have" – suggest the comparison of the basic income proposal with the existing welfare system. Munger writes that "given that the United States has already decided to create a social safety net, so the economic analyst's role is simply to make recommendations about how to accomplish that goal with the largest benefits and the fewest distortions […] the delivery of benefits is maximal, and the distortions caused by the [basic income] program are minimal." (p. 504). Munger also argues that the negative income tax is the best way to implement the basic income guarantee.

As a particular examples coming from the right-wing authors, we could cite Charles Murray (2006) and Richard Sulík (2006). Murray (2006) presents a concrete proposal for a universal basic income in the context of the United States. He builds of Friedman's ideas but attempts to fix the shortcomings he sees in his scheme. In particular, he proposes a universal income of 10,000 USD decreasing from certain level of earned income (i.e., as if it was subject to an income tax). Unlike in the earlier US proposals that concerned family income, Murray's scheme is strictly individual, thus avoiding some of the issues raised earlier. Regarding the justification, it is also similar to Friedman's and Munger's. Murray starts with the acknowledging that the government spends a lot of money to reduce poverty; he proposes how to organize the welfare spending in a better way. The plan would be financed out of savings after terminating the current welfare programs. The chief advantage according to Murray is, that people would receive money which they could spend as they see the best, i.e., in a way that would maximize their welfare.

Sulík (2006) drafted a concrete proposal for Slovakia. He focused on the social security tax – which is the more significant part of personal income taxation – rather than the income tax. Thus, his proposal integrates taxation, social security and even health insurance. Sulík argues that his proposal guarantees justice (equity) in taxation, solidarity and neutrality with regard to different sources of income, while increasing freedom by reducing of the total tax burden. Sulík also proposes to offset the decrease in fiscal revenues with the savings after terminating the extant welfare programs. Unlike the standard basic income and negative income tax schemes, Sulík's proposal includes diversified subsidies reflecting certain situations in one's life (such as maternity) – hence his claim of solidarity component in the proposed scheme. Although the particulars differ, the general reasoning is in line with other right wing schemes.

To sum up the right-wing argument, it is mostly aimed at efficiency of the welfare system. Although many libertarians oppose the weflare state, in a more nuanced debate they might support the universal basic income, particularly in the negative income tax version, as an alternative to the existing welfare policies. This is an extension of earlier argument of Milton Friedman. However, other arguments could be added, rooted deeper in the polical philosophy, such as the extension of Lockean proviso or different notions of solidarity.

Conclusions

The previous text summarizes one part of the debate; that is, the debate about justification of the negative income tax or the universal basic income schemes. There are other elements of the debate that have started to receive more attention recently. Since the idea is potentially acceptable to people of various ideological backgrounds, the focus is being shifted towards practicality of different proposals. Similar schemes are appearing in the world in a limited scale, mostly within experimental settings. The key question is the effect of unearned income on labor incentives. Public finance feasibility is also being discussed. Finally, the interest in basic income schemes is increasing with the advances in automation.

There is currently only one state with a universal income scheme, Alaska; however, there is a number of experiments that could provide valuable information. The Permanent Fund of Alaska funded by oil revenues pays the Permanent Fund Dividend to Alaska residents who have lived within the state for a year and intend to remain Alaska residents; the amount of payment depends on the Fund performance and the highest dividend paid was 2072 USD in 2015. In the United States, beside the experiments of 1960s and 1970s, the effect of native casinos profit sharing is studied. Brazilian welfare program Bolsa Família is sometimes cited, although it does not fully fit the definition (the income is conditional).

There are different experimental programs in Africa, notably in Namibia and Uganda. In Europe, experiments have recently begun in the Netherlands and Finland. Experiments are crucial to examine the effect of the unconditional income on the labor supply or, more generally, on the productive effort. A negative impact on labor supply has already been established in the past experiments in the United States. On the other hand, experiments in African countries indicate higher entrepreneurial activity of the income recipients. Results of the experiments must be read with caution, especially if they are used to argue about the general applicability of the universal basic income. The experimental design typically does not reflect the society at large; e.g., the selection of participants is not random. Hawthorne effect is often cited as a source of potential bias and the limited time-scale of the experiments could also affect participants' behavior.

Public finance feasibility is another issue that is often debated. However, the debate is regularly misguided. It makes no sense to talk about feasibility of the negative income tax or the universal basic income as such. There are always schemes that are feasible as well as those unfeasible. The debate must always be on concrete proposals specifying the details on the extent subsidies, the sources of financing and the relation to the current welfare system. Clearly, a scheme that is feasible from the public finance perspective may be inadequate from the household income maintenance (or equity) perspective while another scheme that would have acceptable welfare impact may be fiscally infeasible. Thus, the debate shall always be complex, including both macroeconomic (public finance) and microeconomic component.

The debate about the negative income tax or, more broadly, the universal basic income will certainly continue in the future. It is being revived recently with the discussion about automation. Replacement of labor with machinery may result in dramatic shifts in income distribution. Even if overall productivity increases, this does not necessarily solve the problem of income sufficiency to particular individuals and households. In Europe, this is combined with adverse demographic trends. Thus, major welfare policy reforms may be expected in the future and the schemes discussed in this paper will surely be reconsidered.

Finally, one crucial question remains: If the universal basic income receives support from both right and left wing of the political (ideological) spectrum, why the scheme is not widely implemented? It must be noted that the proposals for the negative income tax and the universal basic income also receive criticism from both wings. Yet, we may expect interesting evolution in the debate and perhaps even policy reforms in the future.

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Employment of shareholders-individuals in tax planning through Panama Papers destinations: A case study for the Czech Republic

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Abstract. Panama Papers have revealed a number of specific stories where financial secrecy, anonymous ownership or shell companies play an important role in the world economy and while the news stories contributed to better understanding of this until now mostly hidden underworld, a systematic estimate of its scale and importance has proved more elusive. The paper researched the importance of the Panama papers tax havens in profit-shifting from the Czech Republic. We found that MNEs may shift the profits to these tax havens. Generally, the profit shifting within the structure of the entities with the link to the tax haven is done through the shift of operating revenues or the costs. The profit shifting through debt channel was not identified in case of the Czech Republic.

Keywords: Panama Papers, profit shifting, shareholders-individuals

JEL Classification: H25, H26

1 Introduction

In the context of globalization and increased mobility of capital across the world, the avoidance of corporate income tax becomes a difficult issue to tackle. One of the most common tax avoidance strategy used by the Multinational Companies (hereinafter as MNC's) is the shifting of profits through various methods from high-tax jurisdiction to low or no-tax country. However, the Panama Papers[6] have revealed that tax avoidance or tax evasion is also performed by individuals who are shareholders of off- or onshore companies.

Panama Papers have revealed a number of specific stories where financial secrecy, anonymous ownership or shell companies play an important role in the world economy. While the news stories contributed to better understanding of this until now mostly hidden underworld, a systematic estimate of its scale and importance has proved more elusive. In general, the basic of issue is the moving of money between different jurisdictions in order to minimize or not pay taxes, or launder money, both offshore and onshore. Based on the report of European Parliament (2017), the Panama Papers include in total 14 000 intermediaries, of which about 2 700, or 19 %, are located in the EU. Furthermore, those intermediaries are responsible for the creation of approximately 20 %, or 39 700, of all the entities established by Mossack Fonseca. Moreover, as states Moscovici an annual loss is estimated on of some €1 trillion in public finances.

It was clear that better regulation, monitoring of existing rules to counter tax avoidance- or tax evasion-practices are urgently needed. Many EU steps have been implemented after the Panama Papers scandal in order to prevent the kind of tax avoidance or tax evasion, such as Money Laundering, Tax Avoidance & Tax Evasion's Recommendations of EP´s Committee, interconnected and publicly accessible beneficial ownership (BO) registers, justification of an offshore structure by tax authorities, a list of non-cooperative jurisdictions in Europe etc.

The aim of the paper is to research the importance of the Panama Papers tax havens in profit-shifting from the Czech Republic, specifically to estimate the employment of shareholders-individuals in tax planning structures of the entities with the link to the tax havens mentioned in Panama Papers.

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[6] The Panama Papers are 11.5 million leaked documents (in 2015 by an anonymous source) dating back nearly 40 years containing more than 214 000 offshore entities connected to people in more than 200 countries and territories, which were created by, and taken from, Panamanian law firm and corporate service provider Mossack Fonseca. Company owners are usually billionaires, sports stars, drug smugglers and fraudsters.

Theoretical background

In this paper we build on the empirical strategy developed by Fuest and Riedel (2012), who carried out their analysis using Orbis data for developing countries, as did in a similar way Janský and Prats (2015) for India. Both studies present empirical evidence that supports the view that profit shifting out of developing countries and into tax havens takes place. The same data, Orbis, has been used intensively by other profit shifting studies as recently reviewed by Dharmapala (2014).

Profit shifting in the European countries has been naturally studied as an integral part of Europe-wide, such as Huizinga and Laeven (2008), Dharmapala and Riedel (2013) and EPRS (2015), or worldwide studies, such as Johansson et al. (2017) and Janský and Palanský (2017). The studies of profit shifting in the Czech Republic, as recently reviewed by Janský (2016), have recently applied a similar approach to Fuest & Riedel (2012) and found an important role of debt shifting (Janský and Kokeš 2015, 2016).

In addition to these studies, an increasing number of academic papers has used the Panama Papers or a similar leaked documents. Alstadsaeter, Johannesen, and Zucman (2017) use stratified random audits and leaked data from offshore financial institutions, including the Panama Papers, to study tax evasion by wealthy individuals. Caruana-Galizia & Caruana-Galizia (2016) used a leaked data set to show that the growth of EU-owned entities declined after a regulation that obliges cooperating jurisdictions to withhold tax or report on interest income earned by entities whose beneficial owner is an EU resident.

Data and Methodology

In this paper, the methodological approach is based on micro indicators and micro data as state Fuest and Riedel (2012). We employ the data on companies from Amadeus/Orbis database on companies from the Czech Republic. The search strategy includes all the active entities from the Czech Republic having the information on tax liability in their balance sheet. The dataset of 76,503 entities was gained based on this search strategy, as presented in Table 1.

Table 1: Datasets - Czech Republic

No. of entities	**Entities without link**	**Entities with the link**				**Panama Papers**
	No. of shareholders - individuals	No. of subsidiaries in TH	No. of entities in TH with known shareholders*	No. of subsidiaries in Europe**	No. of shareholders - individuals***	No. of mentioned individuals
76,503	64,436	114	115	782	**7**	**269**

* number of either parents or subsidiaries in tax havens with identified shareholder
**number of subsidiaries in Europe of parent companies in tax havens
***number of shareholders identified in the dataset of entities with the link to tax havens
TH represents tax havens

(Source: own calculation, Orbis Database).

As can be seen from Table 1, the dataset was further divided into two sub-datasets. The first sub-dataset covers only the entities without the link to six tax havens destinations most frequently mentioned in Panama Papers – i.e. British Virgin Islands, Panama, Bahamas, Seychelles, Samoa and British Anguilla. Second sub-dataset comprises the entities with the link to the tax havens destinations mentioned in the Panama Papers. In the dataset without any link to the tax havens, 64,436 individual shareholders were identified, while in the dataset with the link to the tax havens only 7 individuals were identified.

It is necessary to mention that currently, there is no database exclusively aimed on the information on shareholders-individuals in the European Union. Therefore, the research needed to be done indirectly through the Orbis database aimed at corporate entities that are owned by individual. Even though the database enables to certain extent to search for the shareholders-individuals, very often it is incomplete. As can be seen from the Table 1, only 2.6% from the total number of Czech individuals mentioned in Panama Papers were identified as shareholders-individuals in the Orbis database. Therefore, the results of the paper should be interpreted with this limitation.

Then we performed the analysis of explanatory power of the selected indicators (see below) from the balance sheets and profit and losses statement with respect to their contribution to the profit creation. Based on the results

of analyses the indicators with the most significant explanatory power were selected for measuring the profit shifting in both sub-dataset of entities (i.e. in the dataset of entities without the link to tax havens and in the dataset of entities with the link to tax haven), namely I_B, I_C, I_E, I_F, I_G, I_H and I_I. Further, based on the current research (Janský and Kokeš, 2015 and 2016) the indicators I_A and I_D were added[7]. Through the selected indicators we analysed profitability per unit of assets, tax payable per unit of assets or per unit of profit before tax, operating revenue per unit of profit before tax, operating costs per unit of operating revenue and indebtedness per unit of assets of per unit of shareholders' funds. The explanation of each indicator is mentioned below:

$$I_A = \frac{T}{A} \tag{1}$$

where I_A represents indicators of profit shifting, T represents tax and A stands for the assets.

$$I_B = \frac{T}{P} \tag{2}$$

where I_B represents indicators of profit shifting variant B, T represents tax and P the profit.

$$I_C = \frac{P}{A} \tag{3}$$

where I_C represents indicator of profit shifting variant C, P represents the profit and A stands for the assets.

$$I_D = \frac{OpC}{OpR} \tag{4}$$

where I_D represents indicator of profit shifting variant D, OpC represents the operating costs and OpR stands for the operating revenues.

$$I_E = \frac{OpR}{P} \tag{5}$$

where I_E represents indicator of profit shifting variant E, OpR represents operating revenues and P stands for the profit.

$$I_F = \frac{LtD}{A} \tag{6}$$

where I_F represents indicator of profit shifting variant F, LtD represents long-term debt and A stands for the assets.

$$I_G = \frac{L}{A} \tag{7}$$

where I_G represents indicator of profit shifting variant G, L represents loans and A stands for the assets.

$$I_H = \frac{LtD}{SF} \tag{8}$$

where I_H represents indicator of profit shifting variant H, LtD represents long-term debt and SF represents shareholders' funds.

$$I_I = \frac{L}{SF} \tag{9}$$

where I_I represents indicator of profit shifting variant I, L represents loans and SF represents shareholders' funds.

Furthermore, both datasets were tested by Shapiro-Wilk W test for normal data, which confirmed the nature of both datasets in the form of un-normal data. Therefore, nonparametric analysis in the form of Wilcoxon rank-sum (Mann-Whitney) test was performed with the aim to identify whether the data differ when stratified by the tax

[7] For example, we use indicators I_F to I_G to indicate debt shifting, which might occur when a Czech subsidiary borrows from a tax haven subsidiary of the same MNE in order to reduce its profits and tax base in the Czech Republic due to interest payments being tax deductible.

haven connection criterion. As show the results presented in Table 2 below, it is evident, that both datasets are different in the respect of median value (for more details see Table 3). With the exception of I_H indicator, where the results indicate that the medians are not statistically different at any level smaller than 38.24%.

Table 2: Summary of statistics – Wilcoxon rank-sum test

	I_A	I_B	I_C	I_D	I_E	I_F	I_G	I_H	I_I
p-value	0.0000	0.0000	0.0001	0.0027	0.0000	0.0164	0.0000	0.3824	0.0000

(Source: own calculation).

As can be seen from the Table 3, dataset without the links to tax haven generates higher profit before tax, operating revenues, total assets and tax in comparison with the dataset with the link to tax haven, which generates remarkably lower profitability (ROA and ROE). Therefore, it can be deduced, that entities owned by individual shareholders having the links to tax havens are channeling profits to those destinations i.e. that those entities can shift profits and decrease their tax liability resulting into the lower profitability in the state of their tax domicile (in the Czech Republic).

Table 3: Selected financial data – median value

Dataset	Operating revenue (EUR)	Total assets (EUR)	Tax (EUR)	PL before tax (EUR)	ROE (%)	ROA (%)
Entities without link to TH	2,929,585	2,640,010	25,790.2	14,0281.7	10.73	3.13
Entities with link to TH	595,741.5	1,067,612	4,149.9	-1,149.9	0.26	-2.22

(Source: own calculation, Orbis Database).

To quantify the impact of the Panama Papers tax havens in profit-shifting from the Czech Republic, both groups of entities (with and without the link to tax havens mentioned in Panama Papers) with known shareholders-individuals were compared. Then, the possible erosion of the tax bases due to the employment of the tax havens in the structures of entities owned by shareholders-individuals was identified for the Czech Republic based on the derived differences between the indicators in both sub-datasets.

Results

The aim of the study was to research the importance of the Panama Papers tax havens in profit-shifting from the Czech Republic, specifically to estimate the employment of shareholders-individuals in tax planning structures of the entities with the link to the tax havens mentioned in Panama Papers. Determination of profit shifting was done through the application of the indicators of profit shifting (indicators IA to II) described above. Namely we analysed profitability per unit of assets, tax payable per unit of assets or per unit of profit before tax, operating revenue per unit of profit before tax, operating costs per unit of operating revenue and indebtedness per unit of assets of per unit of shareholders' funds.

The Czech Republic has very small dataset covering only 7 known shareholders-individuals in connection with tax havens (it represents only 2.6% from the total number of Czech individuals mentioned in Panama Papers). Therefore, the results of the paper should be interpreted with this limitation.

Based on the results mentioned below (Table 4) is visible, the dataset with the link to tax haven generates lower tax payable per unit of assets (in average by 99 %) and per unit of profit before tax (in average by 74 %). In order to generate one unit of profit before taxation it is enough for the entity to generate in average by 47% lower operating revenue in comparison with the dataset without the link to tax haven (see highlighted values in table below). Moreover, the profit shifting through the debt channel was not proved, for the indicators of debt ratios are higher in case of the dataset without link to tax haven (for details see highlighted values in the table below).

Table 4: Indicators of profit shifting – Czech Republic

Indicators	Without the link to tax haven*						With the link to tax haven*					
	mean	1p	25p	50p	75p	99p	mean	1p	25p	50p	75p	99p
T/A	0.002547	0	0	0	0.001117	0.033253	2.03E-05	0	0	0	4.12E-05	8.06E-05
P/A	-0.03024	-0.11673	-0.00075	0.000854	0.010393	0.170782	-8.6E-05	-0.00828	-0.00734	-0.00083	0.00832	0.008451
T/P	0.095535	-0.30009	0	0	0.190087	0.857143	0.024514	-0.01919	0	0	0	0.166282
OpC/OpR	-0.12056	0.129877	0.905118	0.97983	1.026341	9.132273	0.968378	0.675433	0.912384	1.006921	1.05464	1.153967
OpR/P	49.05022	-316.829	-0.9389	5.657721	27.00681	1102.583	26.12723	-54.4775	-18.3015	-1.70693	11.41339	221.5429
LtD/A	0.013387	0	0	0	0	0.271237	0	0	0	0	0	0
L/A	0.021531	0	0	0	0	0.352863	0	0	0	0	0	0
LtD/SF	0.025477	-0.17192	0	0	0	2.286922	0	0	0	0	0	0
L/SF	0.365141	-2.3743	0	0	0	5.596988	0	0	0	0	0	0

Indicators	Tax haven**					
	mean	1p	25p	50p	75p	99p
T/A	0.001896	0	0	0	0	0.040403
P/A	0.00041	-0.12363	-0.00592	-8.1E-05	0.000769	0.210474
T/P	0.043109	-0.06495	0	0	0	0.46417
OpC/OpR	2.176182	-4.76508	0.845621	1.014023	1.492985	26.46463
OpR/P	11.97085	-222.444	-0.99453	0	2.762217	664.8362
LtD/A	0.000109	0	0	0	0	0.001538
L/A	0.020697	0	0	0	0	0.247319
LtD/SF	-0.00197	0	0	0	0	0
L/SF	0.061907	0	0	0	0	0.807921

* Entities with known shareholders-individuals from the jurisdiction of the Czech Republic.
**Subsidiaries – tax residents of the Czech Republic or shareholders of German nationalities in tax haven (mentioned in Panama papers).

(Source: own calculation, Orbis Database).

Discussion and Conclusion

Our estimates proved that shifting of the profit is realized in the Czech Republic. Further, as can be seen from the below stated Table 5, the profit shifting within the structure of the entities owned by shareholders-individuals with the link to tax haven is done through the shift of operating revenues or the costs. However, the profit shifting through debt channel was not identified in case of the Czech Republic contrary to the results of Janský and Kokeš (2015 and 2016).

Table 5: Summary of identified profit shifting channels from the Czech Republic

Indicators	*T/A*	*P/A*	*T/P*	*OpC/OpR*	*OpR/P*	*LtD/A*	*L/A*	*LtD/SF*	*L/SF*
Profit shifting	yes	yes	yes	yes	yes	no	no	no	no

(Source: own calculation, Orbis Database).

The paper researched the importance of the Panama papers tax havens in profit-shifting from the Czech Republic. We found that MNEs may shift the profits to these tax havens. Generally, the profit shifting within the structure of the entities with the link to the tax haven is done through the shift of operating revenues or the costs. Specifically, we determined that entities with the link to tax haven generates lower tax payable per unit of assets (in average by 99 %), lower tax payable per unit of profit before tax (in average by 74 %) and generates in average by 47% lower operating revenue in order to generate one unit of profit before taxation.

The research was done indirectly through Orbis database aimed at corporate entities as currently, there is no database exclusively aimed on the information on shareholders-individuals in the European Union. This limitation of the study create opportunity for future research especially in the light of the establishment of the registries of ultimate beneficial owners in EU Members States based on the EU directive on the prevention of the use of the financial system for the purposes of money laundering or terrorist financing at the end of 2017. Data gained from this registry in the future might be used for the direct research of the involvement of shareholders-individuals in profit-shifting.

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Effect of value added tax rate changes on the price level of foodstuffs

Jan Procházka*

Abstract. The aim of this paper is to determine the effect of value added tax rate changes on the price level of foodstuffs and to analyze the VAT rates of member states of the European Union. Value added tax has a specific effect because the indirect tax is included in the price of goods and services. Foodstuffs are basic goods which are consumed by all consumers, so each VAT rate change related to foodstuffs affects all citizens of each member state. Any VAT rate increase brings a significant impact on the price level of foodstuffs, especially in the month the change is implemented. In general, an increase in the VAT rate has a more significant effect on prices than a decrease. As a result, each increase in the VAT rate can cause effects that can be difficult for a government to correct at a later date through a VAT rate decrease.

Keywords: value added tax, price level, foodstuffs, rate change, European Union

JEL Classification: E31, H20

1 Introduction

Value added tax (VAT) is a "general, broadly based consumption tax applied to the value of goods and services" (European Commission, 2017). From the historical point of view, VAT is a modern indirect tax that was first introduced in France on the 1 January, 1954. Today, value added tax forms an integral part of the tax systems of all member states of the European Union (EU).

VAT is the most important source of tax income, and therefore contributor to state budgets, across all member states. The governments of member states often use rate increases to cover state expenditures. However, every VAT rate change has a knock-on effect on price levels. Prior to each VAT rate change it is necessary to analyze the prices of those commodities which will be influenced by such a change. In general, an increase in the rate of VAT brings with it an increase in prices, although this effect is usually spread out over time. In the case of foodstuffs, price levels tend to rise gradually. For consumers this is reflected in the gradual increase in food prices. In contrast, it is very difficult to ascertain the effects of a decrease in the rate of VAT, which is something that very few member states have done in recent years.

Many member states usually apply a reduced rate of VAT to basic goods and services and a standard rate to all others. Typical basic goods include foodstuffs because all consumers must buy them regardless of their income. The prices of basic goods and services are particularly important to low income households because expenditure on these items takes up a very significant proportion of their income.

The aim of this paper was determined on the basis of the above referenced factors. It is to find out what impact VAT rate changes have on the price level of foodstuffs over time. A partial aim was also set, namely to analyze the VAT rates applied to foodstuffs across EU member states from 2007 to 2017.

It is necessary for each government to analyze the impact of any VAT rate change on the prices of the influenced commodities because it can prove extremely difficult to reverse the impact thereof. In general, an increase in the VAT rate has a more significant impact on prices than a decrease in the VAT rate.

Effects of VAT rate changes

The fiscal effect is the main argument for the introduction of VAT. The simple reason for this is that VAT contributes the most to state budgets across all member states. Nevertheless, value added tax rate changes have a monetary effect in terms of price levels and this can have a very significant impact on those people on low incomes. Indirect taxes are applied to the consumption of goods and services. Therefore, every change to the VAT rate influences price levels. Prices are particularly influenced by the frequency and the size of VAT rate changes. This influence can occur when VAT is introduced for the first time and then repeatedly with each new VAT rate change (Tait, 1988). Mirrelees (2006) describes the main difference between direct and indirect taxes from the perspective of the taxpayer. Direct taxes have a strong psychological impact on the taxpayer because they directly affect their income and as a result they consume less goods and services. In contrast, indirect taxes are hidden in the prices of

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goods and services, which consumers have very little perception of. Moreover, consumers pay VAT on foodstuffs more frequently, but in smaller amounts instead of one high amount as is the case for income tax.

In Chapter 2, Articles 97-99 of Council Directive 2006/112/EC, which came into effect on 1.1.2007 (EUR-Lex, 2006), the range of tax rates is set out. Member states are required to apply a standard rate that is not less than 15% and can apply two reduced rates which may not be less than 5%. These reduced rates may be applied to the goods and services noted in Annex III of the Directive, which includes foodstuffs. This legislation gives member states the opportunity to modify their tax rates on foodstuffs in accordance with their needs.

In general, the more VAT rates and exceptions that are applied, the more complicated the tax administration is for the State (Kubátová, 2010). For example, Ireland applies a standard rate, two reduced rates, and two super-reduced rates. France has an almost similar situation. In the contrast, countries such as Bulgaria, Denmark, Estonia, Finland, the Netherlands, Lithuania, Luxembourg, Romania and Slovenia only apply one VAT rate, either standard or reduced. Malta and the United Kingdom apply almost a similar system, with a standard rate and a zero rate for almost all kinds of foodstuffs.

Table 13: Application of reduced rates of VAT (in %) on foodstuffs by member states as of 1.1.2017

Member state	Standard rate	Reduced rate		Super-reduced rate	
AT	**20**	**10**			
BE	21	12	6		
BG	20				
CY	19	5			
CZ		15	10		
DE	19	7			
DK	25				
EE	20				
EL	24	13			
ES	21	10		4	
FI		14			
FR	20	10	5.5	2.1	
HR	25	13	5		
HU	27	18	5		
IE	23	13.5	9	4.8	0
IT	22	10	5	4	
LT	21				
LU				3	
LV	21	12			
MT	18			0	
NL		6			
PL	23	8	5		
PT	23	13	6		
RO		9			
SE	25	12			
SI		9,5			
SK	20	10			
UK	20			0	
∅ EU	21.8	9.6		2.2	

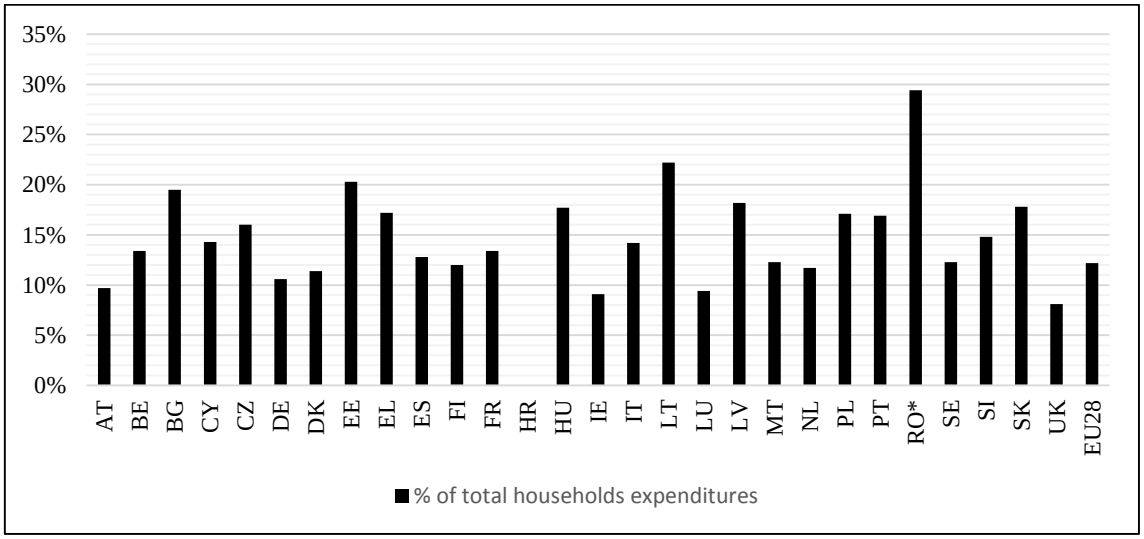
Source: European Commission, 2017

Two attributes of VAT are important with regards to consumption. The first attribute is neutrality, i.e. the tax rate is identical for identical goods and services. In other words, all consumers pay the same tax regardless of their personal income. The second attribute is universality, i.e. the tax is applied to almost all kinds of goods and services. In other words, it is applied to all goods and services irrespective of the elasticity of demand. Foodstuffs are a typical example of goods with low elasticity. Consumers must buy them regardless of price. This often creates a dispute between consumers and the State because both stakeholders usually have a different point of view on the issue. Consumers don't want to pay high prices for their basic needs, especially low income households, because

expenditure on foodstuffs represent a significant proportion of their outlays. In contrast, the point of view of the State is that it must raise sufficient revenues with which to fund state policy. If the State increases the VAT rate on foodstuffs, it usually results in higher revenues because of the low elasticity of demand. However, if the VAT rate on foodstuffs is too high, it can put an appreciable tax burden on low income households, which is undesirable and something the State would want to prevent (Mirrelees, 2006).

In the European Union, expenditure on foodstuffs represents approximately 10–20% of total household expenditure. Figure 1 shows expenditures across all member states (data for Romania is from 2015; no data was available for Croatia). Between 2008 and 2016, the average across the European Union was very stable, fluctuating in a range of 0.2%. Household expenditure on foodstuffs was the highest in Romania (29.4%), which stands out from the situation in the other member states, although it exceeded 20% in Latvia and Lithuania, too. In contrast, household expenditure on foodstuffs was the lowest in the United Kingdom (8.1%), a difference of 21.3%. In Austria and Ireland, the situation was also similar to that in the UK.

Figure 3: Household expenditure on foodstuffs in 2016



Source: Eurostat, 2016

The purpose of decreasing the VAT rate is to reduce prices for consumers. Bernal (2017) analyzed the impact of a decrease in the VAT rate in 2011 in Poland. The government decided to decrease the reduced rate of VAT from 7% to 5%. Bernal drew the conclusion that the decision of the Polish government did not have the intended effect at all. Quite the opposite was true, the price level of foodstuffs actually went up. In the month the VAT reduction was implemented, prices went up by 1.7%, with the price level of foodstuffs over 2011 as a whole going up 5.1% in total.

The assumption is that a reduction in the VAT rate results in a decrease in revenues for the state budget. Martinková and Bánociová (2016) analyzed the economic impact of reduced VAT rates on groceries in Slovakia. The conclusion they came to was that state revenues were not significantly affected by the reduction in the VAT rate. Furthermore, the reduction in the VAT rate improved the situation of households because the proportion of income they spent on foodstuffs decreased, but consumption did not. According to Martinková and Bánociová, a slight reduction in the VAT rate on foodstuffs can be considered to have a slightly positive effect on households without having any significant negative effect for the State.

Hamplová, Provazníková and Svobodová (2016) analyzed the effects of VAT rate changes. Their analysis shows that an increase in VAT rates has a more significant effect than a reduction. They even show that in some cases a reduction in VAT rates can result in an increase in prices. Gautier and Lalliard (2013) emphasize the significant influence of VAT on inflation. In their opinion, of all the types of taxes, VAT has the most significant influence on inflation. However, they qualify this by saying that the influence can be varied because of the complexity of VAT and the many factors that can influence the final effect. Benkovskis and Fadejeva (2013) examined the impact of VAT rate changes on inflation over time. Their results show that a VAT rate change usually has a short-term effect which is most significant in the month of implementation and for the following 6 months. The impact of the change is therefore transferred to consumers gradually, not immediately.

Data and methodology

The data used in this paper were obtained primarily from the databases of European institutions, namely the European Commission with regards to VAT rate changes, and Eurostat for the data related to the price levels of foodstuffs (Harmonized Index of Customer Prices (HICP)). VAT rate changes were examined for the period starting 1.1.2007 and ending 31.12.2016. The start of the examined period was determined on the basis of when Council Directive 2006/112/EC on the common system of value added tax came into effect (EUR-Lex, 2006).

Calculation

The results of changes in the VAT rates on foodstuffs are presented in the last column (Weighted ∅) of Tables 3 and 4. All the values for each effect were calculated using the weighted average. Criteria A (0.25), B (0.50) and C (0.75) were used as the weights for the calculations because they represent the scale of the impact on the price level of foodstuffs as a result of a VAT rate change. The results in the last column include all partial values, the validity of which are ensured by the criteria and inflation tolerance control.

Value added tax

During the examined period, VAT rates were changed and modified many times. The total number of VAT rate changes relating to foodstuffs was 34, however, these were only implemented by 15 member states. Other member states made VAT rate changes as well, but without relation to foodstuffs. The exceptions are Belgium, Denmark and Sweden. These member states did not make any VAT rate changes during the examined period, which reflects a high level of stability. On average, every member state made 1.21 VAT rate changes relating to foodstuffs between 2007 and 2017. The highest number of VAT rate changes were introduced in the Czech Republic. In total, four VAT rate changes saw the reduced rate of VAT increase from 5% to 15%, an average increase of 2.5% every two and half years.

The types (standard, reduced and super-reduced) and number of VAT rates on foodstuffs vary across the EU. Every member state uses at least one rate for some kinds of foodstuffs. The reduced rate is the most frequently applied. In total, 21 member states apply a total of 30 reduced rates of VAT. This is because some of them apply two reduced rates (France, Italy, Croatia, etc.) to foodstuffs. On the other hand, some states use only the standard rate for foodstuffs (Denmark, Luxembourg, the Netherlands, etc.). The highest standard rates on foodstuffs are applied in Denmark (25%) and Hungary (27%). The lowest standard rate is applied by Malta (18%), but only for non-alcoholic beverages, whereas for food the rate is zero. The situation is similar in the United Kingdom, which applies a VAT rate of 20% on non-alcoholic beverages and a zero rate on food. The highest reduced rates are applied by Hungary (18%) and the Czech Republic (15%).

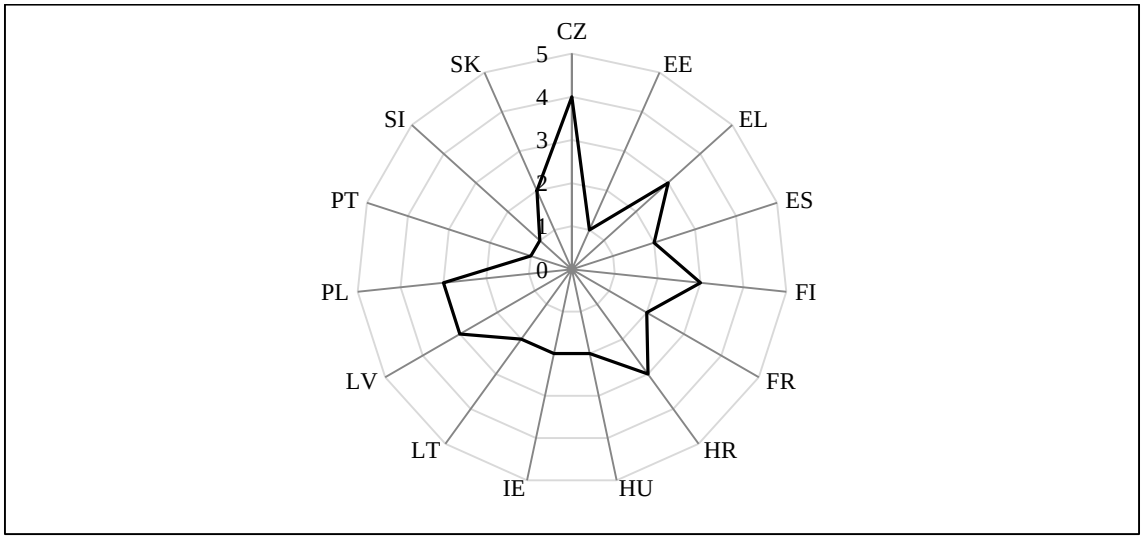
Table 14: The number of VAT rates applied to foodstuffs by EU member states

Number of VAT rates	Member states
1	(BG, DK, EE, FI, LT, LU, NL, RO, SI)
2	(AT, CZ, DE, EL, ES, CY, MT, LV, SK, SE, UK)
3	(BE, HR, HU, PL, PT)
4	(FR, IT)
5	(IE)

Source: Author; European Commission, 2017

Although the number of VAT rates applied to foodstuffs varies considerably, the majority of member states apply two. As previously stated, during the examined period, VAT rates were modified many times. The highest number of VAT rate changes were introduced in the Czech Republic.

Figure 4: Number of VAT rate changes on foodstuff



Source: European Commission, 2017

Foodstuffs

For the purposes of this paper, foodstuffs are defined according Article 2 of Regulation (EC) No 178/2002 of the European Parliament and of the Council (EUR-Lex, 2012) as "any substance or product, whether processed, partially processed or unprocessed, intended to be, or reasonably expected to be ingested by humans". According to this regulation, foodstuffs include all kinds of food and non-alcoholic beverages.

This definition of foodstuffs applies to all member states. Nevertheless, the issue of value added tax and foodstuffs includes exceptions and specific VAT rates. A lot of countries apply more than one VAT rate to foodstuffs, as well as provide exceptions for selected foodstuffs. For example, Croatia applies a reduced VAT rate of 5% to specified basic foods (e.g. cereals, bakery products and milk products) and the Czech Republic a reduced VAT rate of 10% to gluten-free raw materials (e.g. gluten-free flour) and some kinds of baby food. In some cases, countries apply super-reduced rates, also usually for selected basic foodstuffs.

Due to the fact that the member states apply different VAT rates to different kinds and groups of foodstuffs, three criteria (A, B and C) were determined on the basis of the data presented in Figure 2, and household food expenditure:

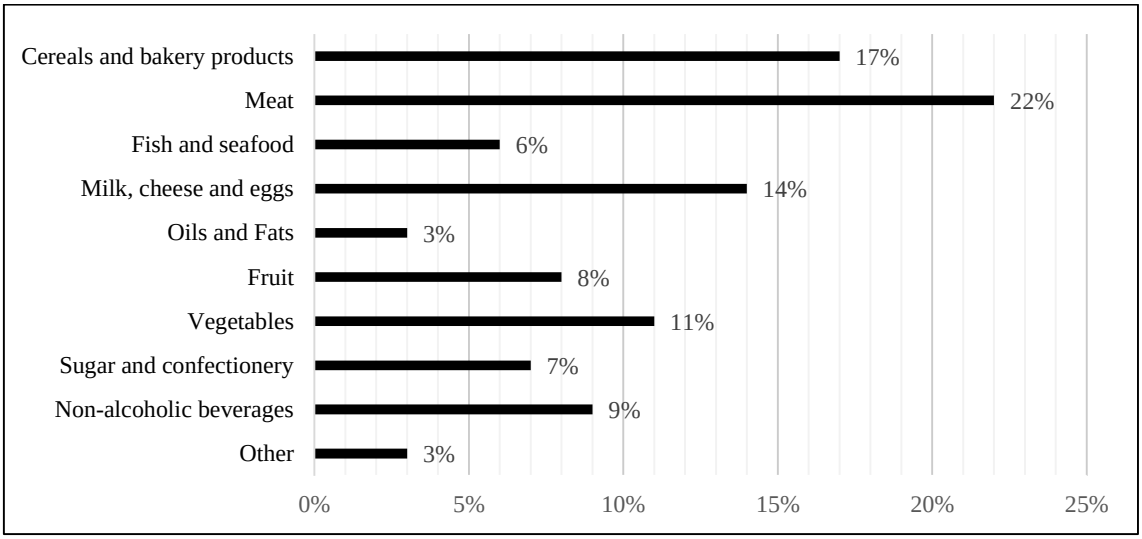
- Criterion A: ≥ 25%
- Criterion B: ≥ 50%
- Criterion C: ≥ 75%.

Each criterion reflects how large the share of expenditure on foodstuffs is affected by a VAT rate change. It follows that criterion C is more reliable and valid than criterion A. In cases where VAT rate changes influence less than 25% of the commodities included in a household's food expenditure, this change is not counted because the change in VAT rate has an insignificant impact on the price level of the foodstuffs.

In accordance with the previously stated, the VAT rate change in Croatia (reduced rate 5%) was used for the calculations, but the VAT rate change(s) in the Czech Republic (reduced rate 10%) was not.

The objective of this procedure was to unify VAT rate changes and the structure thereof in comparison to price levels. The VAT rate changes in relation to foodstuffs were subsequently determined on the basis of the criteria.

Figure 5: Structure of household expenditure on foodstuffs



Source: European Food Safety Authority, 2016

Price level

The method for determining the price level is based on research conducted by Geraldi, which is incorporated in his work, entitled "Value Added Tax and Inflation: A Graphical and Statistical Analysis" (2014). This procedure eliminates inflation shock and other price distortions. It is based on the use of a control inflation rate with which to compare the inflation rate of a member state a year before a VAT rate change is introduced and applied. For this method it is necessary to determine a control inflation region, country or union (group of countries) which has very similar economic indicators. For the control inflation rate the inflation rate of the European Union was selected. This decision is based on the assumptions that only states with a sufficiently developed economy can join the European Union and that the EU itself follows a policy of economic convergence among its member states. For example, Finland applied a VAT rate change on 1.1.2013 and the HICP in 2012 was 2.8%. This compares to a HICP of 2.7% for the European Union, a difference of 0.1%. In this example, the inflation rate in Finland was almost on a par with the control inflation rate (European Union) in 2012. For the reason that there are differences, a "tolerance inflation range" was determined. This range shows the level of the difference between the control inflation rate (EU) and inflation rate of the member state. Three levels of tolerance were determined:

- Low tolerance: ≤ 1 %
- Medium tolerance: ≤ 3 %
- High tolerance: ≤ 5 %

In cases where the difference was less than or equal to 1%, the result was viewed to be the most reliable and valid. Where the difference was higher than 5%, the VAT rate change was not counted.

Development of the price level over time

VAT rate changes affects price levels over time. This is influenced by many variables, such as the structure of the value added tax, the tax policy of the State, the availability of information on legislative changes, etc. The following effects were determined based on Felcser (2014), who specified several time effects of VAT rate changes. Each effect takes into account the HICP data as a result of changes to VAT rates.

- Pre-implementing effect (effect in the month preceding the VAT rate change)
- Implementing effect (price level in the month the VAT rate change is implemented)
- Monthly effect (price level in the month following the VAT rate change)
- Quarterly effect (price level at the end of the 1st quarter after the VAT rate change)
- Annual effect (price level at the end of the year after the VAT rate change)

Results and discussion

The following tables capture the various effects of increases in VAT rates on the price level of foodstuffs. Unfortunately, the data cannot be viewed as being representative because member states did not reduce VAT rates on

foodstuffs frequently enough. What the data does show is that where a reduction in the VAT rate has been introduced, this can lead to an increase in the price level. The data also shows that standard and reduced rates of VAT affect food prices in a similar way. The most significant effect is annual. Nevertheless, the annual effect is the least accurate because it includes many other effects during the year. The most reliable result is the implementing effect. In this case, an increase in the VAT rate of 1% results in a price increase of less than 1% in the month of implementation. In other words, the VAT rate change is not fully transferred to the consumer. This transfer occurs gradually, although it is difficult over a longer period of time to determine how significant a role the VAT rate change still plays. From the point of view of sellers, it is more logical to spread the impact of an increase in the VAT rate, rather than to impose it all at once. This cautionary approach softens the blow to consumers and helps to retain customers. The question remains whether and for how long consumers perceive and compare prices within the context of a VAT rate change. This is of particular interest in member states where price levels increase irrespective of VAT rate changes on foodstuffs.

Table 15: Effect of a 1% increase in the standard rate of VAT on price level

Effect	Tolerance	Criterion A	Criterion B	Criterion C	Weighted ∅
Pre-implementing	1 %	0.40	0.32	0.03	**0.05**
	3 %	0.05	-0.02	0.02	
	5 %	-0.06	-0.10	0.00	
Implementing	1 %	0.63	0.24	0.37	**0.55**
	3 %	0.90	0.65	0.88	
	5 %	0.48	0.21	0.65	
Monthly	1 %	0.40	0.26	0.33	**0.08**
	3 %	0.18	-0.03	0.01	
	5 %	-0.10	-0.05	-0.12	
Quarterly	1 %	0.51	0.32	0.46	**0.26**
	3 %	0.37	0.18	0.26	
	5 %	0.12	0.06	0.15	
Annual	1 %	2.47	2.28	2.27	**1.28**
	3 %	1.23	0.75	0.58	
	5 %	0.98	1.05	0.56	

Source: Author; Eurostat, 2017

Table 16: Effect of a 1% increase in the reduced rate of VAT on price level

Effect	Tolerance	Criterion A	Criterion B	Criterion C	Weighted ∅
Pre-implementing	1 %	0.31	0.31	0.34	**0.29**
	3 %	0.26	0.26	0.27	
	5 %	0.26	0.26	0.27	
Implementing	1 %	0.39	0.39	0.46	**0.42**
	3 %	0.39	0.39	0.44	
	5 %	0.39	0.39	0.44	
Monthly	1 %	0.22	0.22	0.26	**0.21**
	3 %	0.19	0.19	0.21	
	5 %	0.19	0.19	0.21	
Quarterly	1 %	0.30	0.30	0.38	**0.31**
	3 %	0.27	0.27	0.33	
	5 %	0.27	0.27	0.33	
Annual	1 %	1.38	1.38	1.73	**1.38**
	3 %	1.19	1.19	1.40	
	5 %	1.19	1.19	1.40	

Source: Author; Eurostat, 2017

Conclusions

During the last few years, the tendency across the European Union has been to increase VAT rates on foodstuffs. On the whole, the majority of member states apply reduced rates of VAT, whereby the average is 9.6 %. Nevertheless, the changes and the number of VAT rates applied varies. Denmark and Ireland maintain completely different approaches to VAT. Denmark applies only one standard rate to all goods and services, whereby the last change in the VAT rate was introduced in 1992. In contrast, Ireland applies five rates.

Changes in VAT rates have a gradual effect because the changes are not fully transferred to consumers in the month of implementation. However, the implementation of the change has a specific impact on prices. The most significant impact is reflected in the annual effect for both VAT rates. However, this effect is the least exact because many other factors can also play an inflationary effect over this time period. The second most significant impact is the implementing effect. Nevertheless, the results show that changes in the VAT rates are not fully transferred in the month they are introduced. On the other hand, if the pre-implementing, implementing and monthly effects are combined, the values show that the impact of any change to the reduced rate of VAT is almost fully transferred and reflected in the price level of foodstuffs, and for changes in the standard rate, transferred for a significant part. The least significant effects are the pre-implementing and monthly effects, which is reflected in very different values for the standard and reduced rates.

Although the data for decreases in VAT rates are limited, it can be stated that in general, VAT rate increases have a more significant effect on the price level of foodstuffs than a decrease. It is therefore very important to analyze in detail the impact on the price level of foodstuffs and the incomes and expenditures of households, in particular of low-income households, of any changes to the rates of VAT. Governments should also therefore plan VAT rates on foodstuffs over the long-term and only make changes in specific situations because reducing the price level of foodstuffs is more difficult.

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Analysis of the consequences of trading in greenhouse gas emissions the Czech Republic

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Abstract. The Emissions Trading Scheme (ETS) is one of the economic instruments of environmental policy. The goal of this instrument is to reduce greenhouse gas emissions. Emission allowances are a common instrument of the European Union, which is mandatory for all member countries. However, the key issue is the environmental effectiveness of this measure. This idea is also addressed by the authors of this article. The aim of the article is to map the comparable emission trading systems in the world and compare them with the system used in the European Union. The secondary objective is to assess whether this system is environmentally effective in the Czech Republic. With regard to the objective of the article, the main used emission trading systems were described and a basic comparative analysis was performed on the basis of data - time series of GDP development in the Czech Republic, average prices of emission permits and quantity of CO2 emissions per capita. Its results indicate that the emission allowance price is currently low and is likely to fail to fulfill its regulatory function.

Keywords: market, emission allowances, environmental policy, economic instruments, carbon dioxide

JEL Classification: B22

1 Introduction

Carbon allowances

The aim of this article is to map Emission Trading Scheme trading systems and compare them with the EU-ETS system used in the European Union. The secondary aim is to assess the effectiveness of this system in the Czech Republic using a comparative comparative analysis. For environment protection purposes, environmental policy uses various instruments. Economic instruments work in synergy with other greenhouse gas reduction instruments, such as the relevant legislation. The individual instruments are chosen by the states according to the priorities of their environmental policy. One of the basic instruments of this mix is so-called environmental taxes (Hahn et al., 1992, OECD 2007). These allowances can also include emission allowances that work similarly. The purpose of emission allowances is above all to limit greenhouse gas emissions and to integrate the costs of removing their negative environmental impacts into the costs of the companies that produce them. This is the so-called internalization of negative externalities. The idea of setting limits and trading in pollution allowances was developed by the economist in the 1960s. (Barnes, 2008a: 31) The system establishes a maximum allowable pollution limit that is transformed into allowances. Allowances 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 entities, reallocation may take place on a market principle. In general, anyone who emits pollution must surrender the appropriate amount of allowances that allow it, or pay a sum of money that corresponds to their value. (Barnes, 2008a, Daly, 1996). According to Peter Barnes (2008a: 28), this system, if it sets a gradually decreasing carbon limit and includes the whole economy, is the best way to guarantee a drop in carbon to a certain date. Barnes (2008a: 31) The EU Emissions Trading System (EU ETS) was launched on 1 January 2005 and is currently the world's largest emissions trading market. Mandatory emission reduction targets for these sectors have been set for all Member States from 0-40%, which is estimated to provide a total of 30% reduction in greenhouse gas emissions in 2005-2030. 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

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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. Reducing emissions from deforestation and forest degradation (REDD +) are among the most significant attempts to mitigate climate change at present (Agrawal et al., 2011). The new EU ETS system gradually removes the free allocation of emission allowances to individual businesses. Uniform rules for EU-wide allowance auctions are in place. Energy, the most important sector in terms of emissions, has switched to the auctioning of allowances from 2013 onwards. However, with the possibility of an exception for isolated energy markets and states with a high proportion of fossil fuels, electricity generation. And this includes the Czech Republic. For the production sectors, the proportion of allowances allocated to the auctions will gradually increase (from the original 20% in 2013 to 70% in 2020). 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. However, if a satisfactory agreement does not emerge within the framework of the post-Kyoto process, up to 100% of free allowances can be provided to endangered sectors, in order to protect European industry and prevent emissions from being transferred to countries without comparable emission limits (ME, 2009c: 32 + 50-51 , Directive amending Directive 2003/87 / EC). Today, over 400 household appliances are included in the trade, of which 254 were in the energy sector. The EU ETS covers about 60% of all greenhouse gas emissions in the Czech Republic. More than 70% is energy (ME, 2009c). In the first trading period, the Czech Republic distributed 97.6 million allowances every year, which was an average of 12.7% more than actual emissions in the given period. For the second trading period, 86.8 million allowances per year were allocated to the Czech Republic (MoE, 2009d). The EU ETS legislative framework, according to the European Commission, is Directive 2003/87 / EC of the European Parliament and of the Council establishing an EU ETS in the Community. The Directive has been amended several times and the Directive 2009/29 / EC sets out the EU ETS in the third trading period 2013-2020. A number of more detailed European legal acts, such as regulations, decisions, communications and explanatory guidance, follow up this directive. In the Czech Republic, the EU ETS is amended by Act No. 383/2012 Coll. The law specifies the installations to which the system applies and the rights and obligations of their operators. Operators monitor their emissions, report them annually to the Ministry of the Environment, and release allowances for them.. According to Hansjürgens (2007), the EU ETS and the Kyoto Protocol are functionally linked, so businesses can use not only allowances but also cheaper CERs to cover emissions from their installations within the EU ETS. In the Czech Republic, the EU ETS operates on the basis of Act No. 695/2004 Coll. on the conditions of trading in greenhouse gas emission allowances and on the amendment of certain laws incorporating the relevant EU regulations and Decree No. 12/2009 Coll., laying down the procedure for the detection, reporting and verification of the amount of greenhouse gas emissions. In connection with the approved revision of Directive 2003/87 / EC, a comprehensive amendment to the Czech law is also prepared, which specifies the use of revenues from emission allowances auctions.

Literature overview

An important study in this area is the study by Professor Nordhause (2005, 2011). He focused his research mainly on comparing the effectiveness of environmental taxes and tradable emission allowances, their advantages and disadvantages. Based on his research, he strongly opts for environmental taxes before trading in emission allowances. It concludes that the fluctuation of the EUA market price and its volatility in one trading period of the EU ETS is not good in terms of longer-term investment planning. As a recommendation for policy makers and regulators, a pure carbon tax is proposed in the context of fiscal policy as the most appropriate tool for reducing greenhouse gas emissions.

At present, European countries use emission allowance trading within the EU ETS as the main CO2 abatement tool, but some of them also use carbon taxes. (Leu and Betz., 2016)

The main supporter of emission trading is for example Mansur (2013), which states that in relation to tax, a tradable permit can increase prosperity in the market with imperfect competition. Moreover, based on his model of strategic and competitive behavior of traders in the Central Atlantic Market, he notes that when regulators charge tax instead of an allowance, the loss caused by deadweight costs in imperfect competition is higher.

The price of emission allowances in the EU ETS also deals with Brink, Vollebergh and Van Der Werf in the article Carbon pricing in the EU: Evaluation of different EU ETS reform options. They point, in particular, to the current emission allowance market price, which at the current price is relatively far from the projected price of 20 euros in 2020 and thus does not seem to meet the desired effect.

There are also authors who consider the two economic instruments to be similar, especially in terms of impacts. For example Goulder (2013) to investigate tax-system interactions with climate protection policies includes a carbon tax and a cap-and-trade system into a single group called Green Tax. These two economic instruments, according to him, have similar characteristics, especially with regard to the use of their proceeds in the case of sale of tradable emission allowances at auction.

In 2016, the authors of Deeney, Cummis, Dowling and Smeaton in their article deal with the influence of the European Parliament on the auction price of emission allowances. In April 2013 the European Parliament was expected to pass a European Commission legislative proposal to fix the recognised oversupply issue in the EU Emissions Trading Scheme (EU ETS) (Koch et al., 2014). The Commission's proposal1 involved postponing until 2019–2020 the release of 900 million EU emissions allowances (EUAs) – each allowance granting permission to a regulated installation to emit one tonne of CO2equivalent – that were originally due to be released into the market in 2013–2015. The hope of the Commission was that this would support the declining price of allowances already trading in the emissions market and thus act as an incentive towards meeting the overall goals of the EU ETS, namely: encouraging investment in and consumption of cleaner energy production, incentivising more efficient energy use and production processes, and reducing emissions across the EU. On 16 April 2013, however, the European Parliament narrowly voted against the proposal. There was an immediate impact on EUA prices, which dropped by over a third. The futures price of an EUA permitting the emission of one tonne of CO2, which had cost €4.76 at close of business on 15 April, fell to €3.09 on 16 April.

Material and Methods

The main target

In line with the fact that the main objective of the article is to identify existing emission trading systems and compare them with the EU-ETS system used in the European Union, relevant and up-to-date literature, including scientific articles from the Web of Science database, has been studied and evaluated. Theories and data needed were applied in the descriptive part of the article, which compared the system used in the European Union. Another objective was to assess the environmental effectiveness of emission allowances. For this purpose, data was created to create time series, from which the charts were then compiled for a more comprehensive understanding of the problem, and a comparative analysis was performed that tried to assess the second of the targets.

Data

Greenhouse gas emissions are a basic dependent variable. The data source is data from the European Statistical Office (Eurostat). GHG emissions are expressed in tonnes per year of CO2 per inhabitant.

The emission allowance price is an explanatory variable. The data was obtained from the EEX Energy Exchange and the Energy Regulatory Office. Unit is the average annual emission allowance in euro per 1 allowance. The theoretical expectation for this variable is that emission allowance price increases should reduce GHG emissions.

Gross Domestic Product (GDP) is another basic explanatory change. The data was obtained from the database of the Czech Statistical Office (CSO), as a source of respect. GDP is expressed as a percentage of year-on-year growth for the Czech Republic and a year. Expectations for this variable are that greenhouse gas emissions increase with GDP growth.

Results

Basic legislation

The cornerstone of EU ETS is *Directive 2003/87 / EC*, establishing a scheme for greenhouse gas emission allowance trading. The Directive has been amended several times and the *Directive 2009/29 / EC* sets out the EU ETS in the third trading period 2013-2020. The Directive is implemented into the Czech legal order by *Act No. 383/2012 Coll.* and an implementing decree (currently in the legislative process). A number of more detailed European legal acts build on the Directive. Regulations, decisions, communications and explanatory guidance.

Interpretation of Annex I of the revised EU ETS Directive. This European Commission Guideline helps to delimit the boundaries of installations falling under the EU ETS Directive from 2013

Guideline on harmonized allocation of allowances under the EU ETS beyond 2012 (except for Instruction No. 7) Czech translation of a series of methodological guidelines for setting the preliminary free allocation of stationary facilities in III. trading period of the EU ETS (2013-2020).

Methodological guidelines for emission verification and accreditation. Explanatory Material to Commission Regulation (EU) No 600/2012 on the verification of greenhouse gas emissions and the accreditation of verifiers.

Act No. 383/2012 Coll., On the conditions of trading in greenhouse gas emission allowances. This Act transposes Directive 2003/87 / EC as amended by Directive 2009/29 / EC into the Czech legal order.

Directive 2003/87 / EC establishing a scheme for greenhouse gas emission allowance trading.

Directive 2003/87 / EC is the basic legislative source of the emissions trading scheme.

Decision 278/2011 / EU laying down rules for the allocation of free allowances. This decision contains the rules on how to calculate the free allocation of allowances in the third trading period 2013-2020.

Regulation 601/2012 on Monitoring and Reporting of GHG Emissions. The Regulation contains rules for the monitoring and reporting of greenhouse gas emissions. The regulation replaces Decree 12/2009, is directly applicable and brings some changes for the third trading period 2013-2020.

Methodological Guidelines for Monitoring and Reporting Emissions in Stationary Facilities. A set of explanatory materials to improve understanding and orientation in Commission Regulation (EU) No. 601/2012 on Monitoring and Reporting of GHG Emissions.

Methodological Guideline 7: Guidelines for New Market Participants and Decommissioned Devices. Step-by-step instructions for new entrants, installations with large capacity changes or decommissioned - after 30 June 2011.

Trading systems used

Year 2016 is considered globally the warmest year in the history of climate measurement since 1880. It is the third record temperature in the series. According to the World Meteorological Organization, the Second Stage is in 2015 and the third in 2014. One of the causes was the continuing El Niño effect, however, from a long-term perspective, global warming is strongly supported by human activities, especially by burning fossil fuels. (Šrámek, Novotný, 2017). We currently have several different greenhouse gas emission trading schemes in the world. The closest to us is the European Union Emission Trading Scheme (EU ETS or ETS abbreviation), which includes all EU Member States, and the Czech Republic, on a mandatory basis. The European Union Emission Trading Scheme, the European Emissions Trading Scheme, is the world's largest greenhouse gas emissions trading system, across many countries and a number of industries (European Commission's Environment Directorate General, 2008). The EC has been created as a cost-effective yet economically efficient way to reduce greenhouse gas emissions (Directive 2003/87 / EC), as the most effective way to reach the Kyoto commitments, with a view to bringing the future low-carbon economy closer (European Commission, 2007: 3).

The system is firstly legalized by Directive 2003/87 / EC, which entered into force on 25 October 2003, as amended by Directive 200 / 101ES. The system was launched on 1 January 2005 in all the then 25 EU Member States. At present, all EU Member States are mandatory full ETS participants, with 25 of them bound to reduce greenhouse gas emissions under the Kyoto Protocol and 2 have not set their targets. (EC, 2007: 5). The ETS is designed to interconnect with all compatible GHG emission trading systems in other countries where the Kyoto Protocol has been ratified. (EC, 2007: 20).

The EU ETS is also commonly referred to in the professional literature as the cap and trade system (European Commission, 2007: 6). Its basic principle of functioning is to determine the maximum volume of pollutant that can be emitted into the air. Both as a whole and for individual issuers, with individual shares being traded. The main instrument of the system is emission allowances, which represent a payment for the possibility of air pollution. Each emission permit represents the asset value that entitles the facility operator to release the equivalent of a ton of CO2 into the air (European Commission, 2007: 9: Act No. 695/2004 Coll.). Allowances do not exist in physical form but only in electronic form. On the accounts of their owners. In a system of registers, which is similar to the banking system, and which is incorporated into the international registry system used in the framework of the Kyoto Protocol. It is also controlled by a central designated administrator. (European Commission, 2007: 13-14). However, the authorization of the competent institution is required to operate the equipment included in the system. This permit then sets out the requirements for monitoring, reporting the volume of emissions of the facility and other obligations. Each device then allocates a given number of allowances for a predetermined period. This is set out in the so-called National Allocation Plan (NAP) for a certain period (European Commission, 2007). New EU ETS participants will receive allowances allocated free of charge from the reserve created for these purposes within the projected allocation (Directive 2003/87 / EC). In the first phase, the ETS included only CO2 emissions from large issuers in industry, heat and power generation. But also in selected energy-intensive industries. Combustion processes, oil refineries, iron and steel production plants, coke ovens, glass, lime, ceramic products, cement, paper and pulp. It depends on the production capacity or production volume of the producer concerned. (EC, 2007). If businesses keep their emissions under the allocation of allowances, they can sell surplus allowances. Conversely, companies unable to meet the emission limit may purchase missing allowances. However, they also have the option of adopting production measures that reduce the amount of carbon dioxide discharged.

Changing production technology, changing used raw materials, or for example, limiting production volume. They can also use a combination of the above-mentioned approaches. Most likely, they will be looking for the path that will bring the least cost. The cost of buying and selling allowances is based on a market principle. Offer and demand. (European Commission, 2007: 9) In other words, the system creates a liquid emissions market. Through it, carbon prices will be determined (European Commission 2005). The ETS rules do not specify where trade is to take place. It is done either directly or through brokers. (European Commission, 2005: 16). After the end of each calendar year, each operator of an installation that is included in the ETS shall surrender the number of allowances corresponding to the amount of CO2 emitted. If he fails to do so, he must pay the prescribed fine. The surrendered allowances will be discarded and can no longer be reused and put into circulation. Allowances that will not be used in a given year can be sold or used by the company next year. (European Commission, 2007). For each period provided for in Directive 2003/87 / EC, each Member State is required to draw up a national allocation plan. It sets the total quantity of allowances that will be distributed over a given period. And also the quantity allocated to individual producers. Allowances must be allocated on the basis of objective and clear criteria. They are set out in Annex III, the cited Directive (Directive 2003/87 / EC, Act No. 695/2004 Coll.). The national allocation plan must be in line with the Member State commitment. Under the Kyoto Protocol and with the current and planned progress towards its achievement. The NAP is submitted to the European Commission. It may require changes or even reject them altogether. The agreed plan and the European Commission can no longer be changed. (European Commission, 2007: 11). At least 90%, in the first phase it was even 95% of the allowances, to be distributed to the operators. (European Commission, 2007). However, this amount will gradually decrease. The system also allows operators of installations covered by the EU ETS to use credits instead of emission allowances obtained from project mechanisms defined in the Kyoto Protocol instead of emission allowances. Only up to 10% of the total quantity of allowances allocated. These project mechanisms are, for example, joint implementation (JI - Joint Implementation) and Clean Development Mechanism (CDM, Clean Development Mechanism). ETS helps companies to meet their commitments. At the same time, it also supports investments in emission reduction projects in developing countries. (European Commission, 2007: 3-4, ME, 2006: 33). The EU ETS is phased in. In stages of trading periods. The first period started on 1 January 2005. It ended on 31 December 2007. The second period was from 1 January 2008 to 31 December 2012. The third period commenced on 1 January 2013 and runs until 2020. It should be followed by a further period. (Act No. 695/2004 Coll., 12294, MoE, 2009c: 50). Currently, the third stage of ETS implementation is under way. In the current period, the system is already copying the Kyoto Protocol control period. Member States were obliged to implement the Directive into national law. The EU-ETS currently covers more than 40% of greenhouse gas emissions in the European Union (according to the Ministry of Environment, 2015c: 51). The current form of the system is criticized by a number of actors for several reasons (eg Feasta, 2007). Against the first period, the basic principles of the system have not changed. The changes are coming gradually in the third period. The European Commission has applied tighter allocation rules for individual countries for the second and third periods. It has returned its system to its core function. Motivate to reduce emissions by using a sufficiently high price of emission allowances. In the first phase, a large number of allowances were allocated incorrectly than the actual emissions. When they were reallocated, their price dropped to the value of administrative costs (about € 0.20). This, of course, has also negatively affected the overall CO2 emissions. (Ministry of the Environment, 2009c: 49).

The EU ETS change is part of the climate and energy package endorsed by the EU Council and the European Parliament in December 2008. It introduces common procedures and joint solutions in the field of climate protection, security of supply and the competitiveness of European economies. (ME, 2009c: 32) A new Directive of the European Parliament and of the Council amending Directive 2003/87 / EC was adopted. The aim is to improve and extend the greenhouse gas emission allowance trading scheme in the European Union. (ME, 2009c: 32) Member States had the task of implementing the Directive and of creating the legal and regulatory provisions that were in place to comply with this Directive by the end of 2012 with effect from 1.1.2013 (Directive amending Directive 2003/87 / EC). In the new EU ETS, the free allocation of emission allowances is being phased out. Uniform rules are in place for EU allowance auctions. Energy has been transferred to auctions since 2013. This is an exception for isolated energy markets and states. These are states that have a high proportion of fossil fuels for electricity generation. This includes the Czech Republic, where there is still a significant share of energy produced in coal-fired power plants. For production sectors, the proportion of allowances allocated to auctions is gradually increasing. The 20% share of 2013 will gradually increase to a share of seventy percent in 2020. The revision of Directive 2003/87 / EC presumes that at least 50% of auction proceeds will be subsequently used retroactively by climate protection policy. The remaining 50% will be used to offset the adverse social and economic impacts of implementing the climate-energy package of measures. However, if a satisfactory agreement is not reached within the post-Kyoto phase of the process, threatened sectors will be granted up to 100 percent of free allowances. They will be designed to ensure the protection of European industry. It also prevents emissions from being transferred to countries that do not have comparable emission limits. In this period, the current national allocation plans will cease to apply, but a single, EU-wide greenhouse gas emission ceiling will be in place for all EU ETS areas. It will be gradually reduced - by 2020 by 1.74% of allowances in order to achieve a reduction of these emissions by a

total of 21% compared to 2005. (ME, 2009c: 32, Directive amending Directive 2003/87 / EC). Other industries, such as the production of ammonia, aluminum and some other greenhouse gases such as nitrous oxide (N2O) and fully fluorinated hydrocarbons, are newly included in the ETS. Some small businesses are also excluded. Based on the discovery that their participation in the system is inefficient. With related Directive 2008/101 / EC, international air transport is also included in the EU ETS from 2012 onwards. (ME, 2009c: 32 + 50, Directive amending Directive 2003/87 / EC). According to the draft of the climate protection policy (author of the Ministry of the Environment of the Czech Republic) (2009c: 50), the same rules will apply not only in the period 2013-2020, but also in the following periods. However, the overall emission ceiling will be tightened. The EU ETS operates in the Czech Republic in accordance with Act No. 695/2004 Coll., "On the Conditions for Trading in Allowances for GHG Emissions and on Amendments to Certain Acts". It incorporates the relevant EU regulations, including Decree No 12/2009 Coll., "On the determination of the procedure for the detection, reporting and verification of the amount of greenhouse gas emissions". In connection with the approval of the revision of Directive 2003/87 / EC, a comprehensive amendment to the Czech law is being prepared to specify the use of proceeds from emission allowances auctions. Currently, more than 400 home appliances are included in the trading system. Of these, 254 were in the energy sector. The EU ETS covers 60% of all greenhouse gas emissions in the Czech Republic, of which more than 70% is part of the energy sector. (MoE, 2009c: 49). Within the first trading period, the Czech Republic distributed 97.6 million allowances each year among producers. This was an average of 12.7 percent more than actual emissions in that period. For the second trading period, the EU has allocated 86.80 million allowances per year to the Czech Republic. (MoE, 2009d: 49). In 2008, the Czech Republic reported 8.5%, compared to 2007. This was, according to most authors, caused by the ongoing financial and economic crisis. As a consequence of the decrease in the dynamics of industrial production, the price of allowances has fallen by half. With a gradual return to the price of 20-30 euros. (MoE, 2009d: 49)

Other, word-based systems

In the United States, a greenhouse gas emissions trading scheme was launched in 1991. The Environmental Protection Organization launched it through the United States Environmental Agency (Sutlovičová, Kotecký, 2006), with the current name Acid Rain Program. Its primary task was to reduce emissions of sulfur dioxide, which is the main factor in the formation of acid rain. Today, it is also engaged in reducing nitrogen oxide production and has become a model for the European model - the EU ETS. Emission allowances are allocated to the majority of greenhouse gas producers free of charge, and the US system has so far been a rather successful and viable model. Husová says (Zbořil, Husová, 2008) that the US system described above has decreased since its inception in 1990, the total emissions by 40% by 2006, which is a very significant share in comparison with the European space. Hus also points out that, according to The Economist, it is the greatest ecological act of the past decade. (Zbořil, Husová, 2008). The greenhouse gas emissions trading system is currently also known in Japan. However, it works on a voluntary basis (ČTK, 2009).

As another possible trading system, Tradable Energy Quotas (TEQs), as stated by Fleming, have been created as a tool to reduce carbon dioxide at national levels as a complement to international systems. It is part of The Lean Economy Protection project, which helps states gradually reduce their greenhouse gas production using fossil fuels (Fleming, 2007). The system was created in 1996 and, in addition to reducing greenhouse gas emissions, it is also working to provide a fairer access to energy. Its primary tool is the Tradable Energy Quotas described above - Tradable Emission Allowances. In this version of the quotas, it is the right to emit carbon dioxide and the unit of measurement is the kilogram of emissions generated by energy production. In this system, we already encounter a so-called carbon unit. This system already includes not only the amount of carbon released from the production of energy from the defined fuel but also the total carbon brush released during the extraction, processing, treatment and transport of fuel. Other greenhouse gases are compared and rated with CO2. The comparison compares and charges the effect of these other gases with the effect of 1 kg of CO2. It is a rather progressive system that affects all greenhouse gases in this way (Fleming, 2007). The system described above leads the user to economy because unneeded allowances can be traded on the secondary market, in the form of intermediaries, but also on-line. There is a possibility of buying and selling. When purchasing, the cost of running the system is also charged to the customer, in the price of the allowance, as well as the user who does not have his account set up. This includes foreigners and other persons in the state. As described above, the allowance market is the same as any other market. The price is set on the principle of supply and demand, it is influenced by other economic factors and is regularly published in press, news and other media (Fleming, 2007).

The previous system is a state system. The global solution to climate change (Meyer, 2000) then offers an approach called Contraction and Convergence. The system was designed by the Global Commons Institute in London. Brugges states directly that Contraction and Convergence is a mechanism designed to achieve a global agreement to reduce greenhouse gas emissions. (Brugges in Meyer, 2000: 8) Furthermore, I quote: "In today's

serious debate, there is only one proposal that means a chance to unite most of the world's rich, poor people in an attempt to avert catastrophic climate change" (Meyer 2000: 15). Contraction and Convergence was adopted for the next meeting with India, China and African countries. This approach is in line with the idea of the United States for future reductions in greenhouse gas emissions. Although the obligation of developing countries will not directly reduce emissions, they will have to meet the prescribed limit. (Meyer, 2000: 63-66) In June 2000, the Royal Commission of Environmental Pollution stated that the United Kingdom should adopt the principles of Contraction and Convergence. This is the basis for an international agreement on greenhouse gas emissions. (Meyer, 2000: 9).

The Cap and Share system was developed by the Irish foundation The Foundation for the Economics of Sustainability, known as Feasta. Within the work group called The Energy and Climate Group. In November 2006, a campaign was launched, which is currently spreading the idea of Cap and Share in some countries. (Feasta, 2009). The Cap and Share system was a model for Contraction and Convergence. With the effort to transform it into a more functional system, more acceptable to poorer countries and the poor in wealthy countries (Fleming, Feasta, 2007). It is already described in 2006 and 2007 in the Faestas articles criticizing the EU Trading Scheme - EU ETS. Here the system is designed to replace the existing European system. Its description of the operation is focused precisely on the territory of the European Union. There is also mentioned the possibility of using the system on a global scale. The following handbook for 2008 is described as a global system. On www.capandshare.org, you can read that Cap and Share can be introduced for multiple levels. Cap and Share has two basic goals. Avoiding climate change by significantly reducing greenhouse gas emissions and limiting the use of fossil fuels (Feasta, 2008). A fair distribution of benefits should be given to the protection of poor people in particular. Removing inequality sees as a prevention against the opposition of the system (Feasta, 2008: 5).

The system called Cap and Dividend originates from the US and is the On the Commons project. Networks of activists supporting the idea of commons (Barnes, 2008a: 94). Barnes also draws on the idea that an all-economic system will have to be built to ensure emission reductions. It has to meet three basic principles - the greatest possible simplicity, fairness and future payments for air pollution. Principle Polluter pays! Cap and Dividend is partly based on an upstream bid approach. There is a limitation of the amount of carbon in the suppliers, instead of the issuing entities. The limit will be reduced annually. Permits are not allocated free of charge, but auctioned. Dividends are redistributed to people on a per capita basis in the final stage - each adult the same amount. (Barnes, 2008a)

According to Finance Minister David Sassoon, 3.4. 2009, Republican Chris Van Hollen from Maryland, Maryland, proposed a new draft Climate Act. It's built on Barnes' approach. It is called The Cap and Dividend - Act of 2009. According to Sassoon, Van Hollen's proposal can be integrated into the final, climate package currently under way in the legislature in the Houses. However, experts do not expect it to pass through this process without change. The prediction is that it ends with a proposal that dividends will not be paid out from the full amount of the money received through the auctions, but only in part. (Sassoon, 2009). The proof of the functionality of the system described above is presented not only by Peter Barnes, but also by Jonathan Alter - Newsweek (2007). It originates from the Alaska Permanent Fund, which has been in existence since 1976 and annually sends checks to citizens of Alaska, with a share of state oil revenues.

Comparativ Analysis

The following section of the article contains time series of data. Table 1 shows the average price of the emission allowance in the time series from 2005 to 2015. Expectations of the impact of the carbon emission price are that the increase in its price would lead to a decrease in CO2 production. Graph 1 shows these data clearly.

Table 1: Average price of emission allowance. euro / 1 allowance (data 2015)

2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
21,99	**17,14**	**1,50**	**18,43**	**12,72**	**14,17**	**13,25**	**7,42**	**4,57**	**5,68**	**7,99**

Source: ERÚ ČR, own modification

Note: is based on the average price of an emission permit set by the Energy Regulatory Office of the Czech Republic (this fixed price is converted to the Euro at an average annual rate)

Figure 1: Average price of emission allowance. Euros

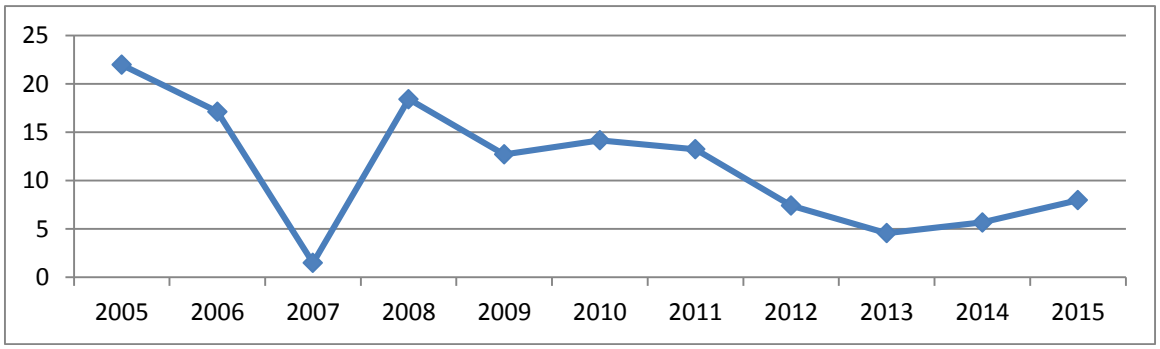


Table 2 shows the annual GDP figures of the Czech Republic in the years 2005 to 2015. This indicator was obtained from the CZSO database and the expectations are that GDP growth will increase greenhouse gas emissions. Figure 2 illustrates these data.

Table 2: Annual GDP of the Czech Republic in %

2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
6,8	7,00	5,70	3,10	-4,5	2,5	1,8	-1,0	-0,9	2,0	4,3

Source: ČSÚ, customized

Figue 2 Annual GDP of the Czech Republic in%

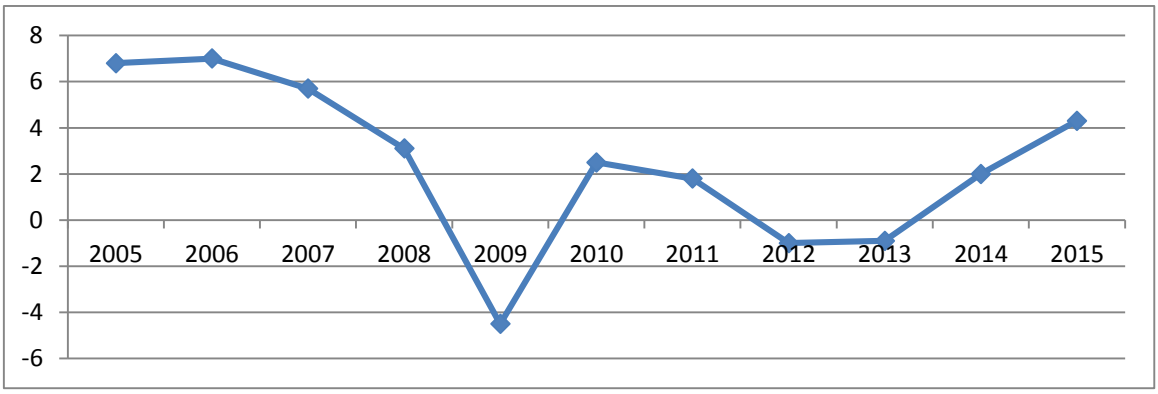


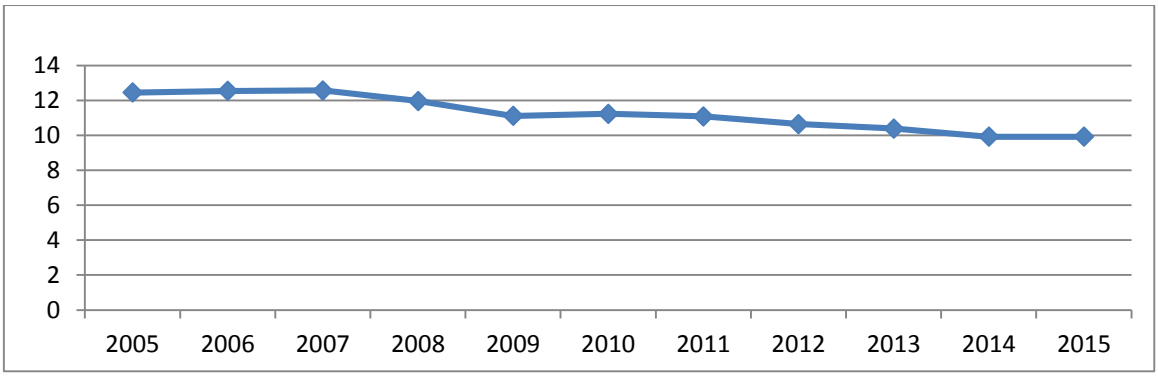
Table 3 contains the data on the amount of emissions produced in tonnes per capita in the Czech Republic. The series is compiled from the data for the years 2005 to 2015. It is a basic analysis variable, the movement of which, depending on the remaining factors, will be examined. Graph 3 clearly shows these data.

Table 3: CO2 emissions per capita in the Czech Republic, tonnes / per capita

2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
12,45	12,54	12,57	11,96	11,11	11,23	11,08	10,64	10,39	9,92	9,92

Source: Eurostat EU, customized

Figure 3: CO2 emissions per capita in the Czech Republic, tonnes / per capita



Disscusion

The overall CO2 emissions in each country are affected by various factors. In particular, it is necessary to interpret the data in terms of climatic conditions and GDP growth or also the population of that country. It is also necessary to take into account the export and import of fuels, energy and electricity. Here, in terms of CO2 emissions, it is preferable for a Member State to import more than its part from the production of imported fossil fuels. Long-term data from the Statistical Office show that, despite all the measures adopted, the Czech Republic together with Estonia, the Netherlands and Luxembourg are among the four countries with the highest CO2-per capita production. (Eurostat, 2016). This is apparently influenced by several factors, namely the position of the Czech Republic, the mountainous border regions of the Czech Republic and the industrial orientation of the Czech economy, focused on exports.

The comparative analysis shows that, despite the above mentioned facts, the Czech Republic is able to reduce CO2 production in the long term. Furthermore, it is quite significant that the amount of GDP affects the amount of greenhouse gas emissions. See increase in emissions from 2005-2007, coupled with GDP growth and a significant drop in 2009 emissions, coupled with a sharp fall in GDP due to the ongoing economic crisis. The function of the economic regulatory action - emission allowances is quite prominent in the data for 2007, when the decrease in GDP has led to an increase in CO2 emissions, which was probably influenced by the too low average emission allowance price on the European market. This price was probably influenced by the economic crisis that began in the western EU countries before the Czech Republic. It also follows from the data that during the economic recession, from 2015, there was no year-on-year increase in CO2 emissions. According to Eurostat, there was no year-on-year increase from the EU member states only for Germany and the Czech Republic. Among other things, this is probably due to a small, renewed increase in the price of emission allowances. The increase in emissions from other Member States shows that this price is probably unnecessarily low and does not fulfill its regulatory role well, and that the Czech Republic appears to be in line with the theory outlined above still reserving greenhouse gas emission reductions. So you can agree with Bring at. all in the article "Carbon pricing in the EU": the projected price of 20e emission allowance for 2020 is far away from the real price and that this current price probably does not perform well.

Conclusions

Long-term scientific studies in the EU show that the introduction of a system of tradable emission allowances has led to a drop in CO2 emissions for large polluters, while emissions from small stationary pollutants, transport and households have increased. These data signal the need for regulatory intervention by the EU institutions to ensure that greenhouse gas emissions are further reduced. Another option is the introduction of a carbon tax as a further tool to reduce greenhouse gas emissions across the EU. The functionality of this tool mix is proven, for example, by the experiences of the Nordic countries, which have been in place since the 1990s. The Tradable Energy Quotas (TEQs) system described in the third part of the article appears to be an innovative and possible direction for the positive trend of reducing greenhouse gas emissions in the European area. This system, as stated in the work, regulates citizens and small businesses and organizations and leads them to energy management. It also has a sophisticated evaluation and review system. Another capable system - Cap and Share - enables the global aspect and the involvement of developing and expanding countries in the system. In the case of these countries, it is about freezing the greenhouse gas production to the current state. However, future developments in the EU territory can

be predicted by increasing the importance and involvement of environmental taxes in the mix of instruments designed to reduce greenhouse gas emissions. In particular, so-called carbon taxes. The Czech Republic also has a study on the introduction of carbon tax, including an impact study. The statistical comparative analysis shows the dependence of the growth of GHG production on GDP development. Which has a negative impact on this analysis. Its growth in the Czech Republic is accompanied by an increase in greenhouse gas emissions. The model may be partly distorted by the economic crisis and the subsequent recession in 2009 and 2013. On the other hand, the positive impact of the price of the emission allowance is not entirely apparent from the model, due to the crisis, respectively the recession and the consequent low price of emission allowance on the market. There seems to be room for EU regulatory action and price regulation, and the addition of an economic tool mix to reduce greenhouse gas emissions by carbon tax could also have a positive effect. A further research in this area and the ongoing evaluation of data and data will be required for the correct composition of the economic tool mix to reduce CO2 emissions in the Czech Republic. New research will be launched in the future, where synergies between other instruments, such as excise duty on solid fuels, energy tax and regulatory fees, will be considered. The most appropriate research method could be multi-channel regression analysis, which is able to take into account the synergic effects of instruments and factors.

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Minimum Wage in the Czech Republic

Zdeněk Sadovský* – Jitka Matějková**

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

1 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.

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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 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[8]	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[9]	27,320[10]	0.863300259

[8] Minimum wage since August 2013

[9] For this year, it is the average wage for Q4 2017

[10] For this year, it is the median value for Q4 2017

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

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.

3.2 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 SMW_n = suggested minimum wage, MWG_{n-1} = minimum wage in the past year calculated according to GDP, MWI_{n-1}=minimum wage in the past year calculated according to inflation, I_{n-1} = inflation rate in the past year, GDP r/r_{n-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, AW_{n-1} = average wage of the past year according to data obtained from the Ministry of Labour and Social Affairs.

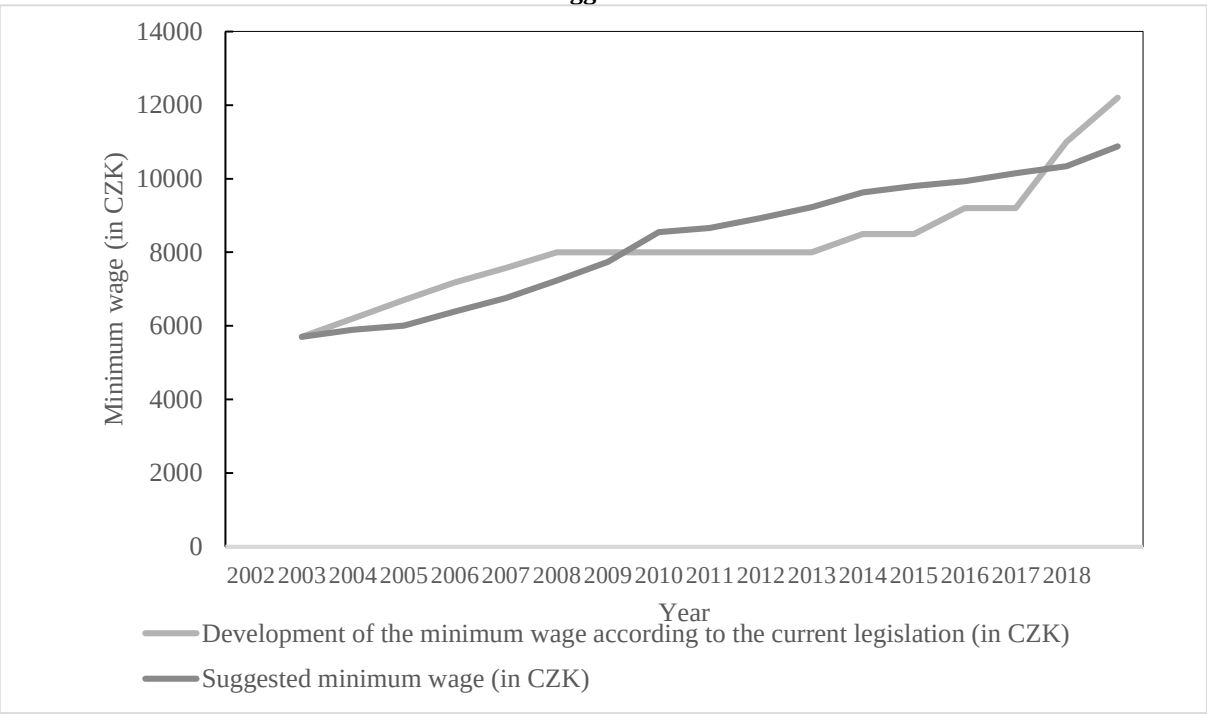
Table 7: Determination of the minimum wage on the basis of the gross domestic product and inflation rate

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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The economic and social consequences of changes in the pension system in Poland in 2017

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Abstract. On the 1st of October 2017 the new law on statutory retirement age in Poland came into force. According to the new regulations insured people born after 31st December 1948 are entitled to retire after reaching a retirement age of at least 60 years for women and at least 65 years for men. It means coming back to the previous retirement age, which was gradually increased from 1st January 2013. This reversal of pensionable age in Poland has significant economic and social consequences. The cognitive goal of the article is to analyze the macro- and microeconomic consequences of restoring the statutory retirement age at the previous level.

The results of analyzes show that the macroeconomic effects of the restoration of the previous retirement age will be negative - the expected increase in public finances expenses for subsidies to the Social Insurance Fund, from which pension benefits in Poland are financed, and the decrease of the GDP growth dynamics related to the population aging and changes on labour market. Also in the microeconomic perspective the balance of changes of pensionable age is negative, because the expected replacement rates (retirement pension to recent or average earnings) will be reduced – for both women and men, in case of women even much more drastic. The future replacement rates in Poland are projected to be among the lowest in the OECD. A full-career average earner can expect the net pension to be 34% or 39% of previous earnings for men and women, respectively, against corresponding OECD averages of 62% and 63%.

It can be assumed that sooner or later it will be necessary to extend the statutory retirement age in Poland. Due to strong politization of this issue that is unlikely to happen before the next parliamentary elections.

Keywords: statutory retirement age in Poland, pension reforms, economic and social consequences.

JEL Classification: J18, J26

1 Introduction – the subject research: statutory retirement age as one of the basic parameters of pension systems

The statutory retirement age in the public pension system is one of the most important parameters of the pension system (Pacud 2016; Żukowski 2013; Blake 2006; Barr, Diamond 2006). It is fundamental in determining pension entitlements. It divides the phase of accumulating pension capital (in a capital-financed pension system) or the phase of acquiring pension rights (in the PAYG system, where generations of retirees are paid from the contributions or general taxes of the working generation) from the payment phase of pension benefits (the decomposition phase). This is also the case in countries (such as in Poland) where the statutory retirement age sets the lower limit of age from which one can retire and not the obligation to end professional activity.

The State is responsible for the determination of the age, but this raises a number of controversies both for the theory of social policy, as well as for different groups of stakeholders. It especially concerns employers, employees, current and future retirees, as well as politicians, who are all too familiar with this important social problem. Establishing the retirement age has both economic and financial dimensions closely related to demographic and legal ones (the realization of the pension entitlement), as well as an institutional one (the obligation of state institutions to pay benefits for the elderly in an efficient and effective manner).The literature of social policy highlights the need to take different circumstances into account in determining the statutory age of entitlement to receive pensions. The predicted state of public finances should not be the only prerequisite, albeit a very important one. At stake are also legal conditions (compliance with the Constitution, European law and international law), as well as important social considerations (e.g. the question of whether the statutory retirement age should be fixed at the same level for all, or take into account the different life situations of women and men, or of persons engaged in certain occupations, etc.).

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Every change in the statutory retirement age determines significant economic but also social and political consequences. The aim of this article is to analyse already observed and anticipated results of the implemented changes of statutory retirement age in Poland from the point of view of pension economics. These changes will be compared with solutions and regulations regarding statutory retirement age in other EU countries.

1.1. Methods of research

The author have used the method of critical analysis of literature, the method of comparative analysis, the method of analysis of legal acts, as well as statistical methods and simulations regarding the amount of future retirement benefits. The sources of data used for research are OECD, Eurostat databases and statistical data of the Social Insurance Institution (in Polish: Zakład Ubezpieczeń Społecznych, public institution responsible for payment of benefits from the pension insurance system in Poland, including retirement benefits).

2 Theoretical backgroud – chosen concepts concerning changes to the statutory retirement age

Research on changes to the statutory retirement age in Poland is carried out mostly on the basis of economics and the social security law. The first kind of considerations – carried out within the framework of the pension economics – present the consequences of the restoration of the retirement for the national economy and for the various participants in the pension system (micro). Representative for this group are the works of Marek Góra (Góra 2016), Joanna Rutecka (Góra, Rutecka 2013), Agnieszka Chłoń-Domińczak (Chłoń-Domińczak, Góra, Rutecka-Góra 2016), Kamila Bielawska (Bielawska 2015), Sylwia Pieńkowska-Kamieniecka (Bielawska, Pieńkowska-Kamieniecka 2015) or Magda Malec, Joanna Tyrowicz (Malec, Tyrowicz 2017).

The second group consists of the works on social security law, exposing such issues acquired rights and other specific problems of regulations related to the statutory retirement age (Pacud 2016).The dependence of benefits on the retirement age (the schedule) is an important indicator in any public pension system.

In the literature on pension issues, a consensus can be observed concerning the positive impact of extension of the minimum statutory retirement age on the long-term sustainability of pension systems and on the reduction of subsidies to social security systems. Demographic and economic forecasts suggest that making workers accept the necessity of working longer is indispensable if public Pay-As-You-Go (PAYG) pension schemes are to provide adequate income for the elderly in the decades to come (e.g. European Commission (EC) 2012a; 2012b). The old-age dependency ratio is to increase by the year 2060 from an EU-wide average of approximately 29% to just above 50% (Eurostat 2016a). This means that the proportion of persons of working age in relation to the number of persons of post-working age will change from about 3:1 in 2016 to only about 2:1 in 2060. In this situation, promoting a longer working life and increasing workers' productivity is crucial for the sustainability of pension systems, but also for national economies as a whole (Domonkos 2015, p. 134). Extending the statutory retirement age in response to the increase in life expectancy has been also recommended by experts of international organizations (European Commission, OECD). For example, in an OECD comparative study of pension systems, it was stated that "the most popular measure was to strengthen the incentives to work by increasing the minimum retirement age and/or the main retirement age, thereby enlarging the contribution base while preserving adequacy for those who are able to work longer" (OECD 2015, p. 20). Such pension reforms have been evaluated as "progressive" for the prospect of the improvement of financial sustainability.

However, there are also analyses that indicate negative consequences of extending the statutory retirement age for certain demographic cohorts and labour groups. For example, Andras Simonovits describes an interesting paradox of pension schemes with a defined contribution formula, such as the Polish pension system since 1999:

"The nonfinancial defined contribution (NDC) pension system has recently become popular mainly because of its alleged actuarial fairness. Using the framework of mechanism design with adverse selection, these systems have theoretically been criticized because they neglect the resulting regressive intracohort redistribution: longer lived workers retire later and are rewarded as if their life expectancies were average" (Simonovits 2013). Behind the close link between lifetime contributions and annual benefits, there is a hidden regressive lifetime redistribution from the poorer to the richer. Upper-income people enter the labour force later in life and live longer after retirement (Breyer, Hupfeld 2009). Comparative studies conducted in Denmark, France, Germany, Italy, the Netherlands, Poland, Sweden and the UK proved that only a minority of employers have applied measures to recruit or retain older employees (Conen, Henkens, Schippers 2012).

3 Old-age pensions and changes in statutory retirement age in Poland

Poland has introduced significant reforms of its pension system. In 1999 the old-age pension scheme reform came into force. From this moment on two old-age pension schemes have been jointly in operation in Poland (ZUS 2016, p. 50):

- old-age pension system operating under earlier rules (Defined Benefit pension formula11, financed purely with PAYG method) – for persons before January 1949;
- old age pension scheme operating under the new rules (Notional Defined Contribution pension formula in first, basic pillar12, funded second in form of pension funds with Defined Contribution formula and voluntary additional pension schemes – the third pillar) – for persons born after 31 December 1948.

The new statutory pension system, fully implemented in 1999 consists of two elements, both of which are mandatory and universal (there are special schemes for farmers and some civil servants such as the military, police, judges and prosecutors): a pay-as-you-go notional defined contribution (NDC) scheme, administered by the Social Insurance Institution (ZUS) and a fully funded scheme, managed by independent private investment companies, supervised by the State.

The statutory pension is based on the defined contribution principle, dependent on the accumulated capital in ZUS and the open pension funds (hereafter OPFs) and on the average unisex life expectancy at the age of retirement (pensions accumulated in the previous system were based on the defined-benefit principle). Contributions are collected by ZUS, and are transferred to OPFs (chosen by the insured individual). According to the reform programme, benefits of the funded pillar should take the form of a life-time annuity (paid by ZUS).

Table 1: The structure of an old-age pension system in Poland operating under new rules (since 1999)

Criteria for classification	First pillar	Second pillar	Third pillar
Status of the scheme	statutory	Voluntary	supplementary
Participation in the scheme	compulsory	Compulsory*	voluntary
Social objective	basic level of benefits	basic level of benefits	higher level of benefits
Scheme management	public	private/public	private
Benefit financing	from current contributions	capital and from current contributions	capital

*since 2014 - voluntary

Source: Own elaboration based on (ZUS 2016a, p. 54.)

3.1 Changes in statutory retirement age in Poland

In recent years, Poland introduced two major reforms increasing the actual and statutory retirement age. The first reform, in 2009, was to reduce early retirement possibilities before the statutory pensionable age. Though the statutory retirement age was 60 (women) and 65 years (men), there were many possibilities to retire earlier. Polish workers could retire at age 55 (women) or 60 (men) if they had a long work career or if they worked in a job covered by the broad list of conditions giving access to early retirement. The 2009 reform significantly tightened the list of working conditions that give right to early retirement. As a result, the actual retirement age in Poland increased from around 59 to 61 for men and from around 56 to almost 60 for women. At the same time, between 2008 and 2014 the employment rate for people aged 55-64 increased from 31.6% to 42.5%, according to the Eurostat figures (European Commission 2016, p. 1).

The second significant reform of retirement age was introduced by means of the Act of 11 May 2012 on the amendment of Act of the pensions from the Social Insurance Fund and other acts. Statutory retirement age for woman born till 31 December 1952 has been left at level of 60 and for men born till 31 December 1947 respectively

[11] A defined benefit pension plan(pension scheme) is a type of pension plan in which an employer/sponsor promises a specified pension payment, lump-sum (or combination thereof) on retirement that is predetermined by a formula based on the employee's earnings history, tenure of service and age, rather than depending directly on individual investment returns.

[12] A defined contribution (DC) plan is a type of retirement plan in which the employer, employee or both make contributions on a regular basis.[1] Individual accounts are set up for participants and benefits are based on the amounts credited to these accounts (through employee contributions and, if applicable, employer contributions) plus any investment earnings on the money in the account. In defined contribution plans, future benefits fluctuate on the basis of investment earnings.
Notional (Non-Financial) Defined Contribution systems are accounting devices that treat PAYG system like defined contribution (DC) system. Pension benefits are paid out of current contributions like in a conventional PAYG system, but the link between benefits and contributions is individualized and defined by the NDC accounting mechanism.

65 years. Starting from 1 January 2013 the retirement age has been gradually increased and – as a target – equalized. The retirement age of 67 years was applicable to woman born after 30 September 1973 and men born after 30 September 1953. The increase in the retirement age was not supported by society. According to an opinion poll, 83% of Poles did not approve of it (CBOS, 2012). The increase of statutory retirement age became one of the important issues raised during the presidential and parliamentary election campaigns in Poland in 2015.

On the 1st of October 2017 the law from 16th November 2016 on the changes in the Law on retirement and other pensions provided by the Social Insurance Fund and some other laws (Journal of Laws 2017, item 38) came into force in Poland. The most crucial is change in article 24, paragraph1 of the Law from 17th December 1998 on retirement and other pensions from the Social Insurance Fund (Journal of Laws 1998, No. 162, item 1118), introducing a reduced retirement age. According to the new article insured people born after 31st December 1948 are entitled to retire after reaching a retirement age of at least 60 years for women and at least 65 years for men. It actually means coming back to the previous retirement age, which – as already mentioned – was gradually increased from 1st January 2013. Hence, in October 2017, the statutory retirement age decreased by 14 months.

4 Macroeconomic effects of the changes in the statutory retirement age in Poland introduced in 2017

From the macroeconomic point of view, a pension system is a mechanism for dividing the GDP between working generation and the post-working age generation. In the microeconomic perspective, the effects of changes in the statutory retirement age can be analyzed for an employee and for his employer. For an individual participant of the pension system, the pension system is an instrument for smoothing consumption over time, transferring part of the income enabling consumption from the period of professional activity for the period after its completion.

First of all, it is worth analyzing macroeconomic effects. The fewer people of the productive age involved in generating GDP, the lower the possibilities of maintaining economic growth. Only in part, human labor can be replaced by other factors of production (capital, use of natural resources or technology). Even the anticipated increase of labour productivity in a knowledge-based economy would not compensate for the decline in human labor generating social income.

Population ageing is accelerating in Poland. Between 2015 and 2050, the number of people older than 64 per 100 people of working age (20-64) will increase from 24 to 60. As a result Poland's old-age dependency ratio will move from below to substantially above the OECD average (OECD 2017).

Reduction of retirement in Poland may be surprising (Śleszyński 2017, p. 79) especially if we compare it with data from recent years on average life length and the indicator of economic burden - the ratio of number of pre-working (0-17) and post-working (60/65 +) people to the number of people in production age (18-59 / 64) – see table 3.

Table. 2: Inicators of economic activity and average length of life in Poland

Year	2010	2011	2012	2013	2014	2015	2016
Indicator of economic burden in percent	55	56	57	58	59	60	62
Average length of life in years - men	72.7	72.4	72.7	73.1	73.8	73.6	73.9
Average length of life in years - women	80.6	80.9	81.0	81.1	81.6	81.6	81.9

Source: (http://stat.gov.pl/wskazniki-makroekonomiczne) (access: 15.02.2018)

If the indicator of economic burden and the average life expectancy increases, there is no macroeconomic reason to shorten the statutory retirement age. Also long-term demographic forecasts indicate the demographic aging trend, with significant impact on macroeconomic situation in Poland (see table 4).

Table. 3: Population of Poland in working- and postworking age – forecast after lowering statutory retirement age

Year	2015	2020	2030	2040	2050	2060
Total population (in thousands)	38 490	38 346	37 403	36 108	34 696	33 126

In this:						
in pre-production age	6 959	6 954	6 223	5 561	5 499	5 230
in production age	24 141	23 843	22 926	22 385	19 834	17 459
indicator of economic bourden in percent	57.7	61.0	63.1	61.3	74.9	86.5

Source: (ZUS 2016b.)

The most important expected macroeconomic effect of reducing retirement age is its impact on labour market. The number of employees will be reduced and the number of inactive people will increase, thus fewer workers will have to maintain a larger group of retired people. It weakens the labour market in Poland and could stimulate the growth of the shadow economy (Haponiuk 2016, Śleszyński 2017).

4.1 Financial implications of reduction of statutory retirement age

The demographic aging process (an increase in the population in the post-electoral age in relation to the population of people of working age) is a serious challenge for public finances. In particular - will affect the increase in subsidies from the state budget to the Social Insurance Fund, from which pension benefits are paid. Shortening the statutory retirement age will only accelerate and strengthen the negative impact of demography on the financing of the public pension system in Poland (see table 5).

Table 4. Social Insurance Fund balance in three variants of forecasts of receipts and expenditures for years 2018-2022

Specification	2018	2019	2020	2021	2022
Variant nr1(basic)					
Balance in billion PLN	-56.5	-60	-63.5	-68.5	-73.5
Balance in % of GDP	-2.72%	-2.72%	-2.71%	-2.75%	-2.77%
Variant number 2 (pessimistic)					
Balance in billion PLN	-65	-72	-79.5	-88.5	-96.5
Balance in % GDP	-3.22%	-3.39%	-3.56%	-3.75%	-3.93%
Variant number 3 (optimistic)					
Balance in billion PLN	-48.5	-49.5	-51	-53	-55,5
Balance in % GDP	-2.28%	-2,17%	-2.08%	-2.03%	-1.98%

Source: (ZUS 2015, pp. 16-17.)

Of cause, the condition of Social Insurance Fund und of the whole public pension system in Poland is dependent from many factors, not only from demographics. In the periods of economic expansion and boom unemployment decreases and receipts from pension contributions increase. That is what happened in Poland in 2017 (GDP growth by 4.6%). Also in 2018 relatively high economic growth is expected. The basic scenario of FUS receipts and expenditures is most probable (Śleszyński 2017, p. 20). But even in the less likely optimistic scenario the reduction of statutory retirement age in Poland will cause additional costs and will have negative impact on financing of the Polish pension system. The simulations carried out by the Social Insurance Institution (ZUS 2017) show that lowering the statutory retirement age will result in additional costs related to the payment of retirement benefits in the years 2017-2021 of 54 bln PLN (12.7 trillion EUR).

5 Microeconomic effects of the changes in the statutory retirement age in Poland introduced in 2017

The microeconomic effects of changes in the statutory retirement age can be examined both from the perspective of a single participant of the pension system and from a single enterprise (employer). All simulations of retirement benefits carried out so far indicate that they will be lower after lowering the statutory retirement age. This is primarily related to the adopted formula for determining retirement benefits. As already mentioned, the entire public pension system is based on the principle of defined premium (DC). An old-age pension under the new rules (introduced with pension reform in 1999) is based on close correlation of the benefit amount with the amount of contributions actually paid.

The change of statutory retirement age will especially influence woman as their shorter professional experience means less accumulated pension contributions and longer pension period, resulting in lower pensions. Lowering

the retirement age will lead to an increase in the number of people receiving minimal pensions even twice (Haponiuk 2016). For example, Z.Śleszyński's prepared exact simulations of expected pension benefits in correlation to retirement age. The fragment from its calculation is presented in the table 6.

Table 5. Percentage growth in the pension level while retiring in specific age comparing to the age of 60

Retirement age		60	61	62	63	64	65	66	67
Revaluated initial capital* (on 31 XII 2017)	Yearly contribution (inPLN)	Pension level (in PLN)	Percent growth in the pension level while retirering in specific age comparing to the age of 60						
283 253 PLN	4 685	**1118,5**	8.4	17.5	27.4	38.1	**49.8**	62.6	**76.5**
	9 000	**1125.5**	9.9	20.8	32.5	45.3	**59.2**	74.6	**91.3**
	12 000	**1130.4**	11.0	23.0	36.0	50.2	**65.7**	82.8	**101.4**
	15 000	**1135.3**	12.0	25.2	39.4	55.1	**72.1**	90.9	**111.5**
500 000 PLN	6 000	**1970.6**	7.9	16.6	25.8	36.0	**47.0**	59.0	**72.1**
	9 000	**1975.5**	8.6	17.9	27.9	38.8	**50.7**	63.8	**78.0**
	12000	**1980.4**	9.2	19.1	29.9	41.6	**54.4**	68.5	**83.8**
	15000	**1985.5**	9.8	20.4	31.9	44.4	**58.1**	73.2	**89.6**
600 000 PLN	6000	**2362.7**	7.7	16.2	25.2	35.0	**45.7**	57.4	**70.2**
	9000	**2759.8**	8.3	17.2	26.9	37.4	**48.8**	61.4	**75.0**
	12 000	**2769.6**	8.8	18.3	28.5	39.8	**52.0**	65.3	**79.9**
	15000	**2377.5**	9.3	19.3	30.2	42.1	**55.0**	69.3	**84.7**

*Initial capital – pention entiltments transferred from the old pension system for people who worked before 1999.

Source: Simulation based on (Śleszyński 2017, p. 82.)

In the defined contribution system – as clearly illustrated by data from table 5 – each subsequent year of extending the professional activity translates into a significant increase in the retirement benefit, and shortening the contribution period significantly reduces future retirement.

Reduction (or rather – withdrawal from extension) of the statutory retirement age in Poland differs from the tendency observed in most EU countries, where the statutory retirement age has already been or is being gradually increased. Due to automatic adjustments of both notional accounts to wage bill and GDP growth and pensions to life expectancy, population ageing will lower pension benefits unless workers fully compensate by working longer. The future replacement rates in Poland are projected to be among the lowest in the OECD. A full-career average earner can expect the net pension to be 34% or 39% of previous earnings for men and women, respectively, against corresponding OECD averages of 62% and 63%. Replacement rates are among the lowest in the OECD and in EU (see table 6).

Table 6. Net pension replacement rates by earning

	Individual earnings, multiple of mean for men (women where different)			
	Pension age	0,5	1	1,5
Czech Republic	**65**	**88.3**	**60.0**	**48,7**
Denmark	74	110,3	80,2	76,2
Estonia	65	73,7	57,4	51,1
Finland	68	66,9	65,0	65,1
France	64	70,4	74,5	70,3
Germany	65	54,7	50,5	49,8
Greece	62	60,7	53,7	54,1
Hungary	65	89,6	89,6	89,6
Iceland	67	85,5	75,7	77,8

Ireland	68	70,0	42,3	32,4
Italy	71	93,0	93,2	93,8
Latvia	65	55,7	59,5	59,0
Luxembourg	60	98,3	88,4	83,6
Netherlands	71	105,1	100,6	100,2
Poland	**65 (60)**	**37.2(35.3)**	**38.6(34.1)**	**37.9(33.8)**
UE 28 (average)	**65.9 (65.5)**	**79.7(79.6)**	**70.6(70.4)**	**66.8(66.6)**
OECD (average)	**65.8 (65.5)**	**73,2(72.7**	**62.9(62.2)**	**58.9 (58.2)**

Suorce: (OECD Pension models, in: OECD Pensions at a Glance 2017.OECD 2017.)

It is worth to mention that reaching the statutory retirement age gives the right, but it is not an obligation retire. Poland is one of the few European OECD countries that do not allow employers to set an age when an employee has to retire. Nevertheless, the employment rate among 65-69 year olds at 10% is much lower than the OECD average of 26%. From the point of view of a participant in the pension system, it would therefore be cost-effective to extend the period of work and retire beyond the statutory retirement age. The public authorities and public institutions (including the Social Insurance Institution) have undertaken information activities promoting longer work and indicating the possibility of a significant increase in retirement benefits due to longer work and a longer period of paying pension insurance contributions. But there are so far only negligible effects of this information campaign. The data published by the ZUS show that in the group of people who from October 1, 2017 have acquired the right to a retirement pension due to the statutory pension, over 90% already receive retirement benefits: these are 312,9 thousands additional pensioners (178.5 tsd. women and 134.4 tsd. men). If the statutory retirement age were not shortened, those who worked, of course, would work longer and would start receiving higher retirement benefits in the future. For economically inactive people, shortening the retirement age was advantageous, because they would not be able to raise their future pensions anyway, because they are not working and will no longer be paying out pension contributions.

Taking into account the microeconomic perspective of an employer, the assessment of the effects of lowering the statutory retirement age is more complex. With a low level of unemployment (5.4% in 2017 - measurement of the BAEL method), it is not easy to recruit employees with appropriate qualifications in place of people retiring. On the other hand, most employers in Poland do not make sufficient efforts to motivate older people to work longer or to serve older people. This is evidenced by the low employment rate of older people (55-64 years) according to BAEL, amounting to 46.1% compared to other EU countries.

6 Conclusions

Polish experience shows that the vast majority of people retire in the year of obtaining pension rights, even if they are still able to work. Some people later combine retirement with labour. In pension systems in the form of a defined contribution or Non-Finacial Definied Contribution (such as in Poland), the amount of retirement benefits is directly related in an equivalent way to the length of working period and to the sum of paid contribution. Extending the professional activity after reaching the statutory retirement age means increasing the amount of the pension. Even so, only a few participants of the pension system decide on such a solution.

The presented analyses clearly show that the reduction of the statutory retirement age in Poland from 1 October 2017 was unfavourable from the macroeconomic as well as microeconomic point of view. For the Social Security Fund and the state budget, it means additional, significant expenditure (estimated PLN 54 billion in the years 2017-2021). The shortage on the labour market that cannot be fully compensated (especially when experienced professionals are retiring). Reduction of the statutory retirement age strengthens the negative the impact of the demographic process of an aging population on the economy and especially on the financing of the social security system. Only people with the lowest income, having sufficient seniority to pay the minimum pension, will not lose financially by retiring earlier, because they will receive a minimum pension in the state guaranteed by the state.

For employers, changing the statutory retirement age may mean additional costs associated with looking for new employees, but in some cases also a chance to rejuvenate the team. The low employment rate of older people in

Poland indicates that far too many people in Poland are not working much before they reach the statutory retirement age (even shortened) and there is still much to do in this area – both for economic and social policy.

It can be assumed that sooner or later it will be necessary to extend the statutory retirement age in Poland. Due to strong politization of this issue that is unlikely to happen before the next parliamentary elections.

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FDI and investments in SPE – differences in elasticity

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Abstract. This paper analyses the relationship between tax variables and foreign direct investments. As dataset, data about inflow of FDI are used – firstly FDI data containing data about special purpose entities (SPE) and data without SPE. There are many studies which analyze influence of taxation (especially corporate income tax variables) on the amount and location of foreign direct investments, but only few papers discuss difference between data with SPE and non-SPE data.
The analysis is done for yearly data for period 2014 – 2016 as two steps analysis – if FDI takes place or not and about decision about the amount of FDI.
The results shows, that the data of FDI in SPE has impact on elasticity of variables. In the step about decision making, data without SPE has more statistically significant variables. In case of decision about amount of FDI the statistically significant variables are almost the same in both cases, but there is difference in the elasticity (impact). The impact of data without SPE is only in the amount circa 80% of the amounts of data with SPE.

Keywords: FDI; taxation; SPE; special purpose entity

JEL Classification: F21, H24.

1 Introduction

Foreign direct investment (FDI) is one of the best measurements of attracting foreign investors by countries. There are many possible factors which could influence the decision about location and amount of the FDI. Demirhan and Masca (2008) and Becker et al., (2005) described some of these factors – market size measured by GDP, openness, labor cost and productivity, political risk, infrastructure, growth and tax. FDI has based on (Vintila, 2010) many positives effects – increasing of productivity, transfer of technology and know-how and decreasing of unemployment. On the opposite site, FDI could have also negative effects on the receiving country – inefficient allocation of sources because of distortion of governmental policies (Raff, 2004). Generally, it is considered, that FDI has positive impact on the receiving country.

The aim of this paper is to analyze the relationship between tax variables and total amount of FDI for 2 situations – if investments into SPE are counted in the total amount of FDI and as second possibility, if the investments into SPE are not counted in the total amount of FDI. The tax factors cover also labor taxation (not only personal income tax, but also the social security contributions paid by employer and employee). The elasticity of the variables for these two models will be afterwards compared to each other.

The analysis of influence of tax variables could be done in two steps based on the two step estimation model described in Hansson and Olofsdotter (2014). First step analyzes if the FDI should be located in the given country and the second step analyzes the amount of FDI (if it takes place).

There are many papers which analyze the influence of corporate income tax on FDI as this could be the most important tax factor for potential investors (Wolff (2007); Bieltvedt Skeie (2017); Bénassy-Quéré et al. (2005); Mooij and Ederveen (2006). The result shows negative impact of corporate taxation on the FDI

Other authors analyze the influence of other taxes e.g.- Buettner and Wamser (2009) analyze other tax variables like sales tax, VAT, excise and import duties, property tax and labor tax (taxes on skilled labor). Also Popovici (2016) analyze the impact of corporate income tax, labor tax and value added tax on the FDI. Based on these studies labor tax has statistically significant negative influence on the FDI.

The implication of labor taxation on FDI was analyzed by Hansson and Olofsdotter (2014) and Egger and Radulescu (2011). The results show that labor taxes differences between countries imply negatively the FDI with the elasticity of -2.

Based on the literature review, following factors were considered as important by decision about FDI – GDP, GDP per capita, distance, labor costs, corporate tax rate and tax wedge.

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Based on (Markusen, 1984), there are 2 different types of FDI – horizontal and vertical – it depends on the main motivation of the investors – in case of horizontal FDI, the main motivation is to expanse their business to another markets, in case of vertical FDI, the main motivation is to benefit from (mainly) low wages for part of the production process and decrease production costs. Based on Blonigen (2005), horizontal FDI are more common than vertical FDI. (Overesch and Wamser, 2009) discussed, that vertical FDI are more sensitive on tax variables than horizontal.

Based on (OECD, 2015), the SPE is usually used for channel investments through several countries before reaching their final destinations (because of this, SPE has no or few employees, little or no production, controlled by nonresident). This could afterwards distort statistic related to the FDI in two ways – these transactions have impact on inflows and outflows of FDI in the given country (net result should be the same in long run).

Based on available literature, there are few papers which adjust FDI data from SPE values or compare these values with FDI with SPE. (Damgaard and Elkjaer, 2017) compare amount of FDI and rank depending if counted SPE or not. Influence of SPE (especially used for financing of other companies) was held by Dutch national bank (Claassen and van den Dool, 2013). Another study was made for Hungarian case (Montvai, 2015).

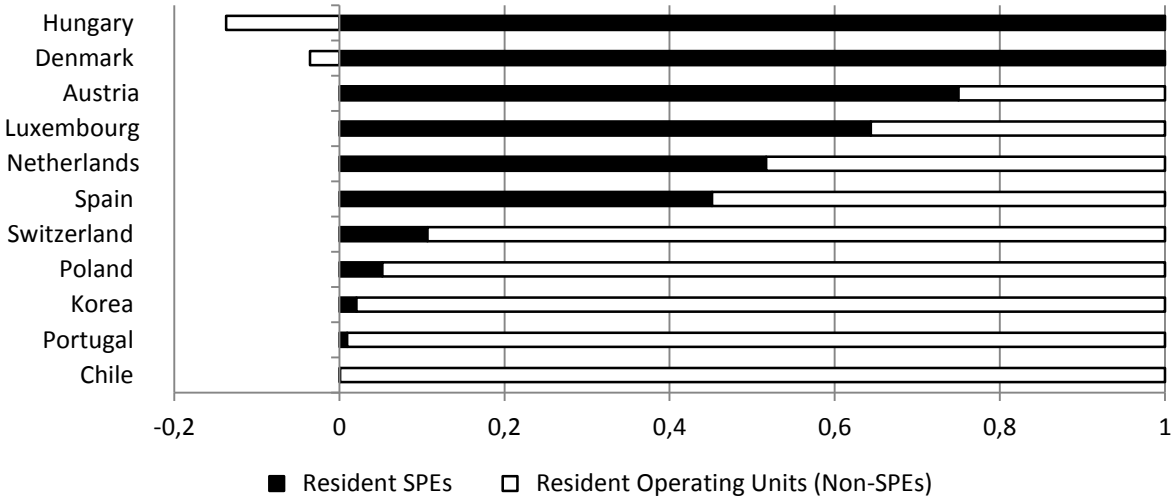
Data

The available data of FDI could be adjusted from investments into the SPE (special purpose entity). OECD countries implemented new standards related FDI no later than in 2014.

Because of this change, the new data under the new definition of FDI (BMD4) give currently more accurate information than previous definition (BMD3). Based on the (OECD, 2015), the highest share of FDI related the SPE was in 2013 in following countries: Luxemburg, Netherlands, Hungary, Austria and Iceland. Luxemburg is well known as the right place for location of all types of holdings and Netherlands is usually used as location of intellectual property and location for financing entities.

The difference between new standard and old standard (and their values of reported FDI) is shown on case of Hungary. There are high differences between statistic which includes SPE and excludes SPE (e.g. from Luxemburg inflow only 35% relates to the real investments, the rest is only going through the Hungarian economy).

Figure 6: Ratio of inward FDI into the economy in 2016 – FDI in SPE and FDI in Non-SPE



Data source: OECD

Based on the OECD data for 2016, some of the countries did not reported any FDI related to the SPE – it was e.g. Czech Republic, Finland, France, Germany, Greece, Slovak Republic and Slovenia. In cases of Belgium, the FDI into SPE was negative and total FDI was positive. In case of Denmark and Hungary the FDI into SPE was the mainly part of the FDI and amount of FDI into other type of entities took opposite mark than the total FDI (part of Figure 1). In figure 1, please find countries, which total FDI is mixture of investments into SPE and into other entities.

In the OECD statistic are data in definition of BMD4 available for years 2014-2016. It is short period, but there is no other solution as the full data for previous period are not available.

Methodology

As explained in the theoretical background, it is important to divide the decision about FDI into two steps – firstly, the investors decide about the fact if invest or not to invest, secondly the investors decide about the amount to invest. This could help us to catch the effects of variables, which lead to zero FDI in that year and which variables have impact on the amount to invest.

The analysis will be done with data about inflow of FDI into the country – inflow of FDI into all companies (counted also with SPE) and inflow of FDI without counting the inflow into the SPE. The reason for this separate analysis is that, these values depend on more (tax) variables and investments into SPE reflect only some special treatment in the local regulations.

The dependent variable will be amount of FDI (natural logarithm) and information if there was positive FDI or not. Source of these data is OECD. The FDI will be measured as inflow of FDI into one country from each country from Europe states (members of OECD).

The analysis will be done, because of limited available data, only for period of 3 years – 2014-2016 for OECD countries from Europe (in total 25 countries). Generally, this gives us 3 600 observations as we have 2 different explained variables related to the FDI. For each year were found variables for one direction between couple of two countries. Some countries provide no data related to the non-SPE FDI flow (Finland, Ireland, Luxemburg, Norway, partly Sweden, Slovakia, Spain).

Because of missing data for some observations and countries, we have only 2 558 observations and there is only 1 455 positive observations. For computing this analysis, software Gretl was used.

In this paper will be used similar methodology as in (Wolff, 2007). In this paper, the sample selection model based on (Heckman, 1979) is used. This model works with problem of sample selection bias – we have to consider not only the (positive) flow of FDI, but we have to also consider the decision, that the FDI flow takes place or not. The explanatory variables could be the same for both steps or they can differ.

Decision about FDI is done in 2 steps. Firstly investor decides, if the investment will be done in given country and if yes, then he decides about the amount of investment. The same approach will be used in this paper.

In the first step will be used logit model as it fits best in this situation based on the possible results (yes x no results) and this model is used in cases of choices and decisions. First step uses dummy variable 1, if FDI is positive (FDI takes place) and 0 otherwise. This analysis could give us information about factors, which are important for decision making about location of FDI.

The logit model formula is following:

$$y = \ln\left(\frac{p}{1-p}\right) \quad (1)$$

where y = influence of all factors, which could be decisive for FDI placement
p = probability that the placement will be done in given country

The equation (1) could be rewrite as following for measuring probability:

$$p = \frac{e^y}{1+e^y} \quad (2)$$

where y = influence of all factors, which could be decisive for FDI placement
p = probability that the placement will be done in given country

Results of logit model could not be easily interpreted as linear regression, because the dependence is not linear, but it is exponential. Influence of increase of explanatory variable by 1 on the dependent variable is not the same for the whole scale (e.g. in the middle the dependent variable could increase by 1 %, in the higher part it could be increase only about 0,05 %).

The first step based on the methodology used is to analyze if there is any flow of FDI in this direction. For this purposes the following equation (3) is used:

$$s_{ijt} = \beta_0 + X_{1ijt}\beta_1 + \varepsilon_{1ijt} \quad (3)$$

where s_{ijt} = which implies, if there was positive flow of FDI ($s_{ijt} = 1$) and otherwise ($s_{ijt} = 0$)
β_0 = constant
X_{1ijt} = values of explanatory variables for investment country i and hosting country j in year t

β_1 = regression coefficient of FDI on changes of explanatory values
ε_{1ijt} = error term

Second step analyses the variables, which influence amount of FDI, if the FDI is observed (e.g. in first step is variable equal to 1).

Amount of FDI is influenced by many variables with different power and direction (negative or positive) plus the error term should be considered for each year (t) and investing country (i) and host country (j). This analysis will be done as gravity model. This analysis is done only in case, that the amount of FDI in this direction is positive (in the first step is variable equal 1). Variables from which are composed variables X_{1ijt} and X_{2ijt} may not be the same.

$$FDI_{ijt} = \beta_0 + X_{1ijt}\beta_2 + \varepsilon_{2ijt} \quad (4)$$

where FDI_{ijt} = total value of the FDI of the investment country i and hosting country j in the year t
β_0 = constant
X_{2ijt} = means values of all explanatory variables for investment country i and hosting country j in year t
β_2 = regression coefficient of FDI on changes of explanatory values
ε_{2ijt} = error term

Second equation could be written in log-semi log specification. In the equation, some variables have high variability. Because high variability of some values, these variables are used in natural logarithm – amount of FDI flow between countries, absolute values related to GDP (GDP, GDP per capita) and distance. The other variables will be not computed as logarithm (the variability is low). For more information about variables, please see table (1). The equation (4) could be written as follows:

$$\ln FDI_{ijt} = \alpha_1 \ln GDPDom + \alpha_2 \ln GDPPar + \alpha_3 \ln GDPpCapDom + \alpha_4 \ln GDPpCapPar + \alpha_5 \ln Dis + \gamma_6 V_6 + \ldots + \gamma_n V_n + \varepsilon_{3ijt} \quad (5)$$

where $lnFDI_{ijt}$ = natural logarithm of FDI flow of the investment from country i into hosting country j in the year t
Vn = values of each explanatory variable for investment country i and hosting country j in year t (other than used in previous part of equation)
α = regression coefficient
γ = dependence between amount of FDI on changes of explanatory values
ε_{3ijt} = error term

Based on the correlation matrix, there is high correlation (correlation higher than 80%) between average wage and GDP per capita – in reporting country and also in partner country. Because of this, the GPD per capita will be not used and only average wage will be used as independent variable.

In table (1) are stated all variables together with their sources.

Table 17: Variables used in model

Variable	Description	log-form	Source
lnFDI	Amount of FDI inflow into the country – dependent	yes	OECD
FDI-dis	1 if positive flow, 0 otherwise – dependent	no	OECD
lnGDP-rep	GDP - reporting country	yes	OECD
lnGDP-par	GDP - partner country	yes	OECD
lnGDPcap-rep	GDP per capita - reporting country	yes	OECD
lnGDPcap-par	GDP per capita - partner country	yes	OECD
CIT-rep	CIT marginal tax rate - reporting country	no	OECD
CIT-par	CIT marginal tax rate - partner country	no	OECD
PIT-rep	tax wedge – total amount - reporting country	no	OECD
PIT-par	tax wedge – total amount - partner country	no	OECD
lnWage-rep	average wage cost in economy - reporting country	yes	OECD
lnWage-rep	average wage cost in economy - partner country	yes	OECD
lndist	distance between capitals	yes	Cepii

GDP reporting (domestic) and partner country should have positive impact on the location and amount decision (Egger and Maria Radulescu, 2011; Wolff, 2007) as especially the variable of GDP of partner country means that the partner country will be able to invest in reporting country. Reporting country has to be able also to receive the investment.

Wage costs in reporting country should have negative impact on inflow GDI in case of vertical type of FDI, on the opposite site, the wage costs in partner country should have positive impact on the location and amount of FDI (Egger and Maria Radulescu, 2011). In case of horizontal type of FDI, the impact of wage costs is not clear, but it should be also negative for domestic country and positive for partner country. Distance should have negative impact on both steps of decisions - location and amount of FDI (Egger and Maria Radulescu, 2011; Wolff, 2007).

Corporate income tax rate of domestic country should have negative impact on location and amount of FDI as it decreases the net profit of investors (Wolff, 2007). CIT rate of partner country should have positive amount of FDI (especially in case of vertical kind of FDI) as the investors search for countries with lower taxation of their investments (Wolff, 2007). The variable of labor tax wedge of domestic country decrease the FDI as it decreases net wage of employees and in case of managers also their motivation. This variable also increase the total gross amount of costs which has to be paid by employer.

Results and discussion

Table 2 shows results for 2 steps decision making model for total amount of FDI without data for SPE and for total amount of FDI with data for SPE. First step was to decide if the FDI flows into the country and second step is analysis of the amount of FDI.

Table 18: Total amount of FDI without SPE, Total amount of FDI with SPE

	Total amount of FDI without SPE					**Total amount of FDI with SPE**				
	Location			**Amount**		**Location**			**Amount**	
Variable	**Coef**	**SS**	**z**	**Coef**	**SS**	**Coef**	**SS**	**z**	**Coef**	**SS**
const	−3,52197		−1,2174	−40,71550	***	−2,26197		−0,8557	−54,7204	***
l_GDPrep	0,00819		0,1510	0,54717	***	0,02633		0,5345	0,69786	***
l_GDPpar	0,15983	***	3,2572	0,48905	***	0,21718	***	4,5428	0,61237	***
l_Wagerep	0,41729	**	2,1890	0,48530	**	0,18895		1,1213	1,30727	***
l_Wagepar	0,12378		0,7285	2,99152	***	0,03677		0,2200	3,41131	***
l_dist	−0,29489	***	−3,1859	−0,92216	***	−0,23309	***	−2,5821	−1,11186	***
CITrep	0,00820		0,4868	0,028271	*	−0,01288		−0,9953	−0,02368	
CITpar	0,01914		1,4958	0,003479		0,00688		0,5562	−0,00955	
PITrep	−0,03297	***	−2,9529	0,01378		−0,00677		−0,7826	0,01886	**
PITpar	−0,01644	**	−2,0188	0,00989		−0,01371	*	−1,7534	0,01254	
% of predicted cases	61,2 %					62,3 %				
coef. determina-tion				59,19 %						62,05 %
n	1230			659		1328				796

Source: OECD, CEPII, own calculation

Note: Coef = coefficient, z= ratio between coefficient and standard deviation, SS = statistical significant level, *** = 1%, ** = 5%, * = 10%.

The results for decision about the FDI placement in case of total amount of FDI without SPE – logit model - (if the inflow from the partner country takes place or not in domestic country) are statistically significant variables about distance, GDP partner country, labor costs of domestic county and labor tax wedge in both countries.

The variable distance has expected (negative) influence on FDI location. Tax wedge on labor has also negative effect on the location of FDI. This is expected by the domestic country, as wage costs are important parts of total company's costs and tax wedge influence net income of employees. However, it is interesting why the tax wedge in partner country has negative influence on location of FDI as one could expected opposite relationship (high tax wedge in source country of FDI should mean higher motivation for location FDI abroad). Similar situation is by the variable of wage costs - there should be negative relation with country receiving FDI and not positive. The

reason could be the fact, that wage costs are highly correlated with GDP per capita and this variable show us the possibility to receive the FDI.

Based on the results of the OLS model for decision about amount of FDI without SPE, it is possible to say, which variables are statistically significant and which not. The total amount of FDI without SPE which inflow into the domestic country is positively correlated with values of GDP (both – domestic and partner country) and the same is valid for wage costs (which has high correlation with GDP per capita and this could be the explanation of positive correlation – the influence of partner country wage costs is 6 times higher than influence of domestic wage costs). Total amount of FDI inflow is negatively affected only by the variable of location (in line with expectation).

The results for decision about the FDI placement in case of total amount of FDI with SPE – logit model - (if the inflow from the partner country takes place or not in domestic country) are statistically significant only variables about distance, GDP partner country and labor tax wedge of partner country.

The variable distance has expected (negative) influence on FDI location. Tax wedge on labor of partner country has also negative effect on the location of FDI, but this result is interesting as one could assume opposite relationship (high tax wedge in source country of FDI should mean higher motivation for location FDI abroad).

The amount of FDI is influenced by the similar variables as in model with data without SPE data. There is also high difference between the values of coefficient for wage costs of reporting and partner country – the value for partner country is circa 2,5 times higher than for reporting country.

In following part will be compared results of both models together, whether the investments into SPE has impact on results or not. In the first step (decision about location) FDI without SPE has more statistically significant variables (5 variables versus 3 variables in case of FDI data with SPE. The extra variables are wage costs of reporting country and tax wedge of reporting country (both related coefficients have also higher value in case of non-SPE data than in case of SPE data.

In case of decision about amount of FDI the statistically significant variables are similar - GDP of both countries, wage costs of both countries and distance. In case of data without SPE is statistically significant also CIT rate of reporting country. In case of data with SPE, the extra statistically significant variable is tax wedge of the reporting country. It is also important to compare the power of influence of independent variables. In case of location decision, there is high variability and there is no trend. However, in case of decision about amount of FDI, almost all statistically significant variables in case of data without SPE reach only 75-88% of the values of FDI data with SPE. The exception is variable wage in reporting country, which reach in case of data without SPE only circa 37% of the value of data with SPE.

Conclusions

The aim of this paper was to analyze the relationship between tax variables and total amount of FDI for 2 situations – if investments into SPE are counted in the total amount of FDI and as second possibility, if the investments into SPE are not counted in the total amount of FDI. SPE is usually used for channel investments through several countries before reaching their final destinations. The tax factors covered especially labor taxation (not only personal income tax, but also the social security contributions paid by employer and employee – tax wedge). The analysis was done for Europe OECD countries for period 2014-2016.

As dependent variable was chosen amount of FDI inflow into the selected country, as independent variables were chosen GDP, GDP per capita, labor cost, distance, CIT rate and tax wedge. Based on the correlation matrix, there is high correlation (correlation higher than 80%) between average wage and GDP per capita – in reporting country and also in partner country. Because of this, the GPD per capita will be not used and only average wage will be used as independent variable.

Based on the results, there are different results for data with SPE and without SPE. In case of the first step – decision about choosing of location, the results for data without SPE shows more statistically significant variables - 5 variables versus 3 variables in case of FDI data with SPE. Statistically significant variables in both cases are GDP partner country, distance and tax wedge of partner country. The extra variables are wage costs of reporting country and tax wedge of reporting country (both related coefficients have also higher value in case of non-SPE data than in case of SPE data).

In case of decision about amount of FDI the statistically significant variables are similar - GDP of both countries, wage costs of both countries and distance. In case of data without SPE is statistically significant also CIT rate of reporting country. In case of data with SPE, the extra statistically significant variable is tax wedge of the reporting country. It is also important to compare the power of influence of independent variables. In case of location decision, there is high variability and there is no trend. However, in case of decision about amount of FDI, almost all statistically significant variables in case of data without SPE reach only 75-88% of the values of FDI

data with SPE. The exception is variable wage in reporting country, which reach in case of data without SPE only circa 37% of the value of data with SPE

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Aggressive tax planning and Balance of Payments public data

Jana Tepperová[*] – Jan Pavel[**]

Abstract. Aggressive tax planning (ATP) is on the top of the agenda not only for European countries. Many initiatives at both national and international levels were considered with the aim to reduce any possibilities for international groups of corporations to shift taxable profits towards low tax jurisdictions. This paper analyses most common ATP structures utilised for base erosion and profit shifting and identifies the main parameters of such structures as well as discusses how these parameters are reflected in publicly available Balance of Payments data. With such analysis, countries with preferential tax regimes could be identified.

Keywords: BEPS, Balance of Payments, Corporate taxation, FDI, tax planning.

JEL Classification: H26

1 Introduction

International groups of corporations and their tax optimisation policies are in the focus of governments and international alliances. In 2013, OECD's BEPS project to tackle undesirable tax planning strategies was endorsed by the G20 leaders and OECD started to work on this very ambitious project. Since then, as a result of the BEPS project, OECD has provided 15 actions as recommendations to be implemented so that aggressive tax planning strategies are no longer possible. These recommendations are to a certain extent recognized by more than 100 countries (OECD, 2017a). European Union followed the BEPS project with its Anti-tax avoidance package, including the Anti-tax avoidance Directive (Council of the EU, 2016) which is to be implemented by the EU countries before the end of 2018. In response to aggressive tax planning, discussions about harmonization of the corporate tax in the form of the common consolidated corporate tax base (C(C)CTB) are also back on the table (European Parliament, 2018). All these initiatives have as its objective suppression of the so-called aggressive tax planning (ATP).

ATP has a special position in the tax behaviour, as it is legal but undesirable at the same time. International tax planning can be described as structuring of cross-border matters within the group of companies and related stakeholders with the aim of optimizing the overall tax burden. It is hard to tell where the aggressive tax planning starts. European Commission (2012) proposed in its recommendation that aggressive tax planning is the use of mismatches between two or more tax systems, as well as the use of technicalities of a tax system with the aim of reducing tax liability.

ATP needs to be clearly distinguished from tax evasion. Unlike tax planning structures, tax evasion is illegal by its nature and goes against the law. At the same time, drawing a line between what is legal and what is illegal can affect the inclination to tax evasion, as such (Blaufus at al., 2016). As it is difficult to define the clear border between "fair" tax optimization and aggressive tax planning that already should be suppressed despite still being legal, collecting taxes from multinational companies creates a lot of tension.

The question can be raised: Why is there so many struggles when no unlawful behaviour takes place? The answer lies at the core of the system of international taxation, which is far too outdated to catch up with fast going digital economies. Projects of BEPS, ATAD or C(C)CTB) focus on technical solutions and aim to modernize the system of international taxation so that it better fits the contemporary markets. However, it takes a very long time to bring such solutions into life, as it requires a close cooperation of the countries and their international commitments, represented mainly by the extensive network of double tax treaties. At the same time, countries do not want to lose their sovereignty and control over their national corporate tax systems. That is also why, apart from these technical interventions into the current system of international taxation, other ways to control corporate taxation are undertaken within tax policies and why the companies are making deals with governments to get away from the public scrutiny.

Even though there are different ATP strategies adopted by multinational corporations, there are common features that can be identified within the structures. In BEPS reports (OECD, 2015), some ATP strategies where described as a precondition for follow-up recommendations. European Commission (2015) in its report on Aggressive tax planning described seven ATP model structures with the classification of indicators of such ATP

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structures. In the follow-up report from 2017 (European Commission, 2017), the European Commission continuous to work on identification of jurisdictions that are likely exposed to ATP.

All these initiatives show the importance of having more information about the tax systems as such and understand the ATP strategies to the highest possible level, so that it can be addressed accordingly.

The ATP strategies can be analysed both on the micro and macro level. Micro datasets such as Amadeus database can be used to explore financial accounts of multinational group of corporations. Important role in identifying the ATP structures have case studies (Oats, 2012). From the macro level viewpoint, whether the country is used for specific ATP structures can be reflected in FDI data. High inflows and outflows of FDI, as well as other indicators, could indicate that such jurisdiction might be used as the target country for tax optimization purposes.

FDI data has been used to analyse ATP structures in previous studies. UNCTAD (2015) used information on FDI to quantify to what extent do tax and other financial factors affect investments of global corporations. Desai et al. (2003) and Weyzig (2013) analysed FDI in relation to Netherlands and came to the conclusion that close to 1,600 billion US dollars, representing 13% of the global inward FDI stock, have been redirected through this country. Weyzig (2013) further analyses the impact of potential determinants of such diversion, which strongly depends on the tax treaties' network. Chinese strategic-asset-seeking was researched by Sutherland and Matthews (2009) through outward foreign direct investment and its round-trip back to China to receive the special government benefits and lower taxation. According to their research, 47.5 % of Chinese FDI comes from Cayman Islands and British Virgin Islands.

The aim of this paper is to analyse the most common ATP structures and identify the main parameters used for base erosion and profit shifting, with further discussion of how these parameters are reflected in publicly available data from the Balance of Payments statistics.

7 ATP structures

ATP structures use both national and international rules to optimize the overall tax position of a group of companies. It is useful to describe the logic of an ATP structure first. For such a purpose, we adopt a fairly well researched structure called "Double Irish Dutch Sandwich". Other features typically adopted for ATP are further described as well.

7.1 "Double Irish Dutch Sandwich" as an example of ATP

Double Irish Dutch Sandwich is one of the most frequently described structures used by multinational companies and can serve as an example of ATP. It also shows many features typically used for base erosion and ATP in general. The structure involves three companies, all being part of a group controlled by the US holding company: 1) two Irish companies, one of which has its residency on Bermuda (A) and the other being an Irish tax resident (B), and 2) a Dutch company. The US company transformed IP rights using the cost-sharing agreement to the Irish company (A), providing the licence on these IP rights to the Dutch company, which further provided a sub-licence to the other Irish Company (B). The company (B) further provided sub-licences and services to other companies on the EU and Asia markets. However, the Irish company (B) was taxable in Ireland only on the difference between the royalties received from other companies and royalties paid to the Dutch company. Royalties paid from the Irish company (B) to the Dutch company and further to the Irish company (A) are exempt from taxation based on the EU Directive. Royalties received by the Irish company (A) were taxable on Bermuda, where the Irish company (A) was a tax resident. Bermuda has no corporate tax. (Holtzblatt, M. A. et al., 2016, van den Hurk, H., 2014, Darby, B. J., Lemaster, K., 2007, Jareš, Tepperová, 2016)

The structure was possible both due to the international rules – exemption of royalties based on the EU Directive – but especially by national rules allowing the Irish company to be seated in Ireland and being a tax resident on Bermuda and using a special transfer pricing policy. Furthermore there was the possibility to withdraw by an exemption from the CFC (control foreign company) rules of the US.

The pressure based on OECD BEPS project forced Ireland to amend the rules for tax residency and it is no longer possible to establish a company being seated in Ireland and not being a tax resident there. The rules for taxation of royalties within the EU remained unchanged.

7.2 ATP features

ATP structures are allowed by the presence or absence of international and national rules for corporate taxation. International rules are given either by a respective double tax treaty or by the EU Directive which is implemented within the national rules. National tax rules, also used within the ATP structures, are those that are stipulated by national law and are based on national tax policy.

Taxation of cross-border income is governed by the respective double tax treaty, if concluded between the states. Double tax treaties give a right to tax the income by the state. In the context of ATP structures, this is especially relevant for taxation of passive incomes, such as dividends, interests and royalties. Double tax treaty can give the taxation right to the resident state only or to a certain extent limit the taxation in the source state. According to the OECD model convention, royalties are taxable only in the state of residence (Art. 12, OECD, 2017b). Interests can be taxed also in the state of source with the limited taxation up to 10%. (Art. 11, OECD, 2017b). For dividends, the right to tax is given also to the state of source and it is limited for the related companies. However, some bilateral treaties may stipulate otherwise (Art. 10, OECD, 2017b).

For an effective ATP structure, MNEs would search for a combination of the treaties and national law, when their income is neither taxed at the source state (e.g. the right to tax is not given by the treaty) nor in the residence state (due to the national law or due to the possibility to lower it by expenses). To use advantages given by the treaty, MNEs use the so-called "treaty shopping" by creating a related company in the country with a desirable combination of the treaties which only purpose is to make use of the treaty benefits.

The EU countries are obligated to implement the EU Directives into their national legislation. Within the EU market, common tax policy for taxation of dividends, interests and royalties is given by two directives: the so-called "Parent-subsidiary directive" (Council of the EU, 2011) and the "Interest/royalty directive" (Council of the EU, 2003). Based on parent-subsidiary directive, dividends paid between the companies with at least 10% share for at least 12 months within the EU are fully exempt from taxation. Exemption of interests and royalties is linked to the related companies with shares of at least 25% for at least 24 months; however, this relates only to the source state (paid out interests/royalties). It is up to the national policy of the residency state whether the interests/royalty is taxed there. Thus, the EU countries with no residency taxation of interests/royalties have a special value for the ATP structure.

When it comes to the national policy, features such as rules for tax residency, low tax rate, absence of CFC rules, absence of limits on interest deductibility, weak general anti-abuse rules (GAAR), or the transfer pricing policy are being used within the ATP structures.

States adopt their own rules for tax residency of corporations, often as a combination of the legal (registered seat of business) and economic approach (place of management). If only one of these approaches, either the legal or economic one, is adopted by the given state, there may become a space for ATP. In the past, Ireland did not consider companies seated in Ireland but without any effective management there as its tax residents. Existence of another country with the opposite approach, i.e. not considering as its tax residents companies with an effective management there but without formally registered seat, gave possibility to create the so-called "stateless company" without presence of any tax at all. This was at the same time true for the USA. Such companies were not obliged to tax their world-wide income in any of those countries (e.g. Holtzblatt, M. A. et al., 2016).

Under certain conditions, CFC (Control Foreign Company) rules allow the state where the parent company is seated to tax profits of the subsidiary. The purpose is to avoid base erosion and profit shifting to the subsidiary in the country with low or zero corporate tax. For ATP is typical to search for countries with no CFC rules at all or for countries where CFC rules can be avoided by using some form of an exemption.

General anti-abuse rule (GAAR) is being used when artificial transactions or behaviour takes place with the only objective to obtain a tax benefit. States apply GAAR in different forms. It is not always clearly stipulated by the law, but it can be applied based on court decisions. When GAAR is not present within the given jurisdiction, or its application is not clear, it is assumed that the ATP structure is more likely to appear. Even though there are discussions on the role and effectiveness of the GAAR in the legal system (e.g. Prebble, Prebble, 2008).

Transfer pricing is one of the ways how MNEs can erode tax base in low tax jurisdictions (Sikka, Willmott, 2010). Different policies can be adopted by various countries towards application of the transfer pricing rules. Despite the fact many countries apply the OECD transfer pricing policy, setting prices within such rules still allows MNEs to optimize their overall tax liability. In this context, binding rulings of tax authorities can become an important part of the ATP strategy, as some countries might use such advanced tax rulings to attract companies (Huesecken and Overesch, 2015).

Countries attract companies by low tax rates. Low or zero effective corporate tax rates are a precondition for countries used in ATP as the "final destination" for the tax base, as well as for countries from which the dividends are being paid. Some countries with not entirely attractive corporate tax rates can still be used within the ATP structure, for having for example a desirable combination of tax treaties and thus being used within the treating shopping strategy or exempting certain incomes from taxation altogether.

Differences between the corporate income tax systems allow MNEs to use the so-called "hybrid mismatches", as one country sees the company/transaction of a certain type, but the other country considers the same company/transaction otherwise. ATP structures use such mismatches to reach double non-taxation of its income.

8 Balance of payments indicating ATP

Balance of payments statistics depicts economic relations of a country with other countries during a certain period of time. International Monetary Fund gives guidelines for compilation of the Balance of payments. Guidelines were first presented in 1948; current (sixth) edition of the Balance of payments manual has been issued by IMF in 2009 and implemented by the EU countries since 2014 (Olšovský, 2018).

Certain features used for ATP, as described in Section 2, reflect the Balance of payments data. Information on interests, dividends, provided services or foreign direct investments can mirror some non-standard flows. Such non-standard flows can indicate countries that are used at certain position for ATP structures. The position of the country can be the "final destination" for the tax base/profit or the country may serve as the intermediary country.

The following information from the Balance of payments statistics (Czech National Bank, 2018) can be of interest for identifying countries being used for ATP:

- Services,
- Charges for the use of intellectual property,
- Foreign direct investments,
- Payments on Foreign direct investments – dividends and interests.

For international comparison, indicators that can identify ATP can be observed; those indicators must consider the size of the economy to be comparable:

- Modified FDI/GDP ratio

Both inward and/or outward FDI/GDP ratio indicators can be observed. FDI consist of the basic capital, reinvested profit and other capital. Other capital includes loans received and provided. After deducting the other capital, we can observe the profit shifting from/to high/low tax jurisdictions. Any country with a high inward FDI/GDP ratio together with a standard outward FDI/GDP ratio can indicate a tax haven, as a country where dividends can be transferred from the corporation either untaxed or subjected to a low level of taxation. Countries with both high inward and outward modified FDI/GDP ratio could indicate a country that is being used as intermediary within the ATP structure.

- Import of services/GDP ratio

The balance of payments includes data on both services imported (credit) and exported (debit). High ratio of imported services/GDP can indicate base erosion through transfer pricing. The fact that services between the related companies cannot be filtered creates limitations to the interpretation of this ratio.

- Interest plus dividends/FDI ratio

Profitability of capital invested can be observed from the Balance of payments data. Low capital profitability can indicate base erosion through transfer pricing. On the other side, overly high profitability can indicate profit shifting from the corporation with lower taxation.

- Interest/GDP ratio

Both inward and outward interest/GDP ratio can indicate base erosion through high interest deductions.

- Charges for the use of intellectual property/GDP ratio

Data on charges for the use of intellectual property that include royalties allow observing an indicator that can point at base erosion through royalties. However, similarly to the information about services, limitation of such an indicator is the fact that charges for the use of intellectual property cannot be filtered only for related companies.

After indicating countries with non-standard characteristics according to the above mentioned indicators, parameters of the tax systems should be explored in order to understand what puts the country to such a position within the ATP structures. These parameters can be both national and international. In Table 1, parameters related to the specific types of ATP strategy are presented. Besides those specific parameters mentioned in Table 1, other, more general parameters of the tax system should be stated. These general parameters are:

- tax rates for the corporate and personal taxation of capital income in the target/destination country,
- time tests for exemption of some types of income,
- absence of the General anti-tax avoidance rule (GAAR) or its weak position in the jurisdiction.

Table 19: Parameters of ATP transactions and Balance of Payments data

Type of ATP strategy	Balance Payment data	Possible indicator	Parameter of national tax law allowing for such strategy	Parameter of international law allowing for such strategy
Profit shifting from high tax jurisdiction	FDI, without other capital, outward	FDI, without other capital, outward to GDP ration	Zero/low taxation of dividends in country where the dividends are being paid to	Limitation of rights to tax dividends in double tax treaties and/or by the EU Directive
Profit shifting to destination country	FDI, without other capital, inward	FDI, without other capital, inward to GDP	Zero/low taxation of dividends in destination country	Limitation of rights to tax dividends in double tax treaties and/or by the EU Directive
Profit shifting through dividends	Dividends outward	Dividends outward to GDP Interest plus Dividends/FDI	Zero/low taxation of dividends in the source and/or resident state	Limitation of rights to tax dividends in double tax treaties and/or by the EU Directive
Base erosion through interest deductions	Interest outward	Interest outward to GDP Interest/Loans	Zero/low taxation of interests in the source state Missing rules for interest limitations	Limitation of rights to tax interests in double tax treaties and/or by the EU Directive
Base erosion through interest deductions to destination country	Interest inward	Interest inward to GDP Interest/Loans	Zero/low taxation of interests in residential state	Limitation of rights to tax interests in double tax treaties and/or by the EU Directive
Base erosion through TP	Import of Services Interest Dividends FDI	Import of Services to GDP Interest plus Dividends/FDI	Absence of transfer pricing rules and/or non-standard use of tax rulings	
Base erosion through royalties	Charges for the use of intellectual property	Charges for the use of intellectual property to GDP	Zero/low taxation of royalties in source and/or resident state	Limitation of rights to tax royalties in double tax treaties and/or by the EU Directive

Source: Czech National Bank, 2018.

9 Conclusions

The Balance of Payment statistics can be used to create indicators and suggest countries that are more likely used for ATP structures either as intermediary or destination countries. Indicators using FDI data or data on dividends can indicate profit shifting. Base erosion can be identified by different indicators using the data on interests, services or charges for the use of intellectual property.

When such country is being identified through the set of indicators, parameters of its tax system should be explored. However, some parameters are strictly based on the national legislation and often special position of the given country in the network of double tax treaties can play an important role.

In this paper, indicators that can be used to identify countries involved in ATP structures are specified along with parameters that relate to them. Differences in parameters between national tax systems and international rules

can be included in a macro model to further research the impact of these parameters on base erosion and profit shifting.

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Expenditure on Public Administration in the Statutory Cities

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Abstract. This paper is focused on the evaluation of public administration expenditure in the statutory cities of the Czech Republic. These are expenditures for self-government and delegated state administration. The expenditures on administrative include also the expenditures on delegated state administration; whose administrative districts are different statutory cities that can organize their internal affairs by creating town areas with their own self-government. The statutory city then has a large number of offices, authorities, councilors, and higher administrative expenses. However, not all statutory cities organize their internal affairs by creating town areas. The aim of the paper is to compare and evaluate the expenditure on public administration in 25 statutory cities, both territorially structured and not territorially structured, and to identify the main factors that affect them. The contribution shows overall the issue of assessing expenditures on the administration of statutory cities.

Keywords: statutory city, state administration, self-government

JEL Classification: H50, H72

1 Introduction

Under the conditions of the Czech Republic, all municipalities, such as the basic territorial self-governing units, have the same competences, out of which the statutory cities, which can organize their internal relations in such a way as to create the city's districts, are differentiated. However, no rules are laid down for the dividing of statutory cities and the constitution of city districts, and it is up to each statutory city to decide how to approach this issue. The conditions of individual statutory cities in the Czech Republic are different (Čechák, 2017). In practice, this is reflected in the fact that only seven statutory cities of 25 statutory cities have divided internally their administration[13]. When the statutory city establishes parts with its own self-government, a city representatives and its own district office will be established for the respective part of the city. It is expected that this level of governance will also be reflected in the expenditure on administration of the entire city.

In addition to self-government, the municipality also performs activities, which performs instead of the state, i.e. the delegated state administration. For statutory cities, this execution is entrusted to the statutory city as a whole, however, even within the statutory city, if the city districts are established, some activities of the delegated state administration are delegated to the city districts. This is reflected in the expenditure on administration of these city districts.

Given that the statutory cities constitute a specific group of municipalities, this group of cities was selected to assess the expenditure on public administration only for this group of cities. Statutory cities in the Czech Republic in the number of 25 represent (apart from Prague) the 25 largest cities in the Czech Republic.

The problem of evaluating of the expenditure on municipal administration is generally related to the fact that the expenditure on self-government and for the state administration are not monitored separately and the different roles of municipalities in the performance of the state administration do not allow directly to compare municipalities in terms of expenditure on administration of municipal.

The aim of the contribution is to evaluate the expenditure on public administration carried out by statutory cities and to assess the methodological and economic impacts that can affect the comparability of the expenditure on administration of these cities and identify possible links of the size of expenditure on administration in terms of size of statutory cities.

The issue is related to the search for efficiency of public administration. In this context, it is particularly useful to monitor the effectiveness of expenditure on public administration; for example, it is possible to assess the expenditure on the efficiency of financing the delegated operation of municipalities with extended competence in the Czech Republic (Vrabková, 2016 and Voldánová, 2004). Benchmarking methods, based not only on the monitoring of financial indicators, but also on monitoring the results of the activity (Vrabková, 2012) are also used to evaluate the performance of municipalities.

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[13] The Capital City of Prague is also divided into the parts, but its position is very specific, it combines the role of the municipality and the region and cannot be compared to other statutory cities in the area of expenditure on administration.

The monitored issue fits into the wider context of monitoring the effectiveness of municipal expenditure, specifically focused on one segment of municipalities, statutory cities (like Bagor, 2017) and only on one area of spending.

Methodology and data

Methodological context of expenditure on administration of statutory city

Statutory cities within the public administration carry out activities that concern both activities of self-government and activities of delegated state administration.

Within the framework of the delegated operation of state administration, statutory cities perform all types of delegated state administration (the authorized municipal office, the municipal office with extended competence, the building office, the registry office and the state administration carried out by all municipalities). For most of these activities the size of the administrative district is larger than the territory of the statutory city (administrative districts also differ in relation to the individual activities mentioned). The expenditure on delegated state administration are reflected in municipal expenditure in the form of expenditure in the activity reported as local government activity (§ 6171 (MS)). However, expenditure on self-government (same paragraph) is also monitored here. The comparability of state administration expenditure between municipalities in general is thus limited by the different levels of state administration operation and by the different sizes of administrative districts. Therefore, a direct comparison of data per capita between municipalities is not possible. There is provided subsidy to the municipalities for delegated state administration; opinions differ in its size in relation to the state administration expenditure of individual municipalities, i.e. the extent to which it covers the expenditure of municipalities for the delegated operation of state administration. However, according to the valid rules, this subsidy is provided to all municipalities. The size of this subsidy may be a criterion for eliminating the differences in scope and territorial reach of local governments of individual municipalities.

If we project this rule into the conditions of the territorially structured statutory cities that delegates the administrative (some) activities to the city's districts, then it is disadvantageous for the statutory city, because if the beneficiary was directly city district (with fewer inhabitants) then the income would be higher (of course, on the other hand, there is a prerequisite for lower efficiency of these administrative activities). By allocating these activities between the districts of the statutory city, the expenditure are higher, but the subsidy is set as for the entire statutory city, i.e. the higher expenditure resulting from the fragmentation of the activities into the city districts is thus carried out by the statutory city itself.

Another impact on the high of the expenditure on the state administration of municipalities has revenues from administrative fees, which supplement the funds from the state administration subsidy. Therefor in next evaluation of expenditure on administration in statutory cities is applied an approach of the exclusion of the state administration expenditure and revenue from this activity. This approach is applied in the form of expenditure reduction in local government by the amount of provided subsidy for state administration and next a reduction in administrative fees revenue (SP).

The funds provided to the municipalities for the state administration (provided in the framework of the overall subsidy relationship - SDV) are determined on the basis of a calculation based on the type of operation of the state administration of municipalities and the size of the administrative district; the subsidy is supplemented by funds for the exercise of public guardianship so that the differences between municipalities in terms of the indicators mentioned can be eliminated.

Subsidy to state administration is provided according to the rules established in the state budget, and the rules for the subsidy do not differ from the point of view of municipalities, towns, statutory cities, either territorially structured or not territorially structured. However, in real terms, the high of subsidy per capita differs for a certain type of state administration. The subsidy is not provided to municipalities on a per capita basis, but on the basis of rules (formulas) which give higher subsidy to smaller units (for a smaller administrative district) per capita than for the same activity for municipalities with a larger administrative district; based on the assumption that activities performed for a larger administrative district14 can achieve greater efficiency and therefore simply provide a lower contribution.

Within municipal self-government activities, municipalities are responsible for managing their own affairs, and local spending can be used (part of § 6171 - see above) and municipal representatives (§ 6112 (ZO)).

Expenditure on municipal representatives represent, in particular, expenditure on the remuneration of representatives (free and unpaid). Remuneration rules are set equal for all municipalities. Nevertheless, the comparison

[14] See, for example, the calculation based on the State Budget Act 2016, Act No. 400/2015, Annex No. 8.

between municipalities even with similar size shows that, on the one hand, the number of representatives is not fixed, but for a certain municipality size is defined by a certain interval (even the same size municipalities may vary by the number of representatives) and individuality of individual municipalities can be shown by the number of board members of the municipal, the number of deputy mayors, the number of committees, commissions and the number of their members. All this has an impact on the size of the expenses, especially related to their remuneration.

In the case of territorially structured statutory towns, the number of districts of the city will be reflected in the expenditure of the representatives, as the rules for the number of representatives are not set for the statutory city as a whole, but individually for the city as a whole, but also for each part separately. Thus, with the number of parts, respectively, in terms of population these parts will be smaller, these expenditure will objectively increase.

Methodology for assessing the expenditure on administration of statutory cities

Into expenditure on administration of statutory cities can be included local government expenditure, which include both the expenditure on self-government activities and the expenditure on the delegated state administration (MS), and the expenditure on a representatives (ZO). The resources that are used to cover these expenditure are the subsidy to the delegated operation of state administration, administrative fees, and other own budget resources.

Using these indicators for individual statutory cities, the high of expenditure on administration of city can be estimated from the following points of view:

- Total expenditure on administration of statutory cities per inhabitant (U1 indicator)

This expenditure indicator for the administration of statutory cities includes both the expenditure on self-government and the delegated operation of state administration (§ 6171 "local government"). The comparability of cities is limited here by the fact that the size of the state administration can vary from one city to another because of a different size of administrative district. The evaluation of this indicator for statutory city per inhabitant indicates the size of the expenditure on public administration, which reflects both aspects of the activity (self-government and state administration), but the explanatory power of indicator is limited by the fact that resources are not taken into account and therefore how much money must statutory city use only from its own resources to administration.

$$U1 = \frac{MS}{OB} \quad (1)$$

- Expenditure on self-government of statutory cities per inhabitant (U2 indicator)

With regard to the self-government expenditure (SaS), without the impact of the delegated operation of state administration (the relevant indicator is not monitored), the simulation of these expenditure can be made on the assumption that the subsidy to the delegated operation of state administration reflects the expenditure on the state administration, so we subtract the local administration expenditure (item 4112, SDV), thus eliminating the influence of the size of the administrative district related to the operation of the state administration. And as a further part of the resources to cover the expenditure on the state administration, in addition to the subsidy to the delegated operation of state administration, the income from administrative fees (item 1361, SP) is also deducted.

$$U2 = \frac{MS - SDV - SP}{OB} \quad (2)$$

- Expenditure on representatives of statutory city per capita (U3 indicator)

The expenditure on representatives of statutory cities (ZO) reflects the number of representatives, the number of board members, deputy mayors, the number of commissions, committees and the number of their members etc. Although the statutory interval of size of representatives increases with the size of municipalities, generally the expenditure on representative per capita of the municipality with the size of the municipality decrease. This general tendency can be observed especially when comparing small and large municipalities. Statutory cities are the largest cities where more significant differences cannot be expected for these reasons.

$$U3 = \frac{ZO}{OB} \quad (3)$$

- Expenditure on administration of a statutory city covered by own resources per capita (U4 indicator)

The expenditure on administering of the statutory city paid from own resources (VS) per capita includes, on the one hand, all expenditure on administrative (self-government and state administration) and the expenditure on

the representative, these total expenditure being reduced by the subsidy to delegated operation of public administration (SDV) and incomes from administrative fees.

$$U4 = \frac{MS + ZO - SDV - SP}{OB} \quad (4)$$

Analysis of expenditure on administration in statutory cities

Data on the size of the monitored indicators of all 25 statutory cities were used for the analysis. For the analysis were used indicators for all statutory cities, i.e. including possible parts. These are local government expenditure (MS), expenditure on representatives of municipalities (ZO), received transfers (for the delegated operation of state administration - represented by revenues of the city in the frame of general subsidy relation (SDV), administrative fees (SP). The values of the indicators were calculated per capita, and local government expenditure was calculated without delegated operation of public administration and administrative fees income (the adjustment was made by reducing local government expenditure on subsidy to operation of state administration and administrative fees). An overview of the values of the relevant indicators in the monitored cities is contained in Table 1, including monitored indicators of expenditure on administration per capita (PC).

Table 1: Expenditure of Statutory Cities on Administration in 2016

Statutory cities	PO	SDV	SP	MS	ZO	U1	U2	U3	U4
						MS/PC	SaS/PC	ZO/PC	VS/PC
	population	CZK mil.	CZK mil.	CZK mil.	CZK mil.	thous. CZK	thous. CZK	thous. CZK	thous. CZK
Brno**	377 973	332.7	98.7	1511.5	109	4.00	2.9	0.29	3.15
Ostrava**	291 634	263.9	62.7	1157.4	91.1	3.97	2.8	0.31	3.16
Plzeň**	170 548	120.9	46.4	649.1	52.6	3.81	2.8	0.31	3.13
Liberec*	103 853	66.4	33	301.6	10.3	2.90	1.9	0.10	2.05
Olomouc	100 378	75.1	34.8	478.6	14.1	4.77	3.7	0.14	3.81
Č. Budějovice	93 470	73.5	44.4	306.3	11	3.28	2.0	0.12	2.13
Ústí nad Lab.**	92 984	60.2	21.9	339.9	15.9	3.66	2.8	0.17	2.94
Hradec Králové	92 929	66.8	34.2	249.9	9.6	2.69	1.6	0.10	1.71
Pardubice**	90 044	63.4	29.9	312.6	19.9	3.47	2.4	0.22	2.66
Zlín	75 117	54.1	23.4	239	11.9	3.18	2.1	0.16	2.31
Havířov	73 274	49.6	12.5	180.5	9.9	2.46	1.6	0.14	1.75
Kladno	68 660	61.3	29.4	224.2	8.1	3.27	1.9	0.12	2.06
Most	66 768	44.7	17.8	175.8	5.4	2.63	1.7	0.08	1.78
Opava*	57 387	54.2	19	170.8	13.4	2.98	1.7	0.23	1.93
Frýdek - Místek	56 719	52.3	22.8	197.6	16.2	3.48	2.2	0.29	2.45
Karviná	55 163	39.6	8.5	206.9	9.0	3.75	2.9	0.16	3.04
Jihlava	50 714	48.9	20.2	220.6	7.9	4.35	3.0	0.16	3.14
Teplice	49 959	49.4	21.2	103.1	5.4	2.06	0.7	0.11	0.76
Děčín	49 739	41.6	15.2	171.0	4.8	3.44	2.3	0.10	2.39
Karlovy Vary	49 326	44.9	20.6	193.4	6.5	3.92	2.6	0.13	2.72
Chomutov	48 710	42.3	15.1	178.8	5.4	3.67	2.5	0.11	2.60
Jablonec n. N.	45 510	34.7	12.9	154.4	6.0	3.39	2.3	0.13	2.48
Mladá Boleslav	44 199	53.6	29.6	155.0	7.3	3.51	1.6	0.17	1.79
Prostějov	43 977	50.8	19.9	189.9	9.0	4.32	2.7	0.20	2.92
Přerov	43 994	44.1	13.3	189.2	8.5	4.30	3.0	0.19	3.19

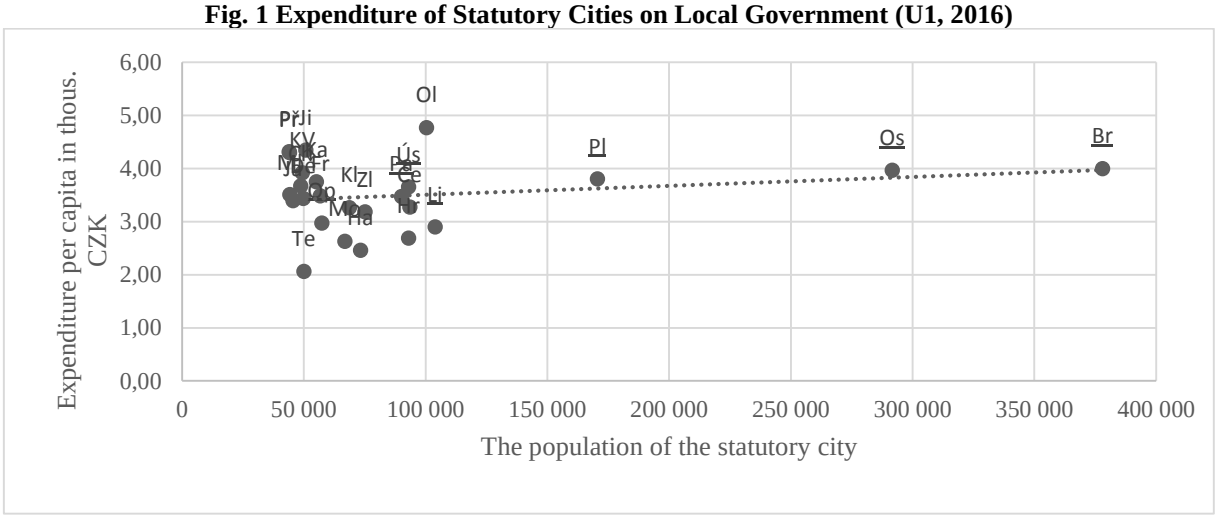
Source: Own calculation based on Monitor data – of the Ministry of Finance of the Czech Republic.
Notes: ** Statutory cities fully territorially structured, * Statutory cities partly structured

PO – population
MS – local government expenditure (§ 6171)
ZO – expenditure on municipal representatives (§ 6112)
SDV – subsidy to the delegated operation of state administration (item 4112)
SP – administrative fees (item 1361)
SaS – self-government expenditure
PC – per capita

3 Results and Discussion

On the basis of the processed data (see Table 1), it is possible to identify the findings from the analysis of the expenditure on public administration of statutory cities. The findings are presented in the form of graphs, which show the relevant views on the expenditure of the statutory cities, in a different degree of complexity, per capita of the statutory city and summary of the findings, including methodological contexts.

Fig. 1 Expenditure of Statutory Cities on Local Government (U1, 2016)

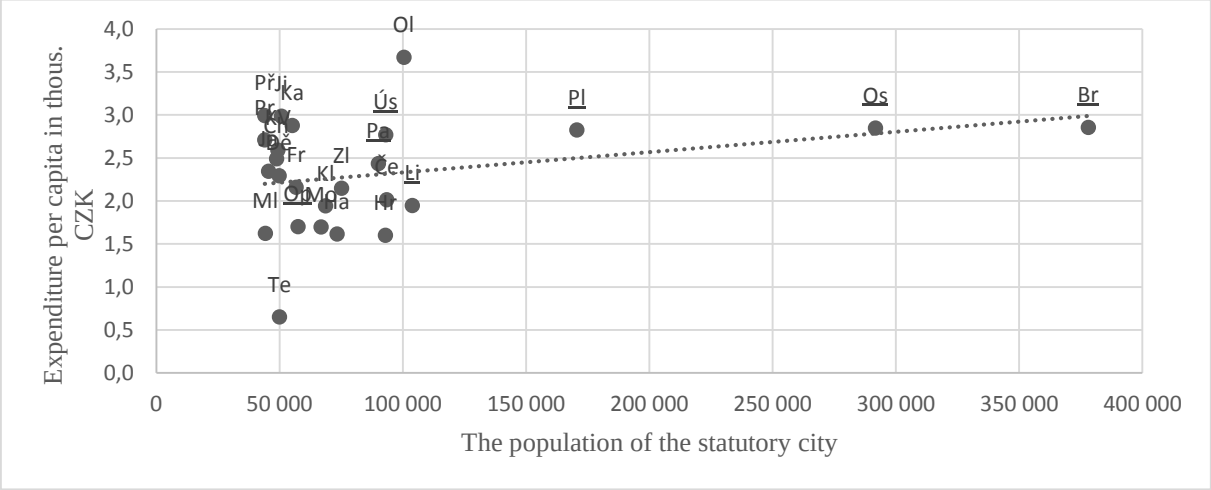


Source: Own calculation based on Monitor data – of the Ministry of Finance of the Czech Republic.

Expenditure of statutory cities on local government account only the total expenditure of statutory cities (without taking into account aspects such as subsidy to the financing of the delegated operation of state administration, size of the administrative district, income from administrative fees). Some decisive conclusions from this analysis (see Figure 1) cannot be formulated given the possible different aspects of individual cities. It is only indicative that the expenditure per capita are from 2 to almost 5 thousand CZK, which is a relatively large spread, which can be derived from the above mentioned reasons. Growth tendency in relation to the size of cities is very modest.

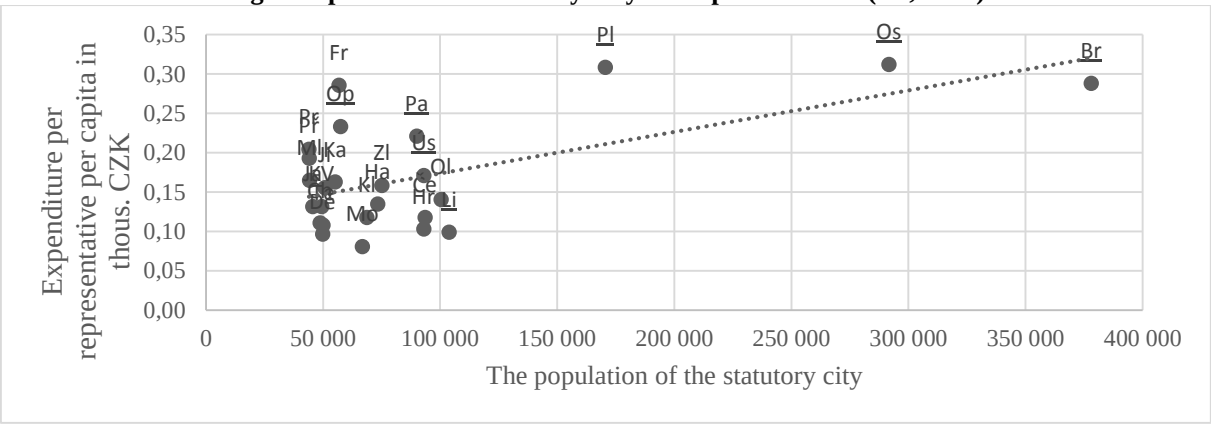
The expenditure of statutory cities on self-government take into account the possible differences in the size of the administrative district in connection with the operation of the state administration and furthermore take into account the revenues from the administrative fees that cover part of the expenditure on the delegated operation of state administration. If we neglect the extreme values (which are Teplice city with the lowest expenditure and Olomouc with the highest expenditure), the expenditure on self-government range from about 1.5 to about 3 thousands CZK per capita (see Figure 2). Here it is shown that the growth tendency in relation to the size of the city is increasing with the size of the city, and it concerns mainly the cities Plzeň, Ostrava, Brno, however, in statutory cities in the size of about 50 to 100 thousands of the population are values twice as large. If we want to formulate a conclusion on the size of the expenditure on administration, it can be said that here, rather than the size of the city, rather other aspects act (for example, it may be what this self-government includes or to what extent certain cities provide some activities by their employees and other cities are outsourced to the same activities, and when in the latter case the expenditure are not reflected in the expenditure on administration but in the relevant substantive part of the budget.

Fig. 2 Expenditure of Statutory Cities on Self-government (U2, 2016)



Source: Own calculation based on Monitor data – of the Ministry of Finance of the Czech Republic.

Fig. 3 Expenditure of Statutory City on Representatives (U3, 2016)

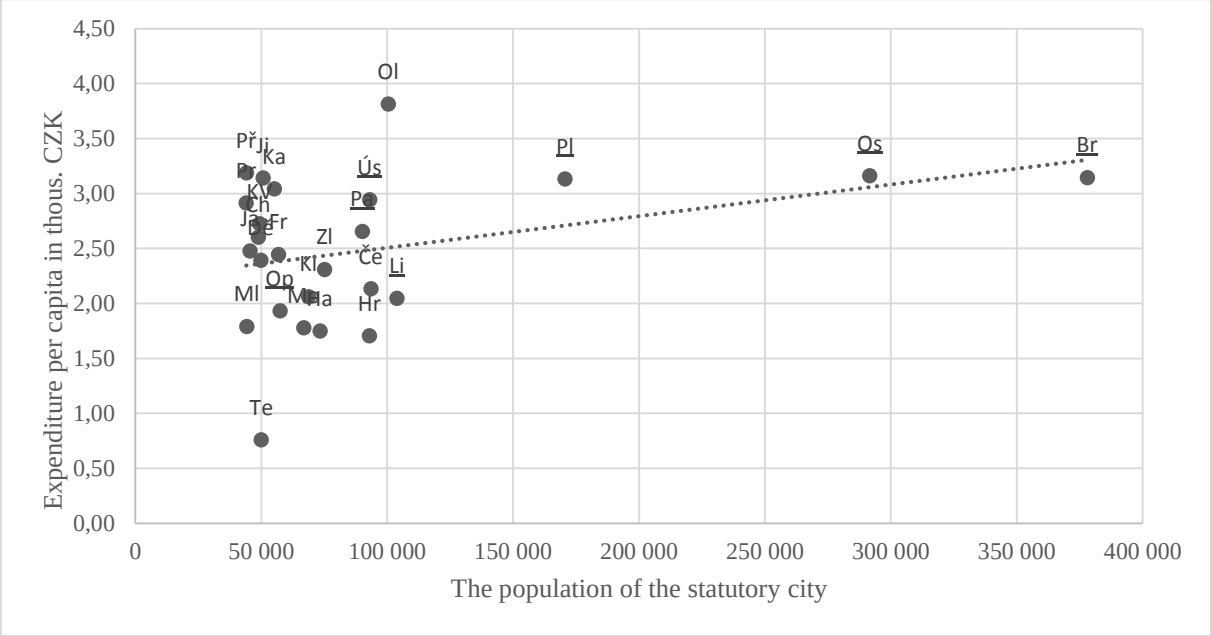


Source: Own calculation based on Monitor data – of the Ministry of Finance of the Czech Republic.

Here, especially in the territorially structured statutory cities, higher values should be found due to the existence of offices in city districts. The city of Olomouc has the highest expenditure, although it is not territorially structured and the territorially structured cities (except of Opava) have higher expenditure, although the cities of Přerov, Prostějov, Karviná and Jihlava have similarly high expenditure. Thus, the assumption of growth of expenditure on self-government due to the division of the city can be confirmed, although other reasons may be reflected in other cities (which cannot be traced from the budget analysis).

In the expenditure of statutory cities per the representative plays a part the number of representatives, committees, etc. Given the tendency, those municipalities choose the number of representatives within the interval, which belongs to the size of the municipality; it is a natural tendency to increase these expenditure per capita with the size of the city; however the existence of city districts is reflected here. In addition to the three largest statutory cities, Frýdek - Místek has high expenditure per capita. Within other statutory cities, the growth trend is not obvious and the values range from about 100 to about 200 CZK per capita in territorially non-structured statutory cities (which are significant differences between values per capita). Thus, it is possible to assume that here the size of the city itself does not work, but that the city itself has a decision on the number of paid representatives, respectively other functionaries (see Figure 3).

Fig. 4 Expenditure of Statutory City on Own Resources Administration (U4, 2016)



Source: Own calculation based on Monitor data – of the Ministry of Finance of the Czech Republic.

Expenditure of statutory cities from own resources include the total expenditure on local government and on representatives, and are cleansed from the subsidy on operation of state administration and administrative fees income (Figure 4). This represents the complex expenditure on administration of municipalities paid from their own resources. From the point of view of individual statutory cities, similar trends can be derived as from the previous indicators. A slightly increasing tendency can be seen, depending on the size of the city, however, in the range of cities from about 50 to 100 thousands inhabitants has these expenditure considerable scattering (even without the inclusion of extreme values). Here, too, it is confirmed that the high of these expenditure per capita depends on circumstances other than the size of the statutory city.

4 Conclusion

From the analysis of expenditure on administration in the group of statutory cities, knowledge was gained derived from the available data on the administration of statutory cities. The possibilities of this data are given by monitoring of the structure of the budget administration of municipalities on the basis of budget structure. The analysis looked in particular at the question of whether the size of statutory cities is related to the size of expenditure on administration. Various aspects of the expenditure on administration of statutory cities were assessed, and although the growth trend was identified, its origins are mainly linked to the three largest cities: Brno, Ostrava and Plzen. For other statutory cities, whose size is in the range of about 50 to 100 thousands inhabitants, the values are represented by a cluster of values that have a large scatter, which is reflected in all observed views. The number of monitored city is not too large, but it covered all statutory cities in terms of intent.

In this sense, it should be noted that either the size of the statutory city does not play a role in the size of the expenditure on administration (and only in a partial way is the creation of city districts is reflected here) and expenditure on administration could only be compared with some output assessments, or this role is played by another circumstances; what these other circumstances might represent is shown below.

In the broader context, public expenditure are influenced, for example, by the political cycle (Plaček et al., 2016), however, for the monitored issue, it is possible to base the comparison of expenditure in individual years, especially current expenditure are included, which do not change very much year-on-year.

The methodical aspect of monitoring and issuing the resources of the authorities (municipalities) can be significant. It is here that the expenditure on administration includes, in particular, expenditure on the Office (municipality, city district) operation and staff expenditure. However, the number of office staff is not limited here and it relates to what the offices provide. This may indicate that some cities ensure their activities through their own staff and other by outsourcing or their own organizations, whereby the relevant expenditure need not to be monitored as part of administrative expenditure but in other areas of budget expenditure. However, such financial aspects of

economic management cannot be captured from available municipal administration data (detailed analyses of cities need to be directly in the offices).

Another aspect of possible influence may be inappropriately defined subsidy on the delegated operation of state administration, respectively the whole mode of financing this activity, i.e. that the formulas for determining the subsidy on the delegated operation of state administration are not set appropriately. Besides the current way of reimbursement of expenditure on the state administration of municipalities, power-based approaches have been considered, which is partly show up due to the fact that the authorities receive a certain amount of money from the state budget when they issue the ID card. The issue of the need for a closer examination of the issue of state administration expenditure in municipalities then shows only the relationship between the size of taken out administrative fees and the size of the subsidy on the delegated operation of state administration, which is reflected in individual cities in values ranging from 20% to more than 50%, which can be seen in Table 1.

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Base Erosion and FDI Statistics

Leoš Vítek *

Abstract. Research literature on corporate tax revenue losses develops dynamically, in particular due to the impact of the 2008–2009 crisis on public budgets. Interest in this research area also support efforts of developed countries at the OECD and the EU levels (Anti Tax Avoidance Package 2016) as well as by other countries at the level of various platforms (e.g. the UN: Subcommittee on Base Erosion and Profit Shifting), aimed at reducing international tax planning and securing additional tax revenue. Studies and policies have focused on the issue of profit shifting and tax avoidance by means of revealing the role of offshore investment hubs in BEPS. FDI analysis stems from the OECD recommendation, which emphasises that FDI could serve as a potential data source for further analysis of the profit-shifting practices of MNEs. Therefore, analysis of the available data for FDI could give a useful indication with respect to the magnitude of BEPS. Data used in this paper were provided partly by the OECD Globalization Database, IMF, and also by the UNCTAD database. The presented paper focuses on the methodology and descriptive statistics of the foreign direct investment (FDI) flows with an emphasis on the Czech Republic. Different FDI reporting methods (BPM5 vs BPM6) present different results and may have impacts on estimates of the BEPS models. The indicator of the level of FDI to GDP demonstrates that even within the EU, there are countries with specific characteristics that may be counted as states with a preferential tax arrangement.

Keywords: base erosion; profit shifting, FDI, dividends.

JEL Classification: H25, H26

1 Introduction and literature review

Ever intensifying globalisation process, economic challenges of developed countries in 2008–2010, growing indebtedness of governments and debates on a fairer distribution of the tax burden: these are the main factors contributing to the major boost of the debate on corporate taxation in the area of base erosion and profit shifting over the past two decades. This discussion has been reflected both in the academic research as well as in activities of supranational or international organisations, such as the UN, OECD or the EC.

Recommended steps proposed by international institutions, individual countries or concerned stakeholders differ. At the OECD level, there is an initiative against the base erosion and profit shifting of corporations (BEPS) that seeks to reduce tax avoidance strategies and aggressive tax planning for multinationals. More than 100 countries subscribe to this initiative and implement it at various degrees of intensity. At the level of the European Commission, apart from attempts to implement the BEPS recommendations there has evolved a debate and proposals that strive to restrict international tax optimisation schemes, e.g. in the domain of electronic services, itself projecting e.g. into the European Commission's proposal to incorporate anti-tax avoidance measures into the draft Directive on the Common Consolidate Corporate Tax Base (CCCTB). The USA went its own way and adopted a relatively radical Foreign Account Tax Compliance Act (FATCA) by which the US *de facto* restricted fiscal sovereignty of other countries.

Research of corporate tax revenue losses and the associated literature dynamically develops mainly due to the impact the 2008–2009 crisis had on public budgets. Interest in this research area is also supported by efforts of developed countries at the OECD and the EU (Anti Tax Avoidance Package) levels, but also by other countries at the level of different platforms (e.g. UN: Subcommittee on Base Erosion and Profit Shifting) to reduce international tax planning and secure additional tax revenue to the public budgets, typically in deficits.

Fuest and Riedel (2009) review empirical estimates of tax revenue losses due to tax avoidance and tax evasion in developing countries. The practice of diverting FDI using conduit countries (i.e. the Netherlands, Luxembourg, Ireland and Switzerland) is based on the extensive and favourable tax treaty network. Desai et al. (2003) considers the possibility that MNEs can reinvest the income of subsidiaries via the base company (i.e. the base company set up in a conduit country) and avoid the home country tax regime. According to Desai et al. (2003) and Weyzig (2013), MNEs have diverted through the Netherlands close to USD 1,600 billion, which represented 13% of the

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global inward FDI stock. Weyzig (2013) empirically analyses the impact of several potential determinants of diverting FDI though the Netherlands as an intermediate country. The author found that FDI diversion strongly depends on the Netherlands tax treaties which tend to increase diversion of foreign investment. Sutherland and Matthews (2009) research the phenomena of the Chinese strategic-asset-seeking of outward foreign direct investment (OFDI). Authors stress that 47.5% of Chinese OFDI comes from Cayman Islands and British Virgin Islands, countries classified by OECD as tax havens.

UNCTAD (2015) is the study that focuses on the issue of profit shifting and tax avoidance by revealing the role of offshore investment hubs in BEPS. UNCTAD (2015) considers that at least 30% of corporate investment stocks have been channelled through conduit countries before reaching their destination as productive assets. UNCTAD (2015) analyses the share of international corporate investment stock routed through offshore financial centres (OFC) and conduits, and FDI that is diverted mainly from tax haven countries or other special purpose entities (SPE) on the average rate of return of capital in developing countries. The objective of UNCTAD (2015) FDI analysis stems from the OECD recommendation which underlines that FDI could be a potential source of data to analyse profit shifting practices of the MNEs. Therefore, analysis of the available data for FDI could give a useful indication with respect to the magnitude of BEPS.

The methodology adopted by UNCTAD (2015) has a conservative approach where the perimeter of offshore investment hubs is limited to tax heaven countries and to the set of countries which explicitly report SPEs. The data used is provided partially by IMF and also the UNCTAD database. The key analytical tool constructed by UNCTAD (2015) is the Offshore Investment Matrix (OIM) that provides a comprehensive mapping of FDI diverted through OFCs and other investment hubs – tax heavens and SPEs. The main assumption of UNCTAD (2015) study is that the share of FDI which comes directly from offshore hubs affects negatively the rate of return of total inward FDI, because the income generated by FDI from OFC is to a greater extent subject to the profit shifting which decreases the rate of return of the capital. Once the relationship and the size of negative effect is established between the offshore indicator and the rate of return, the loss of tax revenues can be determined by using appropriate assumptions on the profitability gap and the average rate of return. The obtained results from the fixed effects OLS-based regression show that developing countries are more vulnerable to profit shifting than the developed countries. Moreover, the authors' interpretation suggests that a 10% share of inward FDI which originates from OFCs results in a 1–1.5 pp decrease in the reported rate of return in the developing countries. From these initial results, UNCTAD (2015) uses the profitability gaps (i.e. decrease in the profitability associated with the actual exposure of developing economies to offshore investment hubs) to estimate the tax revenues loss in developing countries. UNCTAD (2015) found that the tax revenues losses in developing countries due to profit shifting range between USD 330–450 billion.

The most recent studies include Crivelli et al. (2016), Cobham and Jansky (2017). Crivelli et al. (2016) provide an empirical evidence of the impact of BEPS on developing countries. They argue that developing countries are more reliant on the corporate tax revenues than developed countries and based on the presented results they conclude that tax competition and issues of base erosion and profit shifting affect developing countries to at least the same extent as the developed ones. Cobham and Jansky (2017) adopted the Crivelli et al. (2016) model but introduced different data (revenue data from ICTD-Wider GRD, alternative data on average effective tax rates and different data related to the definition of tax havens). Cobham and Jansky estimate total tax revenue loss at around USD 500 billion per year compared to USD 650 billion per year in Crivelli et al. (2016).

While using the balance of payments' data on foreign direct investment (FDI), the article aims to identify those countries whose share of flows to GDP strongly deviates from the average values for other countries. The structure of the contribution is as follows: following the introduction and review of the literature, the methodology for data collection for balances of payments and FDI accounts is described. In the next part are presented basic macroeconomic statistics of FDI, which allow identifying atypical countries. Conclusion and discussion conclude the article.

Data and methodology

For estimates of the magnitude of capital flows transferred between countries for international tax planning purposes, the following estimates of the statistics of the balance of payments are adopted. For a more detailed analysis of BEPS from the macroeconomic point of view, it is necessary to quantify the proportion of FDI in the given economy and its structure and flows of returns between economies. For countries where the largest flows of funds under FDI were identified, tax factors that potentially affect these flows could be analysed

The balance of payments as a sum of economic transactions between residents and non-residents for a certain period of time includes A. current account (trade balance, balance of services, primary income, secondary income), B. capital account, C. financial account (direct investment, portfolio investment, other investments, reserve assets) and D. net errors and omissions. The foreign investment position provides an overview of the overall structure of financial assets and liabilities of residents vis-à-vis non-residents at a certain date.

In 2014, the BPM6 manual was introduced in Member states of the European Union. The sixth edition of the Balance of Payments and International Investment Position Manual (BPM6) updates the fifth edition (BPM5), released in 1993. According to IMF (2013), "the BPM6 takes more deeply into account globalization (currency unions, cross-border production processes, complex international company structures, and issues associated with labor mobility, such as remittances) and builds on the growing interest in examining vulnerability using balance sheet data (for example, greater elaboration of balance sheet components). It also contains increased and updated guidance on new financial instruments and financial activities linked to innovation (for example, on the treatment of short positions, goods under financial leases, and financial intermediation services indirectly measured). BPM6 makes the international investment position (IIP) more central to the framework than does BPM5, and also incorporates clarifications and changes that had already been agreed, such as the clarification of some direct investment transactions".

For OECD statistics is key the methodology OECD Benchmark Definition of Foreign Direct Investment 4th Edition (BD4). At the same time, the EU Member states are bound by European legislation for compilation of the balance of payments' data, in particular by the EC Regulation No. 555/2012. In summary, as oppose to the BPM5, the BPM6 accentuates the three main themes of globalisation. Data are newly published on monthly basis and cover territorial cross-sectional statistics on external economic relations. Foreign trade is monitored on the Community-based principle; there applies the concept of the country of dispatch. The trade balance distinguishes between cross-border and national data.

In the domain of FDI statistics, the BPM6 introduced a different segmentation compared to the BPM5, as shown in the following overview:

Table 20: Differences between the BPM 6 and the BPM5

BPM5	BPM6
Directional Principle	*Asset/Liability Principle*
Abroad Registered capital and reinvested earnings (net) Other capital (net) Inland Registered capital and reinvested earnings (net) Other capital (net)	Registered capital in direct investment enterprises in a direct investor (reverse investment) among sister enterprises Reinvested earnings Other capital in direct investment enterprises in a direct investor (reverse investment) among sister enterprises
Net disclosure of assets and liabilities	*Gross disclosure of assets and liabilities*

Source: Olšovský (2018) + IMF (2010).

Financial flows of foreign direct investments (FDI) are cross-border financial transactions among interconnected subjects (direct investors, direct investment enterprises and/or fellow enterprises). The FDI position measures the volume of a direct investment position at the end of a given period (year), meaning that the change in the direct investment position between two periods is the same as the volume of financial transactions over the given period, taking into account changes in prices, exchange rates and the volume. Financial flows of FDI are in terms of instruments divided into two main groups: (a) financial flows into property interests or equity, respectively, and (b) financial flows into debt. The capital includes equity and preferred stock, reserves and reinvested

earnings. Dividends, profits distributed by affiliates, reinvested earnings and undistributed profits represent the FDI capital gains. Debt instruments include tradable securities, such as bonds, debentures, commercial papers and other marketable debt instruments, such as loans. Interest on debt instruments is defined in FDI statistics as income on debt. Reinvested earnings or reinvestments of profits are specific items of capital in FDI statistics. FDI is expressed in UDS, national currency, or as % of GDP.

In OECD statistics, FDI is comprised of the following components: total direct investments, direct investor in direct investment enterprises parent→affiliate, direct investment enterprises in direct investor DIEDI affiliate→parent, direct investment between so-called fellow enterprises. Fellow enterprises are still divided into two groups: investment in a situation where the ultimate parent controlling company is a resident in the given country, or the second situation, when the parent controlling company is not a resident in the given country. Company-to-company flows are measured for companies where the direct investor or the parent controls more than 10% of voting rights in the direct investment enterprise or an affiliate that receives FDI in another country. Statistics include both direct and indirect 10%+ control (through other companies). Also included are companies that are not interconnected by the 10%+ interest (fellow enterprises), but do have a joint owner with a share of over 10%.

Table 21: FDI financial flows in the Czech Republic, (CZK million)

Type of entity	Asset/Liability principle				Directional principle: Inward		Directional principle: Outward	
	Assets		Liabilities		Net			
	2015	2016	2015	2016	2015	2016	2015	2016
All resident units	91 305	17 857	41 558	158 814	11 441	165 015	61 188	24 058
Resident Operating Units (Non-SPEs)	91 305	17 857	41 558	158 814	11 441	165 015	61 188	24 058

Source: OECD (2018).

Two primary methods are used for reporting the aggregate FDI: the asset/liability principle and the directional principle. Asset/liability principle: FDI statistics are organised according to whether the investment relates to an asset or a liability for the country compiling the statistics. The asset/liability principle does not show the direction of influence. Within the directional presentation, the direct investment flows and positions are organised according to the direction of the investment for the reporting economy.

Direct investment transaction consists of the registered (basic) capital + reinvested earnings + other capital. The registered (basic) capital includes the investment contribution of a non-resident to the basic (equity) capital of the company. Reinvested earnings are the share of the direct investor (in proportion to the direct equity share) on the net income that remained undistributed as dividends. Other capital includes loans received and granted, including debt securities and supplier loans, between direct investors and their affiliates and other entities in the group. These credit relationships are recorded in intercompany receivables and payables.

FDIs are disclosed either under the principle of assets and liabilities (gross basis) for other capital, which affects the total volume of assets and liabilities, or based on the directional principle (net basis). Stocks of listed equity shares are valued at market prices. For companies that are FDI recipients and which are not quoted on the stock exchange, equity shares (positions) are valued at book value. Stakes in equity and reinvested earnings from foreign direct investment are determined once a year based on FDI surveys of micro-units.

Table 22: Balance of Payments, Czech Republic: Balance (CZK billion)

	2004	06	08	10	11	12	13	14	15	16	17
Current account	-114	-87	-75	-142	-85	-63	-22	8	11	74	54
Goods	-68	24	-4	40	75	124	167	220	188	246	241
Services	82	63	89	78	81	78	70	56	78	108	122
Primary income	-128	-155	-148	-250	-223	-238	-249	-261	-255	-252	-261
Secondary income	0	-18	-12	-11	-18	-27	-10	-7	0	-27	-48
Capital account	-14	11	26	38	13	53	82	32	102	54	46
Gross acquisition or disposals of non-produced non-financial assets	0	1	3	10	0	-3	4	2	1	1	1
Capital transfers	-14	11	23	28	13	56	78	30	101	52	45
Financial account	-151	-83	-43	-122	-75	12	68	64	175	117	117
Direct investment	-102	-90	-36	-95	-47	-121	7	-80	50	-187	-135
Portfolio investment	-53	27	9	-150	-6	-55	-93	90	-164	-170	-268
Financial derivatives (other than reserves) and employee stock options	3	-1	3	5	4	-9	-5	-6	-5	11	-14
Other investment	-7	-21	-59	77	-9	116	-30	-13	-57	-102	-712
Reserve assets	7	2	40	41	-17	80	188	73	351	564	1246
Balance from current and capital account	-129	-75	-49	-104	-72	-10	61	40	113	128	101
Balance from financial account	-151	-83	-43	-122	-75	12	68	64	175	117	117
Net errors and omissions	-23	-8	6	-18	-3	22	8	23	62	-11	17

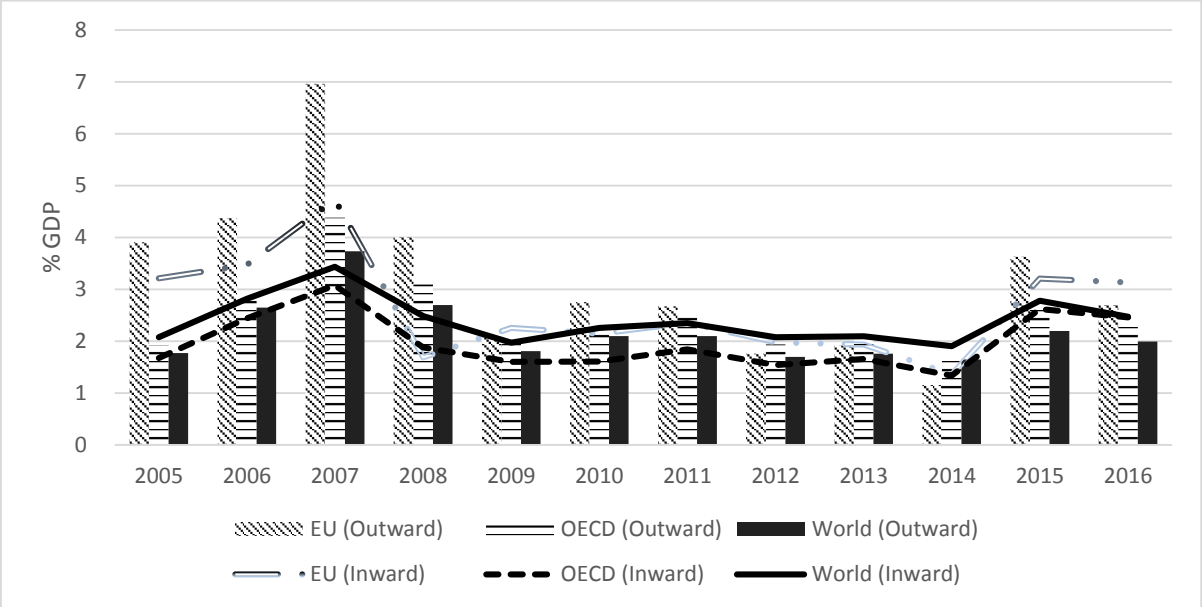
Source: ČNB (2018).

The BPM6 uses a modified sign convention: an increase in receivables and payables is marked as "+" and their decrease as "–", respectively. Net outflow of capital abroad is referred to as net lending, net inflows from abroad is recorded as net borrowing. The national concept of the balance of payments is published by the Member States' statistical offices; the Community concept of the balance of payments is centrally processed by the ECB and Eurostat.

Results

For a basic overview of foreign direct investment flows, the most appropriate and often adopted indicator is the ratio of foreign direct investments to GDP. Average values for countries of the EU, OECD and the whole world (i.e. OECD and other countries such as Argentina, Brazil, China, India, Indonesia, Lithuania, Russia, Saudi Arabia and South Africa) based on the directional principle shows the following figure.

Figure 7: FDI financial flows (directional principle, Outward and Inward flows, % GDP)



Source: OECD (2018).

Average FDI inflows and outflows were in the EU at 2.6% and 3.2% GDP, respectively, in the OECD at 2.0% and 2.5% GDP, respectively, and in all the countries that were followed by the OECD statistics the figures stayed at 2.4% and 2.2% GDP, respectively.

The comparison of FDI flows Inward and Outward among individual countries in 2005 and 2015 is shown in the following table. Countries are ranked descending according to the FDI Inward. Although it is not possible to draw clear conclusions from the flow for individual years, from the available statistics it becomes clear that countries with the largest flows of FDI are Ireland, Luxembourg, Switzerland and the Netherlands.

Table 23: FDI financial flows (directional principle, Outward and Inward flows, % GDP)

2005	Inward	Outward
Ireland	..	7
Switzerland	..	13
Estonia	20	5
Iceland	18	42
Luxembourg	16	24
Belgium	9	8
Czech Republic	9	1
United Kingdom	7	4
Hungary	7	2
Slovak Republic	6	0
Netherlands	6	16
Chile	6	2
China	5	1
Latvia	4	1
Saudi Arabia	4	..
Austria	3	4
Israel	3	2
Denmark	3	5
Norway	3	11
Mexico	3	1
Sweden	3	7
Poland	3	0
Indonesia	3	1

2015	Inward	Outward
Ireland	74	58
Luxembourg	18	55
Switzerland	12	14
Netherlands	9	26
Chile	8	6
Belgium	5	9
Portugal	5	2
Iceland	4	..
Slovenia	4	1
Israel	4	4
Brazil	4	0
Canada	3	4
Mexico	3	1
Spain	3	5
Poland	3	1
United States	3	2
Latvia	3	0
China	2	2
India	2	0
Lithuania	2	0
Turkey	2	1
France	2	2
Indonesia	2	1

Argentina	3	1	Argentina	2	0
South Africa	3	0	Norway	2	6

Source: OECD (2018)

Another indicator in the domain of the balance of payments and flows or stocks of FDI, respectively, that can be put in use to estimate non-standard behaviour in some countries, is the FDI flows' intensity. The index measures the intensity of investment integration within the international economy.

Table 24: FDI flows' intensity, market integration (% GDP)

	2013	2014	2015	2016
Luxembourg	886	337	1179	272
Hungary	-2	5	-24	37
Netherlands	49	15	26	24
Finland	-1	4	-3	8
Ireland	16	15	66	7
Cyprus	-28	-1	62	7
Belgium	5	-2	7	6
United Kingdom	2	:	-1	4
Denmark	1	2	2	4
Sweden	3	1	2	4
Estonia	3	1	0	3
Poland	0	2	2	2
Spain	2	2	3	2
Portugal	0	1	3	2
Czech Republic	2	1	1	2
France	1	1	2	2
Slovenia	0	1	2	2
Croatia	1	4	0	1
Romania	1	:	1	1
Bulgaria	2	2	3	1
Italy	1	1	1	1
Germany	1	1	2	1
Latvia	:	2	1	1
Greece	0	1	1	0
Lithuania	1	0	1	0
Slovakia	-1	0	0	0
Malta	72	61	-3	-7
Austria	0	0	-1	-9

Source: OECD (2018).

According to the OECD (2018a), direct investment refers to the international investment made by a resident entity (direct investor) to acquire a lasting interest in an entity operating in an economy other than that of the investor (direct investment enterprise). Direct investment involves both the initial transactions between the two entities and all subsequent capital transactions between them and among affiliated enterprises, both incorporated and unincorporated. The FDI flow intensity indicator again shows that countries with particularly strong FDI flows are Luxembourg, the Netherlands, Ireland and Cyprus. Belgium is also sometimes considered as a country with specific tax rules that may influence FDI flows. Changes in Hungary may be linked to alternations in its corporate taxation since 2017.

Discussion and conclusions

In their estimates of the size of tax evasion related to international tax planning, academic surveys as well as UN or OECD analyses often reflect foreign direct investment flows or stocks. When estimating potential evasions, there may be identified "above-standard" investment flows with tax incentives. Based on the volume of these flows

and an estimate of the average rate of return, it becomes possible to carry out basic and gross calculations of the loss of potential tax income.

The completed and presented international comparison showed that also within the EU, there are countries where flows of direct international investments are many times higher than the benchmark among developed countries. These are mainly Luxembourg, the Netherlands, Ireland, Malta and Cyprus. Some indicators have also signalled questions with respect to Belgium or, recently, Hungary.

Such roughly constructed indicators, however, may be potentially highly inaccurate: for small economies, they may be affected by one-off large-scale sales, which is particularly relevant for post-transition economies or economies that, for example, for fiscal reasons privatise state-owned enterprises. The question also remains whether very small countries, such as Luxembourg, which traditionally have a very strong banking sector, are being properly described using the FDI flow-based assessment.

Last but not least, it should be taken into account that the results differ according to the BPM5 and BPM6 methodologies. Although most indicators in both methodologies point to similar countries, the rate of intensity of the issue may vary from one method to another. Additionally, data reported by the BPM6 do not possess a sufficiently long time series.

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Reform of the Employee and Self-employed Income Taxation

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Abstract. Post-communist countries mostly realized the Hall-Rabushka tax plan from 1980´s. It was close also in Czechia, but the expert of the neo-liberal party promised to decrease the personal income tax rate to 15 percent before the election and after the election, he did so in the position of the temporary finance minister by adding the employer-paid payroll taxes to this tax base. Today's finance minister wants, on the contrary, to abolish this so-called super-wage taxation in order to reduce taxation of wages only. Similar reflections have always a wider impact primarily on the self-employed and on tax expenditures. It is therefore important to look at the overall analysis of the current Czech system of taxation and social security. That is the aim of this paper, including the resulting steps of rationalization of the employee and self-employed income taxation.

Keywords: Personal income tax, social security contributions, Hall-Rabushka tax plan, self-employed taxation

JEL Classification: H24, H25, H55

1 Introduction

The Czech Ministry of Finance intends to reform the employee and self-employed income taxation as quickly as possible – from 1 January 2019, however, at the beginning of March 2018 the proposal was only at the stage of the external assessment procedure, it was not published in a comprehensive form and subject to public discussion. We can only base our analysis on what the resigning minister, respectively the Ministry of Finance has published in the media and on its website. From these documents it is clear that the starting point for this reform is the requirement to abolish the system of super-gross wage taxation and the main material content is to reduce the rate of employee and self-employed income tax to 19%. In this respect, we would like to investigate whether there are alternatives to achieving the stated objectives and whether the newly proposed structures have a rational foundation. Another objective of the paper is to evaluate the effectiveness of this tax small reform in terms of its direction towards one or the other taxation welfare regime. In this respect, we will follow up the contribution of last year's conference (Vostatek, 2017).

Super-gross Wage Taxation

Super-gross wage taxation is the calculation of the employee income tax where the tax base is the gross wage of the employee plus the employer social security contributions. The aggregate rate of these employer contributions in Czechia has been 34% of the gross wage for a longer time. Even from the tax point of view, it is significant that super-gross wage does not represent the whole labour costs – in this respect, employee benefits (such as employer contributions to private life insurance or supplementary pension savings) escape taxation. As a result, these employer contributions include an indirect state subsidy of the total of 65% of these contributions, which represents the highest rate of state support for these financial products in the world. This cannot be ignored in tax reforms.

In the 1990s, neo-liberal tendencies were largely enforced in post-communist countries, and the World Bank even conditioned granting loans to these countries by these reforms. Czechia was almost not under such pressure, because it did not need these loans. However, the neo-liberal approaches were also applied significantly here, as they were in compliance with the general effort of the government to attract foreign capital: the orthodox neo-liberal tax concept is linked to the refusal of the corporate and personal income taxation, the ideal general taxation is consumption taxation, preferably in the form of value added tax with a flat tax rate.

In post-communist countries, Hall-Rabushka's modified neo-liberal tax concept found its use, replacing the generally forged universal consumption tax – for practical reasons – with two taxes of the same rate: individual wage tax and business tax, each taxing only the respective portion of the value added. The advantage of this proposal (was and) is that these two "partial" taxes are linked to the existing US personal income tax and corporate income tax; the proposal was presented as a considerable simplification of these two taxes (Hall and Rabushka, 1981). Both existing taxes were appropriately "adjusted" in the spirit of neo-liberalism. Newly, individual income tax is to tax only wages, not interest, dividends and other capital gains. Hall and Rabushka "keep" tax deductions from the existing personal income tax on the taxpayer and his/her family, so the result is a progressive flat tax.

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Their business tax does not deduct interest from the tax base, and on the contrary, it fully and immediately deducts the investment (instead of depreciation). Both taxes should have the same, flat tax rate, namely 19%. The flat rate relates these two taxes: "Our flat tax adheres to the principle of a consumption tax: people are taxed on what they take out of the economy, not on what they put in" (Hall and Rabushka, 1985). Let us add that there has been no value added tax in the USA. The Hall-Rabushka proposal has served as the blueprint for several proposals to reform the US federal tax system, but it has not been implemented: it was too radical – the American personal income tax has many tax deductions with many lobbyists behind them.

Estonia is a European pioneer in income taxation having introduced flat income tax rates from 1994. The vast majority of post-communist countries followed Estonia. For us, the essential was the introduction of a flat tax rate in Slovakia in 2004. „Perhaps the most consistent and best-developed tax reform that concerns the flat tax, and which therefore deserves the closest attention, is the Slovak version with its unitary rate of 19% for individuals, corporate entities, as well as for VAT (*true flat tax*). This is in fact the rate recommended by Hall and Rabushka." (MoF, 2008).

Already at the end of 2005, the Shadow Minister of Finance Tlustý introduced at the Czech ODS Congress a pre-election programme, including a "flat tax" at a rate of 15%, including taxation of personal incomes, corporate incomes and value added according to the Slovak model. The 15% rate was a big pre-election trump. After the elections in 2006, Tlustý became a minister for four months, however this government did not gain the confidence of Parliament; during that time he managed to devise the concept of taxation of super-gross wages – the only reason for this concept was the effort to keep the pre-election promise: to tax income at the rate of 15% (even if the state budget could not afford it). With a view of ensuring that, the base of the personal income tax was substantially extended by the employer contributions and the deduction of the employee contributions from the tax base was abolished. We have become the only country in the world in which the tax base also includes employer-paid insurance contributions; the tax base for a single employee thus increased by 54%. (Vančurová and Láchová, 2008). Tlustý assumed that all employers will be required by law to raise employees' wages by insurance contributions paid by employers and that they would no longer be required to pay these contributions. However, his successor did not even try to implement this concept.

In 2010 there was a 27 percent income tax base supplement introduced in Hungary, the reason for the introduction of this "super-grossing" was an increase in public revenues, the official explanation was that, for transparency, employees should see details of their "whole salary": gross wage plus employer social security contributions. This tax base supplement was abolished for incomes below HUF 202,000 monthly from the next year and from 2013 it was completely phased out (Mátyási and Gerő, 2011).

Since 2008, a paradigmatic income tax reform has been implemented in our country, consisting of introducing a flat tax rate of 15% on the super-gross wages. The taxation of dividends and other capital gains was not abolished, however, the taxation of these revenues had been significantly reduced, as the rate of 15% was also applied here. That is the reason why we still have lower rates of capital income taxation than Western Europe. "Social and health" insurance contributions continue to be calculated from gross wages and they are not in any way linked to wage taxation – this is basically consistent with the neo-liberal welfare regime. According to the model, a major restructuring of social security contributions was supposed to follow, including a rise in gross wages to the level of total labour costs, all hand in hand with the privatisation of social security; in this respect, we were witnessing an unsuccessful attempt 5 years ago to partially privatise the Czech "pension insurance" only. It is even ridiculous that the World Bank radically departed from the policy of privatising social pension insurance already in 2003.

Today's Czech system of taxing wages and social security contributions is a reflection of the unfinished neo-liberal revolution. Not only in our country but also in many other post-communist countries social security contributions, paid by employers and often referred to as social levy, dominate in the tax mix. The second typical result of post-communist reforms is the low rate of personal income tax, which is also "transferred" to the low rate of capital income tax. Today, it is not a matter of importance that we incidentally avoided the tax reforms of Hall-Rabushka's theory, because in Slovakia and other countries these tax reforms were later "depreciated" by the differentiation of flat rates. If we want to abolish the super-gross wage taxation today, we should base our analysis on the tax burden on employees and the self-employed. There is no need to include the issue of value added tax or even the corporate income tax, which in our country (even with the rate of 19%) corresponds with the international relations.

International comparisons show that the specifics of Czechia, Slovakia and other post-communist countries are high rates of social security contributions and low rates of personal income tax. In this regard, we should first ask whether these social security contributions are, by their very nature, either

- premiums of social insurance from which earnings-dependent benefits are provided, or whether it is a 'mere'
- earmarked income taxation with the revenues assigned to finance a social security branch.

As for the Czech "general health insurance premiums", the answer to this question is quite simple: according to the classification of types of earmarking (Wilkinson, 1994) it is a weak, wide earmarking type. Czech health insurance premiums paid by employees and employers have nothing in common with the true premiums, even on average for employees as a whole (healthcare costs are only a fraction of the premiums paid). From the point of view of economic theory, these premiums can be dealt with in any way. „Though tax hypothecation might have an expedient role to play in getting a specific project or part of a programme undertaken, it is not a solution to the large-scale and very difficult problems that governments face in making decisions on taxes and public spending." (Wilkinson, 1994). When considering the Czech tax reform, the options when dealing with the health insurance contributions are open; it is "just" a political problem – to provide an explanation of the necessary changes that can "hurt" someone. Czech health insurance premiums paid by employees and employers are a proportional income tax that can be fully integrated into wage taxation paid by employees or employers.

Czech pension insurance premiums differ in their essence from all neighbouring countries, where the principle of equivalence between pensions and contributions prevails. On the contrary, the principle of solidarity prevails in Czechia; more than two-thirds of retirement pensions consist of "flat" pensions at the level of 30% of gross average national earnings (Vostatek, 2016). Coincidentally, Sweden estimates that around 60% of the social security contributions (as a whole) are tax in its nature and only 40% can be considered a standard social insurance premium (Skatteverket, 2016). In Sweden, however, there is no "health insurance" and universal healthcare is actually funded by regional budgets whose main revenue is a proportional personal income tax.

Czech pension insurance premiums are in principle a common state budget revenue, while our specificity is that politicians and journalists create the impression that there is a "pension account" (a notional pension fund) within the state budget, which is subsidised from general government revenues; this notional "pension account" is supposed to be in a surplus this year for the first time in its history – due to a considerable economic growth. From the economic point of view, it can be said that two-thirds of the Czech pension insurance contributions are labour taxation and one third is a true insurance premium. This provides a fair amount of room for rationalising employee income taxation, which will not even be fully used in the planned restructuring of work income taxation, including social and health insurance premiums.

The analysis of the Czech wage taxation will be completed by comparing the structure of the Czech tax wedge with the typical social-democratic, Christian-democratic and neo-liberal tax wedges; we will base our analysis on the definition of these wedges according to the OECD – social security contributions (SSCs) will be for these purposes regarded as taxes, regardless of the rate of application of the principle of equivalence. Table 1 compares the basic, typical structure of labour costs, respectively super-gross wages in the three mentioned welfare regimes. In all three versions, a single childless employee has a gross wage of 100% national average earnings (NAE); his net wage is 70, super-gross wage 130 and personal income tax 30 monetary units. Total social security contributions (SSCs) are 30 units and these units are paid by employees and/or employers, depending on the respective welfare regimes. In the social-democratic model, the entire insurance contributions are paid by the employer, while in the neo-liberal model by the employee and in the Christian-democratic regime, both the employee and the employer pay half. Relations of the social-democratic, respectively the Christian-democratic model roughly correspond to Sweden and Germany. The last column in Table 1 presents the exact figures for Czechia in 2018 in a comparable structure – we have come out of the same net wage of 70 units, and all the remaining data is counted, while preserving accurate relations as they actually are.

Table 25: Czech labour costs (super-gross wage) structure in comparison with 3 welfare regimes: single childless employee with gross wage at 100% NAE

Regime	Social-democratic	Christian-democratic	Neo-liberal	Czech
Gross wage	100	115	130	92.4
Employee SSCs	0	-15	-30	-10.2
Income tax	-30	-30	-30	-12.2
Net wage	70	70	70	70
Employer SSCs	30	15	0	31.4
Labour costs	130	130	130	123.8

Source: Own elaboration.

The comparison confirms the relatively high level of the Czech employer contributions in relation to the OECD average which, however, is not far from the social-democratic welfare regime. The personal income tax rate is

notably low – it does not reach the personal income tax rates in Western Europe nor the average of the OECD countries, even when summed up with the social security contributions paid by employees. In many post-communist countries, the situation is similar to the situation in our country; it is certainly influenced not only by the tax reforms but also by the initial situation in the early 1990s. Taxation of the population incomes played a relatively small role in our country and some others, and social security contributions paid by employees did not exist at all – for systemic reasons. In 1993, the former wage tax was split in our country in the framework of the tax reform into a personal income tax and (low) social and health insurance contributions. Even from the point of view of the structure of super-gross and gross wages, today, there is nothing to prevent us from "adding up" the tax on income from the employment and the contributions paid by the employee. The transition from taxation of super-gross wages to the taxation of gross wages itself is irrelevant for employees in terms of welfare regimes. It is far more important to clarify what should be done with social and health insurance premiums – whether and to what extent it makes sense – and if so, who is to pay it and what base should it be calculated from.

Progressivity and Level of Premiums and Income Taxation

The overall low level of income taxation in the form of employment income tax and premiums paid by the employee and the prevailing tax character of social security contributions as a whole allows us to assess the construction of all payments of the employee as a whole. Employee pension insurance contributions are a proportional employee income tax at a rate of 6.5% of the gross wage, with the wage above 400% NAE not being taxed (a relatively high earnings ceiling, otherwise it is a normal construction of social insurance contributions). The employer pays the pension insurance contributions at a rate of 21.5% on the same assessment base. Employee health insurance contributions are a proportional employee income tax at a rate of 4.5% of the gross wage, with no earnings ceiling; the same construction also have the health insurance contributions paid by the employer, which are collected at a rate of 9% of the gross wage.

Employee personal income tax is collected at a rate of 15% of the super-gross employee's wages. Self-employed persons are subject to the same tax rate on the assessment base relating to their self-employed activity and representing income from their business, after deducting the costs of achieving them. The income of the self-employed persons, after deducting their expenses, is de facto assessed in the same way as the super-gross wage of an employee. The employee and the self-employed premiums are assessed independently of the income tax calculation and vice versa: the premiums are not a deductible item when calculating the income tax. This is a fundamental difference from the Christian-democratic welfare regime, where employee-paid insurance contributions are considered to be the cost of an employee, which than reduces the income tax base (in Table 1, we ignored this fact). The general assessment base of insurance premiums paid by self-employed is 50% of their net income from self-employed activity; it is based on the hypothesis that one half of the self-employed income has the character of wage and the other half is entrepreneurial profit.

The general assessment base in the amount of 50% of the income tax base is consistently used only in health insurance. The participation of self-employed persons in sickness insurance is voluntary (most of the participants are pregnant women); the premium rate is 2.3% of the selected assessment base. The participation of self-employed persons in pension insurance is mandatory, but the amount of the assessment base is chosen by the insureds – usually at the minimum level, which is 50% of NAE for the self-employed (having self-employment as the main activity). The rate of the pension insurance premium for self-employed is 28%, health insurance premium 13.5% and state employment policy contributions 1.2% of the assessment base.

Last year, the Social Democrats voiced – before the elections – the requirement to reinstate the progressive taxation of personal incomes by introducing three additional rates of super-gross wage tax and other assessment bases. This is a very resolute proposal, compared for example to Fico's income tax reform in Slovakia since 2013, where the previous system of flat income tax was "broken" by introducing a second rate of 25%, in addition to the 19% rate. We will not assess the number and amounts of the proposed rates here, as Austria has, for example, 6 non-zero rates. More generally, it is not the task of academics to evaluate the proposed changes to the tax or benefit parameters themselves. However, the party experts do not know what is meant by the progressive nature of the tax, specifically personal income tax. It is stressed even more by the fact that the proposal placed on the website of the party contains a map of Europe with the text that progressive (personal income) taxation has been implemented in 21 countries in the EU – and Czechia and six other post-communist countries are "black sheep" (Member States marked in black colour) which do not have it. (ČSSD, 2017). Progressive taxation of personal income is in all EU countries, only the tools for realising this progressivity differ. Progressive taxation means an increase of the average tax rate with a growing tax base. In systems of flat (marginal) income tax rate, progressivity is realised by tax credit to taxpayers (in our country) or, flat tax deduction (from the tax base). Even after the introduction of a flat income tax rate in 2008, this tax is progressive. It is only a question why the basic tax credit in the amount of CZK 2,070 per month was not adjusted at all in 11 years. Apparently, it came to nobody’s mind – and consequently the tax progressivity has been dropping.

Progressivity of the personal income tax is expressed in various sophisticated ways that respond to the technically complex construction of sliding progressivity in many Western countries. The results of these investigations are published sporadically (Paturot et al., 2013). Moreover, we do not need these sophisticated methods here, because the average tax curve is very smooth in the case of flat tax rate and there is no necessity to explain the "stairs". For our purposes, the basic method used by the OECD in international comparisons will be sufficient. This method measures progressivity by the ratio and difference between two average tax rates, namely for single childless persons with gross earnings of 167% and 67% of NAE.

The progressivity ratio of the total wage taxation rate of a single childless employee (including employee-paid contributions) was, in 2011, on average for all OECD countries 146. The same ratio in the same year for Czechia was 140; progressivity in our country was slightly below average. In 2008, when the flat tax rate was introduced, this ratio was 144. This year, the progressivity ratio dropped to 129. Given that no parameter used in the calculation of this indicator has changed during this time, the explanation of the decrease in the progressivity ratio is simple: the sole reason is the non-valorisation of the basic tax credit (CZK 2,070 per month). This tax credit was 8.9% in 2008 of the then NAE and only 6.9% of NAE in 2018. If we set the credit at 9% of NAE, it would be CZK 2,700 this year and the progressive ratio would raise to 145. This parameter settings can be considered justified, well-founded and, of course, very simple.

The explanation of the progressivity of the overall employee income taxation should be supplemented by the so-called solidary tax surcharge introduced in 2013, initially temporarily for 3 years, but still valid today. The surcharge rate is 7% and relates to incomes above 400% NAE. It does not show up in progressivity ratios. The solidary tax surcharge essentially compensates for the effect of the earnings ceiling in the pension contributions paid by the employee; the earnings ceiling is also 400% NAE and the premium rate is only slightly lower - 6.5% of the gross wage. The obvious option is thus the abolition of the solidary surcharge to the income tax and the abolition of the earnings ceiling for the employee pension contributions – regardless of the other questions.

From the point of view of the overall progressivity level of the income taxation of the Czech single employee, including the contributions paid by him, we may recommend increasing the basic tax credit to 9% of NAE and its further valorisation in the future. From the systemic system point of view, there is nothing to prevent this contribution from being included in the income tax, with the simultaneous transition to the tax calculation from the gross wage; the comparable flat rate of the new income tax is 31.1%.

Self-employed Income Taxation

The situation in self-employed taxation is more complex. Since social security contributions have predominantly the character of income tax (not social insurance), it does not make big sense to calculate "contributions" from half of the self-employed income. In any case, the period when it was expedient to promote self-employment – so that it would develop to a "reasonable level" – has already passed. Today, the situation is in some ways reversed: There are relatively many more self-employed persons (having self-employment as the main activity) than in Western countries and their taxation is significantly lower than in Western countries. Income tax and insurance contributions are subject to aggressive tax optimisation by the self-employed. According to not fully verified information, about 99.9% of the self-employed (having self-employment as the main activity) do not pay any income tax. We will hereafter try to derive a rational system of premiums and self-employed income taxation for current Czech conditions. We will at the same time ignore the cost deductions and value added tax issues.

The substantial input for solving the issue of self-employed taxation is their social security. In this respect, we can assume their continued participation in state-funded healthcare, with the current general health insurance contribution being a "mere" earmarked income tax at a proportional rate. Czech "pension insurance" requires a reform which, while preserving the current scale of redistribution, will mean a reduction of the contributions by at least 11% of the gross wage (Vostatek, 2016). Otherwise, the participation of self-employed in sickness insurance will likely stay voluntary and we do not address this issue further. We recommend exempting the self-employed from paying the contribution to the state employment policy. The "true" contributions will shrink to a maximum of 17% of the gross wage equivalent – instead of today's total contributions at a rate of 42.7%. It is only in these contributions that it makes sense to think about the basis on which it is to be assessed.

Preceding conclusions about the necessary reform of employee income tax, which would have absorbed the existing employee premiums, make it easier for us to seek rational taxation of self-employed income. The rate of income tax for self-employed should (must) be the same, i.e. say 31.1% of the gross wage equivalent. After the reform, the employer will pay all employee health income tax at a rate of 13.5% of gross wages and other premiums totalling 20.5% of gross wage. After the same reform, the self-employed should pay the same health tax and pension insurance premiums at a rate of 17% of the gross wage (compulsory, without the possibility of a reduction to a minimum). Experimental, error and trial calculations have shown that if we want to have a uniform rate of health tax and pension contributions, we have to proceed to reducing the base of the contributions and the tax base. We

still must take into account the special features of the self-employed status – they are not entitled to a paid leave and compensation of lost earnings in case of incapacity for work, etc. Based on these considerations, the recommended base for calculating health and pension contributions would continue to be 50% of the surplus over the expenses of the self-employed persons with the result that the rates are same as those we expect for employees, respectively their employers: 13.5 % and 17%. The contributions thus calculated and paid will be deductible from the income tax base at a rate of 31.1%.

Table 2: Integration of employee social security contributions into personal income tax and its impact on self-employed taxation (CZK monthly)

	Employee	Self-employed
Super-gross wage / Surplus	40,200	40,200
SSC base	29,979	20,100
SSCs	(10,194)	6,130
Tax base	29,979	34,070
Income tax (31.1%)	7,259	8,525
Net income	22,720	25,545

Source: Own elaboration.

We thus conclude on the possibility and need to raise the personal income tax rate to 31.1% and to reduce the premium rate by 11% from gross wages. Such reduced contributions paid by the self-employed persons can be reasonably calculated from a half of the surplus over the expenses and deducted from the income tax base; we illustrate this in Table 2. Here the employee social security contributions (SSCs) are paid by the employer. The gross wage is 100% of NAE in 2018.

Ministerial Proposal for the Income Tax Reform

The proposal of the Ministry of Finance to abolish the taxation of super-gross wages is linked to the proposal to reduce the effective rate of personal income tax, to replace the solidary tax surcharge with a second tax rate and to introduce a deduction of three quarters of the premiums paid from the self-employed income tax base. The key is to reduce the tax burden on employees. "Abandoning the super-gross wage and thus simplifying the tax system and making it more transparent was already one of the promises of the previous government that was not realised for a reasonable reason. Abolishing super-gross wages without changing rates or other parameters is merely an administrative measure that would not bring about any actual change in the tax burden. Therefore, it was responsible to wait for the abolishment of the super-gross wage until we can reduce the real tax rate for employees from 20.1 to 19 percent due to the improved system of tax collection." (Schillerová, 2018).

The Minister is right: the abandonment of the super-gross wage taxation would be self-serving and unnecessary. However, every change of construction requires "guarding" not only the impact on the self-employed, but also tax deductions – because the increase in the nominal tax rate will also increase tax expenditures e.g. for state support of financial products. Therefore, the concept and scope of such tax expenditures should be assessed. Consideration should also be given to eliminating the principle of flat-rate nominal taxation: is it really necessary to ("definitively") introduce a second rate? And, of course, alternative options for reducing the tax burden should be considered. The absence of the Ministry of Finance's expert approach is obvious.

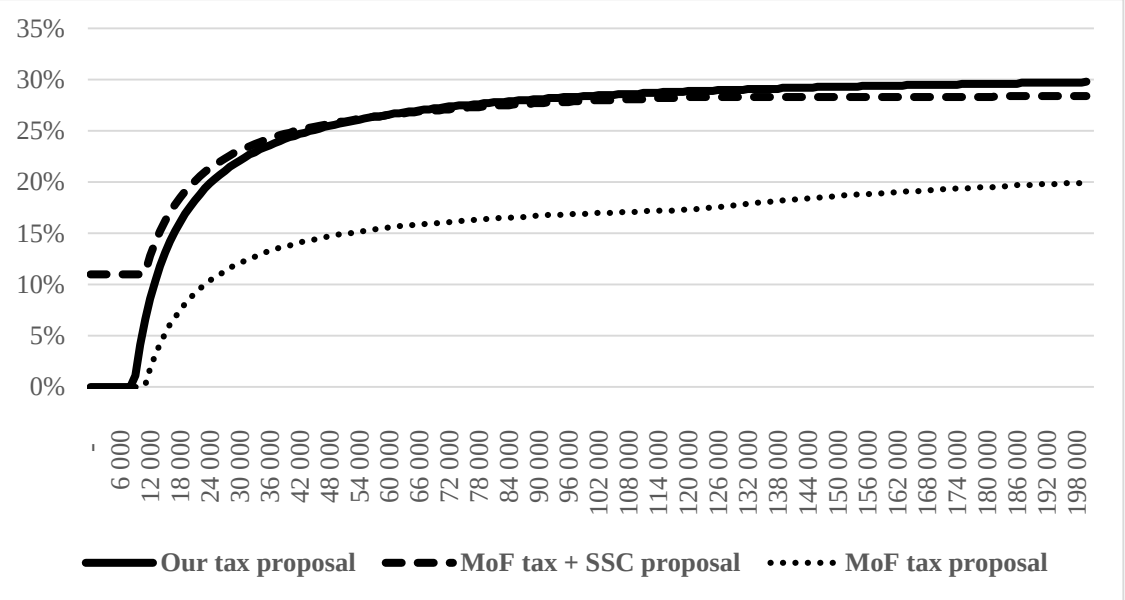
If the government concludes on the possibility of tax reductions, it is certainly expedient to do so without unnecessary delay, i.e. from 2019 onwards. However, we have a much simpler proposal how to increase the personal income tax progressivity to its original level in 2008, or more. In particular: to increase the basic tax credit to e.g. 9% of NAE – see above. It would be easy to implement the integration of employee premiums into the personal income tax, not only to simplify the tax system – see above. At least equally important reason for this integration is a significant potential impact on maternal employment: higher employment is prevented by the fact, that premiums are collected from the first (one hundred) crowns of income. The tax credit for a dependent wife could be abolished with the same purpose (KDU-ČSL party in particular will be against such proposal).

The ministerial proposal and our proposal to integrate both taxes and increase the basic tax credit to 9% of NAE under the conditions of 2018 is presented in Figure 1. There is a visible, albeit not a fully fundamental, difference due to the valorisation of the tax credit: this will increase the progressivity of the personal income taxation to its original level in 2008, or to the international average. We cannot estimate the impact of our proposal

on the balance of the state budget, but we are mainly concerned with the principle here: priority should be given to the increase of the basic tax credit alone before the ministerial proposal itself. However, if the tax burden can be further reduced, a broader rationalisation of the system should be prior to (then only a self-serving) technical change in the tax base.

Coincidentally, the implementation of the 19% personal income tax rate, the basic manoeuvre of the ministerial proposal, would in some ways bring about the implementation of Hall-Rabushka plan to introduce two income taxes with a single tax rate of 19% – the corporate income tax in our country has currently a flat rate of 19%. To complete the Hall-Rabushka neo-liberal concept, it would still be necessary to abolish the taxation of capital income (interest and dividends). Any joy of pushing Hall-Rabushka plan through is a bit spoiled by the fact that Hall has distanced himself from the youthful idea of unifying tax rates. „Instead of the single positive rate of 19 percent that Rabushka and I proposed in 1981, rates of say 15 and 30 percent would come closer to matching the distribution of the burden of the personal and corporate income taxes in the United States." (Hall, 2008). In any case, we do not have to force the introduction of 2 personal income tax rates without adequate analysis of completely different Czech conditions.

Figure 8: Average single childless employee income taxation: 2 proposals



Source: Own elaboration.

Conclusions

Czechia and other post-communist countries have high social security contributions and low personal income taxation. Czech social security contributions are mainly proportional payroll taxes, except for Czech pension insurance, which has very high earnings ceiling for the calculation of premiums (400% of NAE) and only about one third of the premiums has the character of social insurance. The rate of existing healthcare tax (13.5% of gross wage) is several times the cost of employee healthcare, and in the next tax reform, the payment of this payroll tax can be entirely transferred to the employer. The advantage of the overwhelming tax character of pension insurance contributions is the possibility and effectiveness of reducing its rate by 11% of gross wages, which allows the inclusion of the existing social security contributions paid by employees to personal income tax; it is at the same time possible to offset the existing solidary income tax surcharge with the earnings ceiling in the pension insurance premium paid by the employees. Regardless of other possible social reforms, wage taxation in the widest sense of the word can be significantly simplified.

Taxing super-gross wages is a neo-liberal concept that has not been successfully established in any other country. By integrating a portion of the premiums into the income tax, this concept will disappear in our country. Without major tax reform, however, it makes no sense to change the tax base of the Czech personal income tax; this also applies to the ministerial proposal for reform from 1 January 2019, as its sole purpose is to reduce today's low nominal rate of personal income tax with reference to the positive development of the economy. At the same time, the same objective can be achieved simply by increasing the basic tax credit. In addition, this increase is more than desirable in order to increase the progressivity of total wage taxation for employees to a level in 2008 when purely political reasons have introduced a system of taxation of super-gross wages at a rate of 15%.

The self-employed income taxation is low in our country and there are no reasons for the continuation of this policy in the future. However, this is a very sensitive issue and therefore no sudden changes can be expected, after all it is also a wider issue, including the issue of cost deductions and value-added taxation ceilings. In case of increasing the labour income tax rate in connection with the inclusion of 11% social security contributions into this tax, the new income tax rate will also apply to the self-employed persons. While reforming the payroll taxation, we can assume the unification of the assessment base of the reduced pension insurance premiums to 50% of the surplus over the expenses of the self-employed, as is the case with health insurance premiums. We do not see any reason for collecting the contribution to the state employment policy from self-employed. When introducing the deduction of the social security contributions from the personal income tax base, the resulting net income of the self-employed in the model example is still favourable for them.

If it is possible and expedient to reduce the burden of the overall personal income taxation, then it is desirable to link this reduction to the rationalisation of tax expenditures. This way, it is possible to compensate for the desirable abolishing or substantial reduction of the state support for selected financial products.

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